

#### Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations Date of issue: 07/23/2015 Version: 2.0

SECTION 4. Identification				
SECTION 1: Identification				
1.1. Identification				
Product form	: Mixture			
Product name	: Isoflurane (1.00% 65.00%), Oxyger			0% - 49.49%), Nitrous Oxide (30.00% -
Product code	: HC-2005-03520			
1.2. Relevant identified uses of the s			against	
Use of the substance/mixture	: Test gas/Calibra	tion gas.		
1.3. Details of the supplier of the safe	ety data sheet			
Air Liquide 9811 Katy Freeway, Suite 100 Houston, TX 77024 - USA T 1-800-819-1704 www.us.airliquide.com				
1.4. Emergency telephone number				
Emergency number	: CHEMTREC: 1-	800-424-9300		
SECTION 2: Hazard(s) identification	on			
2.1. Classification of the substance of	or mixture			
GHS-US classification				
Ox. Gas 1	H270 -		May ca	ause or intensify fire; oxidizer
Compressed gas	H280 -			ns gas under pressure; may explode if heated
Repr. 2	H361 -		(Inhala	cted of damaging fertility or the unborn child tion)
STOT SE 3 STOT RE 2	H336 - H373 -		May ca May ca	ause drowsiness or dizziness ause damage to organs (lung) through prolonged or
Full text of H-phrases: see section 16			repeate	ed exposure (Inhalation)
·				
2.2. Label elements				
GHS-US labeling	•	•	•	
Hazard pictograms (GHS-US)		$\diamond$		
	GHS03	GHS04	GHS07	GHS08
Signal word (GHS-US)	: Danger : H270 - May caus	o or intoncify for	. ovidizor	
Hazard statements (GHS-US)	H280 - Contains H336 - May caus H361 - Suspecte	gas under press se drowsiness or d of damaging fe se damage to org y displace oxyge	ure; may exploc dizziness ertility or the unb jans (lung) throu n and cause rap	oorn child (Inhalation) ugh prolonged or repeated exposure pid suffocation
Precautionary statements (GHS-US)	P220 - Keep/Sto P244 - Keep red P260 - Do not br P271 - Use only P280 - Wear eye P304+P340 - If ir	re away from cor uction valves/val eathe gas outdoors or in a protection, face haled: Remove exposed or conce	nbustible mater ves and fittings well-ventilated a protection, prot person to fresh erned: Get media	free from oil and grease
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	P405 - Store locked up P501 - Dispose of contents/container regulations CGA-PG02 - Protect from sunlight wi CGA-PG05 - Use a back flow preven CGA-PG06 - Close valve after each u CGA-PG10 - Use only with equipmer CGA-PG14 - Approach suspected lea CGA-PG20 - Use only with equipmer CGA-PG21 - Open valve slowly CGA-PG22 - Use only with equipmer	hen ambient temperatu tive device in the piping use and when empty ht rated for cylinder pres ak area with caution ht of compatible materia	re exceeds 52°C (125°F) ssure als of construction
2.3. Other hazards			
No additional information available			
2.4. Unknown acute toxicity (GHS US	5)		
Not applicable			
SECTION 3: Composition/Informa 3.1. Substance Not applicable 3.2. Mixture			
Name	Product identifier	%	GHS-US classification
Nitrous oxide	(CAS No) 10024-97-2	30 - 65	Ox. Gas 1, H270 Liquefied gas, H280 STOT SE 3, H336
Oxygen	(CAS No) 7782-44-7	19.5 - 55	Ox. Gas 1, H270 Compressed gas, H280
Carbon dioxide	(CAS No) 124-38-9	3 - 49.49	Liquefied gas, H280
Nitrogen	(CAS No) 7727-37-9	0.01 - 46.5	Compressed gas, H280
Isoflurane	(CAS No) 26675-46-7	1 - 3	Acute Tox. 4 (Inhalation:gas), H332 Repr. 2, H361 STOT SE 3, H336 STOT RE 2, H373

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 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 : administration	Not known.
Chronic symptoms :	Suspected of damaging fertility. Suspected of damaging the unborn child. May cause damage to organs (lung) through prolonged or repeated exposure (Inhalation).

#### 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.

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5.2. Special hazards arising from the s	
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
Protection during firefighting	<ul> <li>or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.</li> <li>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.</li> </ul>
SECTION 6: Accidental release me	
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 contain	ment 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 o in a well-ventilated area.
Hygiene measures	: Do not eat, drink or smoke when using this product.
7.2. Conditions for safe storage, inclu	ding 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.
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#### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

Carbon dioxide (124-38-9)		
ACGIH	ACGIH TWA (ppm)	5000 ppm
ACGIH	ACGIH STEL (ppm)	30000 ppm

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Carbon dioxide (124-38-9)		
OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> ) 9000 mg/m <sup>3</sup>	
OSHA	5000 ppm	
Nitrous oxide (10024-97-2)		
ACGIH ACGIH TWA (ppm) 50 ppm		50 ppm

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. 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 Mildly pungent ethereal odor
Odor threshold	: No data available
рН	: 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
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

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#### 9.2. Other information

SECTION 10: Stability and reactivity

Additional information

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

10.1.	Reactivity
None k	nown.
10.2.	Chemical stability
Stable (	under normal conditions.
10.3.	Possibility of hazardous reactions
May rea	act violently with reducing agents. Can form explosive mixtures with flammable materials.
10.4.	Conditions to avoid
None u	nder recommended storage and handling conditions (see section 7).
10.5.	Incompatible materials
Combu	stible materials. Flammable materials. Reducing agents.
10.6.	Hazardous decomposition products
Under r	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

Isoflurane (26675-46-7)	
LD50 oral rat	5450 μl/kg
LC50 inhalation rat (ppm)	13249.8 ppm/4h
ATE US (gases)	13249.800 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
Oxygen (7782-44-7)	
LC50 inhalation rat (ppm)	800000 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	: Suspected of damaging fertility or the unborn child (Inhalation).
Specific target organ toxicity (single exposure)	: May cause drowsiness or dizziness.
Specific target organ toxicity (repeated exposure)	: May cause damage to organs (lung) through prolonged or repeated exposure (Inhalation).
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.
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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	:	Suspected of damaging fertility. Suspected of damaging the unborn child. May cause damage to organs (lung) through prolonged or repeated exposure (Inhalation).

#### 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.	
Oxygen (7782-44-7)		
Persistence and degradability	No ecological damage caused by this product.	
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.	
Oxygen (7782-44-7)		
Log Pow	Not applicable for inorganic gases.	
Bioaccumulative potential	No ecological damage caused by this product.	
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.	
Oxygen (7782-44-7)		
Ecology - soil	No ecological damage caused by this product.	
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.

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	ns
13.1. Waste treatment methods	
Naste 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.
Naste 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) n accordance with DOT	
Fransport document description	: UN3156 Compressed gas, oxidizing, n.o.s.
JN-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/rai 49 CFR 173.27)	
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	
OOT 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.
Other information	: No supplementary information available.
ſDG	
No additional information available	
Fransport by sea	
JN-No. (IMDG)	: 3156
Proper Shipping Name (IMDG)	: COMPRESSED GAS, OXIDIZING, N.O.S.
Class (IMDG)	: 2 - Gases
Air transport	
JN-No. (IATA)	: 3156
Proper Shipping Name (IATA) Class (IATA)	: COMPRESSED GAS, OXIDIZING, N.O.S. : 2
SECTION 15: Regulatory informatio	n
15.1. US Federal regulations	

#### Carbon dioxide (124-38-9)

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

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Nitrous oxide (10024-97-2)	
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	
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	
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

#### **National regulations**

Carbon dioxide (	124-38-9)
Listed on IECSC ( Listed on the Japa Listed on the Kore Listed on NZIoC (I Listed on PICCS (	6 (Australian Inventory of Chemical Substances) Inventory of Existing Chemical Substances Produced or Imported in China) nese ENCS (Existing & New Chemical Substances) inventory an ECL (Existing Chemicals List) New Zealand Inventory of Chemicals) Philippines Inventory of Chemicals and Chemical Substances) adian IDL (Ingredient Disclosure List)
Nitrous oxide (10	024-97-2)
Listed on IECSC ( Listed on the Japa Listed on the Kore Listed on NZIoC (I Listed on PICCS (	6 (Australian Inventory of Chemical Substances) Inventory of Existing Chemical Substances Produced or Imported in China) nese ENCS (Existing & New Chemical Substances) inventory an ECL (Existing Chemicals List) New Zealand Inventory of Chemicals) Philippines Inventory of Chemicals and Chemical Substances) adian IDL (Ingredient Disclosure List)
Oxygen (7782-44	-7)
Listed on IECSC ( Listed on the Kore Listed on NZIOC (I	S (Australian Inventory of Chemical Substances) Inventory of Existing Chemical Substances Produced or Imported in China) an ECL (Existing Chemicals List) New Zealand Inventory of Chemicals) Philippines Inventory of Chemicals and Chemical Substances)
Nitrogen (7727-37	7-9)
Listed on IECSC ( Listed on the Kore Listed on NZIOC (I	S (Australian Inventory of Chemical Substances) Inventory of Existing Chemical Substances Produced or Imported in China) an ECL (Existing Chemicals List) New Zealand Inventory of Chemicals) Philippines Inventory of Chemicals and Chemical Substances)
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#### 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	Non-significant risk level (NSRL)
No	Yes	Yes	No	
Carbon dioxide (124-38-9)				
U.S Massachusetts - Rigl	nt To Know List S Know Hazardous Substance L	ist		
Nitrous oxide (10024-97-2	)			
U.S Massachusetts - Righ U.S New Jersey - Right to U.S Pennsylvania - RTK	o Know Hazardous Substance L	ist		
Oxygen (7782-44-7)				
U.S Massachusetts - Righ U.S New Jersey - Right to U.S Pennsylvania - RTK	o Know Hazardous Substance L	ist		
Nitrogen (7727-37-9)				
U.S Massachusetts - Righ U.S New Jersey - Right to U.S Pennsylvania - RTK	o Know Hazardous Substance L	ist		
SECTION 16: Other in	formation			
ndication of changes	: Revised	safety data sheet in accordar ated March 26, 2012.	nce with OSHA final rule on GH	S implementation
Other information		910.1200. Other government r	suant to OSHA's Hazard Comm regulations must be reviewed fo	

#### Full text of H-phrases:

Acute Tox. 4 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 4	
Compressed gas	Gases under pressure Compressed gas	
Liquefied gas	Gases under pressure Liquefied gas	
Ox. Gas 1	Oxidizing gases Category 1	
Repr. 2	Reproductive toxicity Category 2	
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2	
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	
H332	Harmful if inhaled	
H336	May cause drowsiness or dizziness	
H361	Suspected of damaging fertility or the unborn child	
H373	May cause damage to organs through prolonged or repeated	
	exposure	

#### 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.