Carbon Monoxide (0.0001%-0.0999%); Pentane (0.0001%-0.75%); Oxygen (0.0001%-19.49%) in Nitrogen

Issue date March 1, 2015

Reviewed date November 1, 2023

Safety Data Sheet

SDS ID# 4045

Section 1. IDENTIFICATION

1.1. Product identifier

Product form : Mixture

Product name : Carbon Monoxide (0.0001%-0.0999%); Pentane (0.0001%-0.75%); Oxygen (0.0001%-19.49%) in Nitrogen

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

Product use : Calibration gas/Bumptest gas/Function test gas

1.3. Details of the supplier of the safety data sheet

Intermountain Specialty Gases
21913 Cobalt Ave.
Caldwell, Idaho 83605
Telephone 1-208-585-5829 or Toll free 1-800-552-5003
www.isgases.com

1.4. Emergency telephone number

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

Section 2. HAZARDS INDENTIFICATION

2.1. Classification of the substance or mixture

Classification : GASES UNDER PRESSURE - Compressed gas
: SIMPLE ASPHYXIANTS - YES

2.2. Label elements

Hazard pictograms

Signal word : WARNING

Hazard statements : H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
: OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.
: OSHA - PG01 - DO NOT REMOVE THIS PRODUCT LABEL

Precautionary statements

[General] : Read and follow all Safety Data Sheets (SDS's) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have a product container or label at

hand. Use equipment rated for cylinder pressure.

[Prevention]	: P202 - Do not handle until all safety precautions have been read and understood : P308+P313 - If exposed or concerned: Get medical advice/attention. : P271+P403- Use only outdoors or in a well-ventilated area
[Response]	: P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing. : P313 - Get medical advice/attention.
[Storage]	: CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)
[Disposal]	: Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity

No data available

Section 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Not applicable

3.2. Mixture

Name	Product Identifier	%
Nitrogen	(CAS No) 7727-37-9	80.4101 - 99.9997
Oxygen	(CAS No) 7782-44-7	0.0001 - 19.49
Pentane	(CAS No) 109-66-0	0.0001 - 0.75
Carbon Monoxide	(CAS No) 630-08-0	0.0001 - 0.0999

Section 4. FIRST AID MEASURES

4.1. Description of first aid measures

General	: IF exposed or concerned: Get medical advice/attention.
Inhalation	: Remove to fresh air and keep at rest in a position comfortable for breathing. If breathing has stopped, give artificial respiration or oxygen by trained personnel. If victim feels unwell, seek medical advice.
Skin contact	: Immediately flush with copious amount of water for at least 15 minutes.
Eye contact	: Immediately flush with copious amount of water for at least 15 minutes.
Ingestion	: Ingestion is not considered a potential route of exposure, refer to the inhalation section.

4.2. Most important symptoms/effects, acute and delayed

Acute

Inhalation	: May displace oxygen and cause rapid suffocation.
Skin contact	: Contact with rapidly expanding gas may cause burns or frostbite.

Eye contact	: Contact with rapidly expanding gas may cause burns or frostbite.
Ingestion	: Ingestion is not considered a potential route of exposure, refer to the inhalation section.
Frostbite	: Thaw frosted parts with lukewarm water. Do not rub affected areas. Get immediate medical advice/attention.
Symptoms/injuries upon intravenous administration	: Symptoms of overexposure are dizziness, headache, tiredness, nausea, unconsciousness, cessation of breathing.
Chronic symptoms	: Adverse effects not expected from this product.
Delayed	: Adverse effects not expected from this product.

4.3. Indication of any immediate medical attention and special treatment needed

If victim feels unwell, seek medical advice. If breathing is difficult, give artificial respiration or oxygen by trained personnel.

Section 5. FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media	: Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media	: None known

5.2. Special hazards arising from the substance or mixture

Fire hazard	: The product is not flammable
Explosion hazard	: Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.
Reactivity	: None known.

5.3. Advice for fire-fighters

Firefighting instructions	: In case of fire: Evacuate all personnel from the danger area. Stop the leak and flow of gas before extinguishing fire, if safe to do so. If this is not possible, withdraw from area and allow fire to burn. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Let the fire burn. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Exercise caution when fighting any chemical fire.
Protection during firefighting	: Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus, SCBA) 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.

6.1.12. 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. See information above "For non-emergency personnel".

6.2. Methods and material for containment and cleaning up

For containment	: Immediately contact emergency personnel. Try to stop gas leak if safe to do so.
Methods for cleaning up	:Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Precautions for safety handling	: Pressurized container: Do not pierce or burn, even after use. Use equipment rated for cylinder pressure. Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Protect cylinders from physical damage; do not drag, roll, slide, or drop.
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	: Do not expose to temperatures exceeding 52°C (125°F). Keep containers closed when not in use. Protect cylinder from physical damage. Store in well ventilated area.
Incompatible products	: None known.
Incompatible materials	: None known.

Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Nitrogen (7727-37-9)

OSHA PEL		Cal/OSHA PEL	NIOSH REL	ACGIH 2015 TLV
		(as of 4/26/13)	(as of 4/26/13)	
ppm	mg/m^3	8-hour TWA (ST) STEL (C) Ceiling	up to 10-hour TWA (ST) STEL (C) Ceiling	8-hour TWA (ST) STEL (C) Ceiling
Not established	*Not established*	*Not established*	*Not established*	Simple asphyxiant

Oxygen (7782-44-7)

OSHA PEL		Cal/OSHA PEL	NIOSH REL	ACGIH 2015 TLV
		(as of 4/26/13)	(as of 4/26/13)	
ppm	mg/m^3	8-hour TWA (ST) STEL (C) Ceiling	up to 10-hour TWA (ST) STEL (C) Ceiling	8-hour TWA (ST) STEL (C) Ceiling

There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained

above 19.5%.

Pentane (109-66-0)

OSHA PEL		Cal/OSHA PEL	NIOSH REL	ACGIH 2015 TLV
		(as of 3/1/1989)	(as of 4/26/13)	
ppm	mg/m^3	8-hour TWA (ST) STEL (C) Ceiling	up to 10-hour TWA (ST) STEL (C) Ceiling	8-hour TWA (ST) STEL (C) Ceiling
1,000 ppm	2,950 mg/m^3	600 ppm	120 ppm	600 ppm
		750 ppm [15 min]	(IDLH): 1,500 ppm	
			(C) 610 ppm [15-min]	

Carbon Monoxide (630-08-0)

OSHA PEL		Cal/OSHA PEL	NIOSH REL	ACGIH 2015 TLV
		(as of 4/26/13)	(as of 4/26/13)	
ppm	mg/m^3	8-hour TWA (ST) STEL (C) Ceiling	up to 10-hour TWA (ST) STEL (C) Ceiling (IDHL) Immediately Dangerous to Life or Health	8-hour TWA (ST) STEL (C) Ceiling
50 ppm	55 mg/m^3	25 ppm	35 ppm	25 ppm
		(C) 200 ppm	(C) 200 ppm	
			(IDLH) 1,200 ppm	

8.2. Appropriate engineering controls

Engineering measures/controls : Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly check for leakages. Ensure exposure is below occupational exposure limits. Oxygen detectors should be used when asphyxiating gases may me released. Consider work permit system e.g. for maintenance activities.

8.3. Individual protection measures

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 : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary.

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. Exposure controls

Appearance	: Clear, colorless gas.
Physical state	: Gas
Color	: Colorless
Odor	: Slight gasoline type odor
Odor threshold	: No data available
pH	: No data available
Freezing point	: No data available
Flash point	: No data available
Evaporation rate	: No data available
Flammability (solid, gas)	: Not Flammable - not combustible
Upper flammability	: 7.8% (Pentane)
Lower flammability	: 1.5% (Pentane)
Relative density	: No data available
Solubility	: No data available
Partition coefficient	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	: Not applicable

	Carbon Monoxide	Oxygen	Nitrogen	Pentane	
Molecular weight (grams)	58.12	32.00	28.013	72.14	
Boiling point	-0.5 °C	-182.9 °C	-196 °C	36 °C	
Vapor pressure	2200 hPa @ 20 °C	Above critical temperature	Above critical temperature	1100 hPa @38°C	
Vapor density at 20°C	2.11	1.11	0.97	2.5	
Relative gas density	2.52 @ 15 °C	1.331	1.153	3.228 kg/m^3 @ 15 °C	
Critical Temperature	152.03 °C	-118.6 °C	-146.9 °C	°C	

Section 10. STABILITY AND REACTIVITY

10.1. Reactivity

No reactivity hazard other than the effects described below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

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

10.4. Conditions to avoid

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

10.5. Incompatible materials

None known

10.6. Hazardous decomposition products

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

Section 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Nitrogen (7727-37-9)	
LC50 inhalation rat (ppm)	410,000 ppm/4h

Oxygen (7782-44-7)	
LC50 inhalation rat (ppm)	400,000 ppm/4h

Carbon Monoxide (630-08-0)	
LC50 inhalation rat (ppm)	3,760 ppm/1h
LC50 inhalation rat (ppm)	1,807 ppm/4h

Pentane (109-66-0)	
LC50 inhalation Vapor rat (ppm)	364 g/m3 /4 hours

11.1. Information on routes of exposure

Inhalation	: May displace oxygen and cause rapid suffocation.
Skin contact	: Adverse effects not expected from this product
Eye contact	: May cause irritation.
Ingestion	: Ingestion is not considered a potential route of exposure

11.2. Symptoms related to physical, chemical and toxicological characteristics

Symptoms	Simple asphyxiant. May cause suffocation by displacing the oxygen in the air. Exposure to oxygen-deficient atmosphere (<=18%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury

11.3. Delayed and immediate effects

Skin corrosion/irritation	: Contact with rapidly expanding gas may cause burns or frostbite.
Serious eye damage/irritation	: Contact with rapidly expanding gas may cause burns or frostbite.
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Genetic changes observed in mammalian cell assay systems at exposures of 1,500 to 2,500 ppm of carbon monoxide for 10 minutes.
Carcinogenicity	: Not classified
Reproductive toxicity	: Category 1A. Overexposure to carbon monoxide may decrease the likelihood of successful pregnancy. In rats treated with carbon monoxide, the rate of successful pregnancy in the control group was 100% whereas the rest of successful pregnancy in animals treated with 30 and 90 ppm of carbon monoxide was 69% and 38% respectively.

Developmental Toxicity	Mice exposed to concentrations of carbon monoxide at 65 ppm and higher demonstrated doe-dependent effects on the fetus (increased mortality and decreased weight) with no signs of maternal toxicity. Offspring of rats exposed to 150 ppm carbon monoxide had minor reductions in birth weight and persistent memory deficits which became more pronounced in adulthood.
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: Genetic changes observed in mammalian cell assay systems at exposures of 1,500 to 2,500 ppm of carbon monoxide for 10 minutes : Central vascular system (CVS), Lungs, Blood, Central nervous system (CNS)
Aspiration hazard	: Not classified Not applicable for gases and gas-mixtures

11.4. Carcinogenic effects

The components of this material are not found on the following lists: FEDERAL OSHA Z LIST, NTP AND IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

Section 12. ECOLOGICAL INFORMATION

12.1. Aquatic Toxicity

Ecology - general : No ecological damage caused by this product

12.2. Persistence and degradability

No information available for the product

12.3. Bioaccumulative potential

Pentane (109-66-0)

$LogP_{ow}$	3.45
BCF	171
Potential	low

12.4. Mobility in soil

No information available for the product

12.5. Other

No information available for the product

Section 13. DISPOSAL CONSIDERATIONS

13.1. Disposal methods

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

Section 14. TRANSPORATION INFORMATION

	US DOT	TDG	IMDG	IATA
UN #	UN 1956	UN 1956	UN 1956	UN 1956

Proper shipping name	Compressed gas, n.o.s. (Nitrogen, Oxygen)	Compressed gas, n.o.s. (Nitrogen, Oxygen)	Compressed gas, n.o.s. (Nitrogen, Oxygen)	Compressed gas, n.o.s. (Nitrogen, Oxygen)
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-
Environment	No.	No.	No.	No.

Section 15. REGULATORY INFORMATION

15.1. US Federal regulations

SARA 311/312 hazard categories

Acute Health : No
Chronic Health : Yes
Fire : No
Pressure : Yes
Reactive : No

SARA Title III Notifications and Information: None known	
This product does not contain toxic chemicals subject to reporting requirements of section 313 of the Emergency planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372.	
SARA 311/312	Sudden Release of Pressure Hazard

15.2. US State regulations

Nitrogen (007727-37-9)
U.S. - Massachusetts - Right To Know List
U.S. - Minnesota - Right To Know Hazardous Substance List
U.S. - New Jersey - Right To Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right To Know) List
Oxygen (007782-44-7)
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
Pentane (109-66-0)
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
Carbon Monoxide (630-08-0)
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

U.S. - California Proposition 65 (Developmental)

Section 16. OTHER INFORMATION

Date of issue/Date of revision	11/1/2023
Revision Note	

Hazardous Material Information System (USA)

Hazard Scale	: 0 = Minimal/ 1 = Slight/ 2 = Moderate/ 3 = Serious/ 4 = Severe
Health	: 1
Fire	: 0
Physical hazards	: 3

Key/Legend

SARA	Superfund Amendments and Reauthorization Act
OSHA	Occupational Safety and Health Administration
DOT	Department of Transportation
TSCA	Toxic Substance Control Act
NTP	National Toxicology Program
ACGIH	American Conference of Governmental Industrial Hygienists
PEL	Permissible Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TDG	Transportation of Dangerous Goods
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
TWA	Time Weighted Average
Prop	Proposition
ATE	Acute Toxicity Estimate

DISCLAIMER OF EXPRESSED AND IMPLIED WARRATIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose (s).