Date of Issue:
06 December 2021

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 2658a
SRM Name: Oxygen in Nitrogen (Nominal Amount-of-Substance Fraction 10 % mol/mol)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This SRM is intended for use in producing metrologically traceable secondary standards for the calibration of instruments used for oxygen determinations. This SRM is a primary gas mixture supplied in a DOT 3AL-specification aluminum (6061 alloy) cylinder with a water volume of 6 L. Mixtures are shipped with a nominal pressure exceeding 12.4 MPa (1800 psig), which provides the user with 0.73 m^3 (25.8 ft^3) of useable mixture. The cylinder is the property of the purchaser and is equipped with a CGA-590 brass valve, which is the recommended outlet for this oxygen mixture.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
E-mail: SRMMSDS@nist.gov
Website: https://www.nist.gov/srm

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

2. Hazards Identification

Classification

Physical Hazard: Compressed Gas
Health Hazard: Simple Asphyxiant

Label Elements

Symbol

Signal Word

WARNING

Hazard Statement(s)

H280	Contains gas under pressure; may explode if heated.
------	May displace oxygen and cause rapid suffocation.

Precautionary Statement(s)

P410+P403	Protect from sunlight. Store in a well-ventilated place.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. Composition and Information on Hazardous Ingredients

Substance: Oxygen in nitrogen, compressed gas

Other Designations:

Oxygen: dioxygen, oxygen molecule.
Nitrogen: Dinitrogen; nitrogen compressed.

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Nitrogen	7727-37-9	231-783-9	90
Oxygen	7782-44-7	231-956-9	10

4. First Aid Measures

Description of First Aid Measures

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Cleanshoes thoroughly before reuse.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Ingestion of a gas is unlikely.

Most Important Symptoms/Effects, Acute and Delayed: Potentially fatal if inhaled.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek immediate medical attention.

5. Fire Fighting Measures

Fire and Explosion Hazards: Negligible fire hazard applicable to the identified NIST cylinder. Cylinders may rupture or explode if exposed to heat. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Use extinguishing media appropriate to the surrounding fire.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: Oxides of carbon.

Special Protective Equipment and Precautions for Fire-Fighters: Move cylinder from fire area if it can be done without personal risk. Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection". Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Methods and Materials for Containment and Clean up: Stop leak if possible without personal risk. Isolate hazard area and deny entry. Stay upwind and keep out of low areas.

7. Handling and Storage

Safe Handling Precautions: Close valve after each use and when empty. Keep valve protection cap on cylinder when not in use.

Storage: Store and handle in accordance with all current regulations and standards. Secure cylinder to prevent physical damage. Keep separated from incompatible substances (see Section 10, "Stability and Reactivity"). Store in well-ventilated area. Subject to storage regulations, OSHA 29 CFR 1910.101.

8. Exposure Controls and Personal Protection

Exposure Limits			
Components	**OSHA (PEL)**	**ACGIH (TLV)**	**NIOSH (REL)**
Nitrogen	simple asphxiant		
Oxygen	no occupational exposure limits established		

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eyewash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties

Appearance (physical state, color, etc.)	colorless compressed gas
Molecular Formula	not applicable
Molar Mass (g/mol)	not applicable
Odor	odorless
Odor threshold	not available
pH	not applicable
Evaporation rate	not applicable
Melting point/freezing point	–210 ºC (–346 ºF) (Nitrogen)
Density	1.2506 g/L (Nitrogen)
Vapor Pressure	760 mmHg at –196 ºC (Nitrogen)
Vapor Density (air = 1)	0.967 (Nitrogen)
Viscosity (cP)	0.01787 at 27 ºC (Nitrogen)
Solubility(ies)	water (1.6 % at 20 ºC) (Nitrogen) liquid ammonia (Nitrogen)
Partition coefficient (n-octanol/water)	not available

Thermal Stability Properties

Autoignition Temperature	not applicable
Thermal Decomposition	not applicable
Initial boiling point and boiling range	–196 ºC (–321 ºF) (Nitrogen)
Explosive Limits, LEL	not applicable
Explosive Limits, UEL	not applicable
Flash Point	not applicable
Flammability (solid, gas)	not applicable

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal pressure and temperature.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid heat, flames, sparks, and other sources of ignition. Minimize contact with material. Containers may rupture or explode if exposed to heat.

Incompatible Materials: No data available.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Miscellaneous decomposition products.

Hazardous Polymerization: _____ Will Occur __X__ Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: __X__ Inhalation _____ Skin _____ Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Nausea, headache, weakness, drowsiness.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Nitrogen compressed gas is a simple asphyxiant. Release in an enclosed space may result in asphyxiation. The symptoms of asphyxia depend on the rapidity with which the oxygen deficiency develops and how long it continues. In sudden acute asphyxia, unconsciousness may be immediate. With slow development, there may be rapid respiration and pulse, air hunger, dizziness, reduced awareness, tightness in the head, tingling sensations, incoordination, faulty judgment, emotional instability, and rapid fatigue. As the asphyxia progresses, nausea, vomiting, collapse, unconsciousness, convulsions, deep coma, and death are possible.

Skin Contact: No information on significant adverse effects.

Eye Contact: No information on significant adverse effects.

Ingestion: Ingestion of a gas is unlikely under normal conditions of use.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified.

Skin Corrosion/Irritation: Not applicable.

Serious Eye Damage/Eye Irritation: Not applicable.

Respiratory Sensitization: No data available.

Skin Sensitization: No data available.

Germ Cell Mutagenicity: Not classified.

Carcinogenicity: Not classified.

Listed as a Carcinogen/Potential Carcinogen _____ Yes __X__ No
Oxygen and nitrogen are not listed by NTP, IARC or OSHA as a carcinogen/potential carcinogen.

Reproductive Toxicity: Not classified.

Specific Target Organ Toxicity, Single Exposure: Not classified.

Specific Target Organ Toxicity, Repeated Exposure: Not classified.

Aspiration Hazard: No data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: No data available.

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: UN1956; compressed gas, n.o.s. (oxygen in nitrogen); Hazard Class 2.2.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Identified cylinder not regulated.

SARA Title III Section 302 (40 CFR 355.30): Identified cylinder not regulated.

SARA Title III Section 304 (40 CFR 355.40): Identified cylinder not regulated.

SARA Title III Section 313 (40 CFR 372.65): Identified cylinder not regulated.

OSHA Process Safety (29 CFR 1910.119): Identified cylinder not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	No.
CHRONIC HEALTH:	No.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	Yes.

State Regulations:

California Proposition 65: Not regulated.

U.S. TSCA Inventory: Oxygen and nitrogen are listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations: WHMIS Information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 06 December 2021

Sources: ChemADVISOR, Inc., SDS, *Nitrogen, Compressed Gas*, 09 December 2015.

ChemADVISOR, Inc., SDS, *Oxygen, Compressed Gas*, 09 December 2015.

Vendor SDS, Airgas, *Nonflammable Gas Mixture: Nitrogen 80.5-99.9999% / Oxygen 1ppb-19.5%*, 02 October 2018.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NTP	National Toxicology Program
ALI	Annual Limit on Intake	OSHA	Occupational Safety and Health Administration
CAS	Chemical Abstracts Service	PEL	Permissible Exposure Limit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	RCRA	Resource Conservation and Recovery Act
CFR	Code of Federal Regulations	REL	Recommended Exposure Limit
DOT	Department of Transportation	RM	Reference Material
EC50	Effective Concentration, 50 %	RQ	Reportable Quantity
EINECS	European Inventory of Existing Commercial Chemical Substances	RTECS	Registry of Toxic Effects of Chemical Substances
EPCRA	Emergency Planning and Community Right-to-Know Act	SARA	Superfund Amendments and Reauthorization Act
IARC	International Agency for Research on Cancer	SCBA	Self-Contained Breathing Apparatus
IATA	International Air Transportation Agency	SRM	Standard Reference Material
IDLH	Immediately Dangerous to Life and Health	STEL	Short Term Exposure Limit
LC50	Lethal Concentration, 50 %	STOT	Specific Target Organ Toxicity
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
n.o.s.	Not Otherwise Specified	WHMIS	Workplace Hazardous Materials Information System
NRC	Nuclear Regulatory Commission		