Method TO14 and TO15 Calibration Standards
Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Method TO14 and TO15 Calibration Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Code(s)</td>
<td>1541</td>
</tr>
<tr>
<td>UN-Number</td>
<td>UN1956</td>
</tr>
<tr>
<td>Recommended Use</td>
<td>Environmental</td>
</tr>
</tbody>
</table>

Supplier Address*
Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC
575 Mountain Ave.
Murray Hill, NJ 07974
Phone: 908-464-8100
www.lindeus.com

Linde Gas Puerto Rico, Inc.
Las Palmas Village
Road No. 869, Street No. 7
Catano, Puerto Rico 00962
Phone: 787-641-7445
www.pr.lindegas.com

Linde Canada Limited
5860 Chedworth Way
Mississauga, Ontario L5R 0A2
Phone: 905-501-1700
www.lindecanada.com

* May include subsidiaries or affiliate companies/ divisions.

For additional product information contact your local customer service.

Chemical Emergency Phone Number: Chemtrec: 1-800-424-9300 for US/ 703-527-3887 outside US

2. HAZARDS IDENTIFICATION

<table>
<thead>
<tr>
<th>WARNING!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Overview</td>
</tr>
</tbody>
</table>
Simple asphyxiant
Contents under pressure
Keep at temperatures below 52°C / 125°F

| Appearance | Colorless |
| Physical State | Compressed gas. |
| Odor | Odorless |

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

<table>
<thead>
<tr>
<th>Principle Routes of Exposure</th>
<th>Inhalation.</th>
</tr>
</thead>
</table>

| Acute Toxicity | |
|----------------||
|                | |

| * May include subsidiaries or affiliate companies/ divisions. |

For additional product information contact your local customer service.
Chronic Effects
None known

Aggravated Medical Conditions
None known.

Environmental Hazard
See Section 12 for additional Ecological Information.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Volume %</th>
<th>Chemical Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>7727-37-9</td>
<td>&gt; 99.99</td>
<td>N₂</td>
</tr>
</tbody>
</table>

Additional information: This MSDS is intended to cover various custom calibration gas standards that contain >99.9% nitrogen. Varying compositions of up to 80 volatile organic compounds may be present in this mix at concentrations up to and including 1 ppm. Please refer to cylinder certification for specific custom mix. The hazards associated with this product are due to its nitrogen content. Therefore, MSDS information is for pure nitrogen.

4. FIRST AID MEASURES

Eye Contact
If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.

Skin Contact
For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing.

Inhalation
PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF INHALATION OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious inhalation victims should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and, as necessary, given artificial resuscitation and supplemental oxygen. Treatment should be symptomatic and supportive.

Ingestion
None under normal use. Get medical attention if symptoms occur.

Notes to Physician
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties
Not flammable.

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Explosion Data

Sensitivity to Mechanical Impact  None
Sensitivity to Static Discharge  None
Specific Hazards Arising from the Chemical  Cylinders may rupture under extreme heat. Continue to cool fire exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists.
Protective Equipment and Precautions for Firefighters  As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/ NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions  Ensure adequate ventilation. Evacuate personnel to safe areas. Use personal protective equipment. Monitor oxygen level.
Environmental Precautions  Prevent spreading of vapors through sewers, ventilation systems and confined areas.
Methods for Containment  Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location.
Methods for Cleaning Up  Return cylinder to Linde or an authorized distributor.

7. HANDLING AND STORAGE

Handling  Use only in ventilated areas. Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use backflow preventive device in piping. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing leak to occur.

Use an adjustable strap wrench to remove over-tight or rusted caps. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.

Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

For additional recommendations consult Compressed Gas Association's (CGA) Safety Bulletin SB-2, Oxygen-Deficient Atmospheres.

Storage  Protect from physical damage. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Full and empty cylinders should be segregated. Use a "first-in-first-out" inventory system to prevent full cylinders from being stored for excessive periods of time. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION
Exposure Guidelines

This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures

Showers. Eyewash stations. Ventilation systems. Local exhaust ventilation to prevent accumulation of high concentrations and maintain air-oxygen levels at or above 19.5%.

Ventilation

Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/ Face Protection

Wear protective eyewear (safety glasses).

Skin and Body Protection

Work gloves and safety shoes are recommended when handling cylinders.

Respiratory Protection

General Use

No special protective equipment required.

Emergency Use

Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%).

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Colorless.</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>-209.9 °C / -345.9 °F</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>Very slight</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>No data available.</td>
</tr>
<tr>
<td>Gas Density</td>
<td>0.072 lb/ ft³ (1.153 kg/ m³) (@ 21.1°C)</td>
</tr>
<tr>
<td>Specific Vol. @ 21.1°C &amp; 1 atm</td>
<td>13.8 ft³/lb (0.867 m³/kg)</td>
</tr>
<tr>
<td>Flammability Limits in Air</td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Lower</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless.</td>
</tr>
<tr>
<td>Physical State</td>
<td>Compressed gas</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Boiling Point/ Boiling Range</td>
<td>-195.8 °C / -320.4 °F</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>28.01</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>0.97 (air = 1)</td>
</tr>
<tr>
<td>VOC Content (%)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Critical Pressure</td>
<td>492.9 psia (3399 kPa abs)</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability

Stable.

Incompatible Products

None known.

Conditions to Avoid

None known.

Hazardous Decomposition Products

None known.

Hazardous Polymerization

Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral: No information available.

LD50 Dermal: No information available.
### LC50 Inhalation:
No information available.

### Inhalation
Product is a simple asphyxiant.

### Repeated Dose Toxicity
No information available.

#### Chronic Toxicity

- **Chronic Toxicity**: None known.
- **Carcinogenicity**: Contains no ingredient listed as a carcinogen.

### Irritation
No information available.

### Sensitization
No information available.

### Reproductive Toxicity
No information available.

### Developmental Toxicity
Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

### Synergistic Materials
None known.

### Target Organ Effects
None known.

### 12. ECOLOGICAL INFORMATION

#### Ecotoxicity
The environmental impact of this product has not been fully investigated.

**Ozone depletion potential; ODP; (R-11 = 1)**: Does not contain ozone depleting chemical (40 CFR Part 82).

### 13. DISPOSAL CONSIDERATIONS

**Waste Disposal Methods**
Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Linde for proper disposal.

### 14. TRANSPORT INFORMATION

#### DOT

<table>
<thead>
<tr>
<th>Proper shipping name</th>
<th>Compressed gas, n.o.s.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Class</td>
<td>2.2</td>
</tr>
<tr>
<td>UN-Number</td>
<td>UN1956</td>
</tr>
<tr>
<td>Description</td>
<td>UN1956, Compressed gas, n.o.s. (&lt;TND00241&gt;), 2.2</td>
</tr>
<tr>
<td>Emergency Response Guide Number</td>
<td>126</td>
</tr>
</tbody>
</table>

#### TDG
Proper Shipping Name: Compressed gas, n.o.s.
Hazard Class: 2.2
UN-Number: UN1956
Description: UN1956, Compressed gas, n.o.s., 2.2

MEX
Proper Shipping Name: Compressed gas, n.o.s.
Hazard Class: 2.2
UN-Number: UN1956
Description: UN1956, Compressed gas, n.o.s.

IATA
UN-Number: UN1956
Proper Shipping Name: Compressed gas, n.o.s.
Hazard Class: 2.2
ERG Code: 2L
Description: UN1956, Compressed gas, n.o.s. (Nitrogen), 2.2

IMDG/IMO
Proper Shipping Name: Compressed gas, n.o.s.
Hazard Class: 2
UN-Number: UN1956
EmS No.: F-C, S-V
Description: UN1956, Compressed gas, n.o.s. (Nitrogen), 2.2

ADR
Proper Shipping Name: Compressed gas, n.o.s.
Hazard Class: 2
UN-Number: UN1956
Classification Code: 1A
Description: UN1956, Compressed gas, n.o.s. (Nitrogen), 2.2, (E)

15. REGULATORY INFORMATION

International Inventories

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TSCA</td>
<td>Complies</td>
</tr>
<tr>
<td>DSL</td>
<td>Complies</td>
</tr>
<tr>
<td>EINECS/ELINCS</td>
<td>Complies</td>
</tr>
</tbody>
</table>

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/ EU List of Notified Chemical Substances

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.
SARA 311/312 Hazard Categories

- Acute Health Hazard: No
- Chronic Health Hazard: No
- Fire Hazard: No
- Sudden Release of Pressure Hazard: Yes
- Reactive Hazard: No

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Risk and Process Safety Management Programs
This material, as supplied, does not contain any regulated substances with specified thresholds under 40 CFR Part 68. This product does not contain any substances regulated as Highly Hazardous Chemicals pursuant to the 29 CFR Part 1910.110.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)
This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990.

CERCLA/ SARA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>

International Regulations

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
A  Compressed gases
Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

**General Disclaimer**
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End of Safety Data Sheet