NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

Date of Issue:
23 February 2026

SAFETY DATA SHEET

1. Substance and Source Identification

Product Identifier

SRM Number: 2659a
SRM Name: Oxygen in Nitrogen (Nominal Amount-of-Substance Fraction 21 % mol/mol)
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is a primary gas mixture of oxygen in nitrogen supplied in a DOT 3AL-specification aluminum (6061 alloy) cylinder with a water volume of 6 L. This SRM is intended for the calibration of instruments used for oxygen determinations and for other applications. 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: Not classified.

Label Elements

Symbol



Signal Word
Warning

Hazard Statement(s)
H280 Contains gas under pressure; may explode if heated.

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; molecular oxygen; O_2.
Nitrogen: Dinitrogen; nitrogen compressed; N_2.

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	79
Oxygen	7782-44-7	231-956-9	21

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: Not applicable.

Eye Contact: Not applicable.

Ingestion: Ingestion of a gas is unlikely.

Most Important Symptoms/Effects, Acute and Delayed: No adverse effects reported.

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 nitrogen.

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 handling in accordance with all current regulations and standards. Secure cylinder to prevent physical damage. Keep separated from incompatible substances (combustible materials, halo carbons, metals, bases, reducing agents, amines, metal salts, oxidizing materials). Store in well-ventilated area. Subject to storage regulations, OSHA 29 CFR 1910.101.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Oxygen: No occupational exposure limits established.
Nitrogen: ACGIH (TLV): Simple asphyxiant.

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

NOTE: The physical and chemical data provided are for the pure components. No physical or chemical data are available for this compressed gas mixture of nitrogen and oxygen.

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)
Relative Density (g/L)	1.2506 (Nitrogen)
Vapor Pressure (mmHg)	760 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; liquid ammonia (Nitrogen)
Partition coefficient (n-octanol/water)	Not available

Thermal Stability Properties

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

10. STABILITY AND REACTIVITY

Reactivity: This material is not reactive at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid combustible materials. Minimize contact with material. Containers may rupture or explode if exposed to heat.

Incompatible Materials: Combustible materials, halo carbons, metals, bases, reducing agents, amines, metal salts, oxidizing materials.

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: No adverse effects have been reported.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: No adverse effects have been reported.

Skin Contact: Not applicable.

Eye Contact: No adverse effects have been reported.

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

Numerical Measures of Toxicity:

Acute Toxicity:
Oxygen: No data available.
Nitrogen: Simple asphyxiant

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.
Oxygen: Human: 40 pph (4 d)
Nitrogen: Not data available.

Carcinogenicity: Not classified.

Listed as a Carcinogen/Potential Carcinogen _____ Yes X No

Neither nitrogen nor oxygen is listed by NTP, IARC, or OSHA as a carcinogen.

Reproductive Toxicity: Not classified.
Oxygen: Rat Inhalation TCLo: 10 pph (9 h, pregnant 22 d)
Woman Inhalation TCLo: 12 pph (10 min, pregnant 26 weeks to 39 weeks)
Note: Adverse health effects begin once the oxygen level of breathable air drops below 19.5 %.

Nitrogen: Not data available.

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: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 23 February 2026

Sources:

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

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

Vendor SDS, *Airgas Nonflammable Gas Mixture: Nitrogen 76.5-80.5% / Oxygen 19.5-23.5%*, 22 November 2017.

National Oceanic and Atmospheric Agency, CAMEO Chemicals Database, Oxygen, CAS No. 7782-44-7, CRIS Code: OXY; available at https://cameochemicals.noaa.gov/chris/OXY.pdf (accessed Feb 2026).

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOT	Department of Transportation
EINECS	European Inventory of Existing Commercial Chemical Substances
EPCRA	Emergency Planning and Community Right-to-Know Act
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IDLH	Immediately Dangerous to Life and Health
LC50	Lethal Concentration
LD50	Median Lethal Dose or Lethal Dose, 50 %
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit
RQ	Reportable Quantity
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments and Reauthorization Act
SCBA	Self-Contained Breathing Apparatus
SRM	Standard Reference Material
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TPQ	Threshold Planning Quantity
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
UEL	Upper Explosive Limit
WHMIS	Workplace Hazardous Materials Information System

Disclaimer: The NIST SDS information is specific to the NIST product and is believed to be correct, based upon our current knowledge. The SDS may not necessarily be all inclusive and should be used only as a guide. NIST does not guarantee the accuracy or completeness of this information. The only official source for specific values and uncertainties is the certificate or report.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; e-mail srmmsds@nist.gov; or via the Internet at https://www.nist.gov/srm.