Date of Issue:
25 July 2014

# SAFETY DATA SHEET

## 1. Substance and Source Identification

**Product Identifier**

**SRM Number:** 2644a
**SRM Name:** Propane in Nitrogen (Nominal Amount-of-Substance Fraction 250 µmol/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 propane in nitrogen provided as a compressed gas in a DOT 3AL-specification aluminum (6061 alloy) cylinder equipped with a CGA-350 brass valve at a nominal pressure of 11.0 MPa (1600 psi). NIST recommends that this cylinder **NOT** be used below 0.7 MPa (100 psi).

**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
FAX: 301-948-3730
E-mail: SRMMSDS@nist.gov
Website: http://www.nist.gov/srm

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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:** Propane in nitrogen, compressed gas

**Other Designations:**

Propane: dimethylmethane; propyl hydride; $C_3H_8$.
Nitrogen: Dinitrogen, nitrogen compressed.

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

| Hazardous Component(s) | CAS Number | EC Number (EINECS) | Nominal Mass Concentration (%) |
|---|---|---|---|
| Nitrogen | 7727-37-9 | 231-783-9 | >99 |
| Propane | 74-98-6 | 200-827-9 | <0.03 |

## 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:** Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed.

**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. As this product is a gas, refer to the inhalation section.

**Most Important Symptoms/Effects, Acute and Delayed:** Harmful if inhaled, blood damage, difficulty breathing, and suffocation.

**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, 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).

**NFPA Ratings** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1 Fire = 0 Reactivity = 0

## 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:** Use only with adequate ventilation. Do not puncture or incinerate container. 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 (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 | No occupational exposure limits | Simple asphyxiant | No occupational exposure limits |
| Propane | TWA: 1800 mg/m$^3$ (1000 ppm) | TWA: 1000 ppm | TWA: 1800 mg/m$^3$ (1000 ppm)<br>IDLH: 2100 ppm (10 % LEL)<br>Ceiling: 229 mg/m$^3$ (200 ppm) |

**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 29 CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

**Eye/Face Protection:** Wear safety goggles. An eye wash 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** | **Nitrogen (>99 %)** | **Propane (<0.03 %)** |
|---|---|---|
| **Appearance (physical state, color, etc.)** | colorless compressed gas | colorless compressed gas |
| **Molecular Formula** | $N_2$ | $C_3H_8$ |
| **Molar Mass (g/mol)** | 28 | 44.11 |
| **Odor** | odorless | distinct odor |
| **Odor threshold** | not available | 5 000 ppm to 20 000 ppm |
| **pH** | not applicable | not available |
| **Evaporation rate** | not applicable | not available |
| **Melting point/freezing point** | –210 ºC (–346 ºF) | –190 ºC (–310 ºF) |
| **Relative Density** | 1.2506 g/L | 0.5853 at –45 ºC (specific gravity) |
| **Vapor Pressure (mmHg)** | 760 at –196 ºC | 6536 at 20 ºC |
| **Vapor Density (air = 1)** | 0.967 | 1.55 |
| **Viscosity (cP)** | 0.01787 at 27 ºC | not available |
| **Solubility(ies)** | water, 1.6 % at 20 ºC; liquid ammonia | water, very slightly soluble; soluble in absolute alcohol, ether benzene, turpentine |
| **Partition coefficient (n-octanol/water)** | not available | not available |
| **Thermal Stability Properties** | | |
| **Autoignition Temperature** | not applicable | 450 ºC (842 ºF) |
| **Thermal Decomposition** | not applicable | not available |
| **Initial boiling point and boiling range** | –196 ºC (–321 ºF) | not available |
| **Explosive Limits, LEL** | not applicable | 2.1 % |
| **Explosive Limits, UEL** | not applicable | 9.5 % |
| **Flash Point** | not applicable | –105 ºC (–157 ºF) |
| **Flammability (solid, gas)** | not applicable | not available |

## 10. STABILITY AND REACTIVITY

**Reactivity:** Stable at normal temperature and pressure.

**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:** Oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium.

**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, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, disorientation, emotional disturbances, pain in extremities, tremors, loss of coordination, hearing loss, and visual disturbances.

**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. Propane may cause slight dizziness.

**Skin Contact:** No information on significant adverse effects.

**Eye Contact:** Exposure may result in irritation, blurred vision.

**Ingestion:** Ingestion of a gas is unlikely under normal conditions of use. As this product is a gas, refer to the inhalation section.

**Numerical Measures of Toxicity**

**Acute Toxicity:** Not classified, concentration of propane is below cut off value of 1 %.
Propane; Rat, Inhalation LC50: 658 mg/L (4 h)
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.

**Carcinogenicity:** Not classified.
**Listed as a Carcinogen/Potential Carcinogen** _____ Yes X No
Nitrogen and propane are not listed by NTP, IARC or OSHA as a carcinogen/potential carcinogen.

**Reproductive Toxicity:** Not classified; concentration of propane is below cut off value of 0.1 %.

**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. Propane subject to disposal regulations, U.S. EPA 40 CFR 262, Hazardous Waste Number: D001.

## 14. TRANSPORTATION INFORMATION

**U.S. DOT and IATA:** UN1956; Compressed gas, n.o.s. (Propane 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: | Yes. |
| CHRONIC HEALTH: | No. |
| FIRE: | No. |
| REACTIVE: | No. |
| PRESSURE: | Yes. |

**State Regulations:**

California Proposition 65: No components are listed.

**U.S. TSCA Inventory:** Propane and nitrogen are listed.

**TSCA 12(b), Export Notification:** No components are listed.

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

## 16. OTHER INFORMATION

**Issue Date:** 25 July 2014

**Sources:** ChemADVISOR, Inc., SDS, *Nitrogen, Compressed Gas*, 19 June 2014.

ChemADVISOR, Inc., SDS, *Propane*, 19 June 2014.

**Key of Acronyms:**

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

**Disclaimer:** Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

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; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at http://www.nist.gov/srm.