1. IDENTIFICATION

Product identifier

Product Name: CHLORINE TRIFLUORIDE

Other means of identification

Safety data sheet number: LIND-P031
UN/ID no.: UN1749
Synonyms: Chlorine fluoride

Recommended use of the chemical and restrictions on use

Recommended Use: Industrial and professional use.
Uses advised against: Consumer use

Details of the supplier of the safety data sheet

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.
Road 869, Km 1.8
Barrio Palmas, Catano, PR 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.

Emergency telephone number

Company Phone Number: 800-232-4726 (Linde National Operations Center, US)
905-501-0802 (Canada)
CHEMTREC: 1-800-424-9300 (North America) +1-703-527-3887 (International)
**Classification**

**OSHA Regulatory Status**
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity - Inhalation (Gases)</td>
<td>Category 2</td>
</tr>
<tr>
<td>Skin corrosion/ irritation</td>
<td>Category 1 Sub-category A</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Category 3</td>
</tr>
<tr>
<td>Oxidizing gases</td>
<td>Category 1</td>
</tr>
<tr>
<td>Gases under pressure</td>
<td>Liquefied gas</td>
</tr>
</tbody>
</table>

**Label elements**

- **Signal word**: Danger

**Hazard Statements**
May cause or intensify fire; oxidizer
Contains gas under pressure; may explode if heated
Fatal if inhaled
Causes severe skin burns and eye damage
Corrosive to the respiratory tract
Symptoms may be delayed
Extremely reactive

**Precautionary Statements - Prevention**
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Keep and store away from clothing and other combustible materials
Keep valves and fittings free from oil and grease
Do not breathe gas.
Do not get in eyes, on skin, or on clothing
Use and store only outdoors or in a well ventilated place
Wear protective gloves, protective clothing, eye protection, respiratory protection, and/ or face protection
Use a backflow preventive device in piping
Use only with equipment of compatible materials of construction and rated for cylinder pressure
Use only with equipment cleaned for oxygen service
Use only with equipment passivated before use
Use behind barricades with remote extensions on valves and regulators
Do not open valve until connected to equipment prepared for use
Open valve slowly
Close valve after each use and when empty
When returning cylinder, install leak tight valve outlet cap or plug

**Precautionary Statements - Response**
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower. If skin irritation occurs: Get
medical advice/attention.
If IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
In case of fire: Stop leak if safe to do so

Precautionary Statements - Storage
Store locked up
Protect from sunlight when ambient temperature exceeds 52°C/125°F

Precautionary Statements - Disposal
Dispose of contents/containers in accordance with container supplier/owner instructions

Hazards not otherwise classified (HNOC)
Not applicable

Other Information
Very toxic to aquatic life

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>Chlorine Trifluoride</td>
<td>7790-91-2</td>
<td>100</td>
<td>ClF₃</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Description of first aid measures

General advice
Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Inhalation
Remove to fresh air and keep comfortable for breathing. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get medical attention immediately.

Skin contact
Wash off immediately with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Dermal burns may be treated with calcium gluconate gel or slurry in water or glycerine. This compound binds the active fluorides in an insoluble form and limits burn extension and pain. Immediate medical attention is required.

Eye contact
Immediately flush eye with running water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area. Immediate medical attention is required.

Ingestion
Not an expected route of exposure.

Self-protection of the first aider
RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. Use personal protective equipment. Avoid contact with skin, eyes and clothing.

Most important symptoms and effects, both acute and delayed

Symptoms
Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. May cause burns of eyes, skin and mucous membranes. Symptoms may be delayed.

Indication of any immediate medical attention and special treatment needed
Note to physicians

For dermal exposure, the use of 2.5-33% calcium gluconate or carbonate gel or slurry has been recommended. The gel is either placed into a surgical glove into which the affected extremity is then placed or applied directly on the burn. This compound binds with the active fluorides in an insoluble form and limits burn extension and pain. Calcium chloride should not be used.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Dry chemical or CO2. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
DO NOT USE WATER. Water reactive.

Specific extinguishing methods
Continue to cool fire exposed cylinders until flames are extinguished. If water is necessary to fight fire, use in flooding quantities. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Damaged cylinders should be handled only by specialists.

Specific hazards arising from the chemical
Non-flammable gas. May cause or intensify fire; oxidizer. Will support and accelerate combustion of combustible materials (wood, paper, oil, debris, etc). The product causes burns of eyes, skin and mucous membranes. Chlorine trifluoride reacts violently with water to form chlorine and hydrofluoric acid. Thermal decomposition can lead to release of irritating and toxic gases and vapors. Cylinders may rupture under extreme heat.

Hazardous combustion products

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. Corrosive hazard. Wear chemically protective gloves/clothing and eye/face protection. Additional chemical protective clothing may be required to protect from toxic decomposition products.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions
Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. Monitor concentration of released product. Eliminate all ignition sources if safe to do so. Use personal protection recommended in Section 8. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

Other Information
Gas/vapor is heavier than air. Prevent from entering sewers, basements and workpits, or any place where accumulation may be dangerous.

Environmental precautions

Environmental precautions
Prevent spreading of vapors through sewers, ventilation systems and confined areas. Do not allow into any sewer, on the ground or into any body of water. Prevent product from entering drains. See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

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

**Precautions for safe handling**

**Advice on safe handling**

Always remove chlorine trifluoride from the cylinder as a gas. Do not connect cylinders of chlorine trifluoride directly to apparatus containing a liquid absorbing medium. Recommended materials for use with chlorine trifluoride are dry, highly fluorinated polymers such as Teflon® and Kel-F®, the metals used in storage containers (monel, copper and stainless steel) or gaskets (Teflon®). Wetted surfaces should be passivated with an "active" fluorine compound to establish a metal fluoride coating for additional protection. Keep equipment scrupulously dry. Many of the metal fluorides are water soluble so that the passive film corrosion protection may be destroyed if wetted with water. Use only equipment of compatible materials of construction. Keep valves and fittings free from oil and grease. Use only with equipment cleaned for oxygen service. Open valve slowly. "NO SMOKING" signs should be posted in storage and use areas. Separate flammable gas cylinders from oxygen and other oxidizers by a minimum distance of 20 ft. or by a 5 ft. high barrier with a minimum fire resistance rating of a half an hour.

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. Never attempt to lift a cylinder by its valve protection cap. 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. Use only with adequate ventilation. Use a backflow preventive device in piping. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Ensure the complete gas system has been checked for leaks before use.

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.

Only experienced and properly instructed persons should handle gases under pressure. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.

**Conditions for safe storage, including any incompatibilities**

**Storage Conditions**

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. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. 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. Stored containers should be periodically checked for general condition and leakage. Do not store near combustible materials.

**Incompatible materials**


8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Control parameters**

**Exposure Guidelines**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine Trifluoride 7790-91-2</td>
<td>TWA: 2.5 mg/ m³ F Ceiling: 0.1 ppm Ceiling: 0.4 mg/ m³</td>
<td>Ceiling: 0.1 ppm Ceiling: 0.4 mg/ m³</td>
<td>IDLH: 20 ppm Ceiling: 0.1 ppm Ceiling: 0.4 mg/ m³</td>
</tr>
</tbody>
</table>

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health

**Other Information**

Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir.,
Appropriate engineering controls

Engineering Controls

Showers. Eyewash stations. Ventilation systems. Exhaust gas should be vented to a gas treatment system. Consider installation of leak detection systems in areas of use and storage. Systems under pressure should be regularly checked for leakages.

Individual protection measures, such as personal protective equipment

Eye/face protection

Tightly fitting safety goggles. Face protection shield.

Skin and body protection

Work gloves and safety shoes are recommended when handling cylinders. Gloves must be clean and free from grease or oil. Appropriate protective and chemical resistant gloves, clothing and splash protection, or fully encapsulating vapor protective clothing to prevent exposure. For materials of construction consult protective clothing manufacturer's specifications.

Respiratory protection

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations

Handle in accordance with good industrial hygiene and safety practice. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product. Remove and wash contaminated clothing before re-use. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Greenish yellow fuming liquid to colorless gas.</td>
</tr>
<tr>
<td>Odor</td>
<td>Sweet, Irritating.</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>If dissolved in water, will affect pH value</td>
</tr>
<tr>
<td>Melting point</td>
<td>-76.34 °C / -105.41 °F</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower flammability limit:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper flammability limit:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flash point</td>
<td>No information available</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Decomposes</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>No data available</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Molecular weight</th>
<th>Boiling point</th>
<th>Vapor Pressure</th>
<th>Vapor density (air =1)</th>
<th>Gas Density kg/ m³@20°C</th>
<th>Critical Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine Trifluoride</td>
<td>92.44</td>
<td>12 °C</td>
<td>3.9 bar @ 50 °C</td>
<td>3.2</td>
<td>3.83</td>
<td>186.2 °C</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity

Chlorine trifluoride reacts violently with water to form chlorine and hydrofluoric acid.
Chemical stability
Unstable on exposure to moisture.

Explosion data
Sensitivity to Mechanical Impact  None.
Sensitivity to Static Discharge  None.

Possibility of Hazardous Reactions
Catalyst for many polymerization reactions.

Conditions to avoid
Protect from water. Protect from moisture. Heat, flames and sparks.

Incompatible materials

Hazardous Decomposition Products

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
All rats exposed to 800 ppm of chlorine trifluoride for 15 minutes died. Reducing exposure time to 13 minutes allowed survival in most tests. Exposure at 400 ppm for 35 minutes resulted in death. Two dogs and 20 rats exposed to an average concentration of 1.17 ppm chlorine trifluoride for 6 hr/ day/ 5 days/ wk exhibited signs of toxicity including sneezing, salivation, panting respiration and occasional expulsion of frothy fluid from the mouth and nose (signs were not as pronounced in rats). After several weeks of exposure a blood-tinged discharge appeared about the nares and eyes of the rats. Six rats and one dog died during the course of the experiment. Severe pulmonary irritation was found in both species among the survivors as well as the animals that died.

Skin contact
Corrosive. Causes severe irritation and or burns. Tissue destruction proceeds under toughened coagulated resulting in deep ulcers, slow healing and scarring. Burns can be progressive, resembling those caused by hydrogen fluoride. Symptoms may be delayed.

Eye contact
Corrosive to the eyes and may cause severe damage including blindness.

Ingestion
Not an expected route of exposure.

Information on toxicological effects

Symptoms
May be fatal if inhaled. Inhalation of corrosive fumes/ gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Symptoms may be delayed.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/ irritation  Category 1A.
Serious eye damage/ eye irritation  Not classified.
Irritation  Causes severe irritation and or burns.
Corrosivity  Corrosive to living tissue.
Sensitization  Not classified.
Germ cell mutagenicity  Not classified.
Carcinogenicity  No information available.
Reproductive toxicity  Not classified.
STOT - single exposure  Category 3. Respiratory system.
STOT - repeated exposure  Not classified.
Chronic toxicity
Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen.

Target Organ Effects
Respiratory system, Eyes, Skin.

Aspiration hazard
Not applicable.

Numerical measures of toxicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine Trifluoride</td>
<td>-</td>
<td>-</td>
<td>= 299 ppm (Rat) 1 h</td>
</tr>
<tr>
<td>7790-91-2</td>
<td></td>
<td></td>
<td>299 ppm (Rat) 1 hr - CGA</td>
</tr>
</tbody>
</table>

Product Information
- Oral LD50: No information available
- Dermal LD50: No information available
- Inhalation LC50: No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity
No known acute aquatic toxicity.

Persistence and degradability
Not applicable.

Bioaccumulation
No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes
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
- UN/ID no.: UN1749
- Proper shipping name: Chlorine trifluoride
- Hazard Class: 2.3
- Special Provisions: 2, B7, B9, B14, N86
- Description: UN1749, Chlorine trifluoride, 2.3 (5.1 8)
- Additional Description: "Toxic-Inhalation Hazard Zone 8"
- Additional Marking Requirements: "Inhalation Hazard"
- Emergency Response Guide Number: 124

TDG
- UN/ID no.: UN1749
- Proper shipping name: Chlorine trifluoride
- Hazard Class: 2.3
- Subsidiary class: 5.1 8
- Description: UN1749, Chlorine trifluoride, 2.3 (5.1 8)
MEX
UN/ID no. UN1749
Proper shipping name Chlorine trifluoride
Hazard Class 2.3
Subsidiary class 5.1 8
Description UN1749, Chlorine trifluoride, 2.3 (5.1 8)

IATA Forbidden

IMDG
UN/ID no. UN1749
Proper shipping name Chlorine trifluoride
Hazard Class 2.3
Subsidiary hazard class 5.1 8
EmS-No. F-C, S-W
Description UN1749, Chlorine trifluoride, 2.3 (5.1 8)

ADR
UN/ID no. UN1749
Proper shipping name Chlorine trifluoride
Hazard Class 2.3 5.1 8
Classification code 2TOC
Tunnel restriction code (C/D)
Description UN1749, Chlorine trifluoride, 2.3 5.1 8, (C/D)
Labels 2.3 +5.1 +8

15. REGULATORY INFORMATION

International Inventories
TSCA Complies
DSL -
EINECS/ELINCS Complies

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 Chemical Substances/European List of Notified Chemical Substances

US 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 Yes
Chronic Health Hazard No
Fire Hazard Yes
Sudden release of pressure hazard Yes
Reactive Hazard Yes

CERCLA
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.

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.

**CWA (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, contains one or more regulated substances with specified thresholds under 40 CFR Part 68 or regulated as a highly hazardous chemical pursuant to the 29 CFR Part 1910.110 with specified thresholds:

**US 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>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine Trifluoride</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**International Regulations**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Carcinogenicity</th>
<th>Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine Trifluoride</td>
<td></td>
<td>Mexico: Ceiling 0.1 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: Ceiling 0.4 mg/ m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: TWA 2.5 mg/ m³</td>
</tr>
</tbody>
</table>

**16. OTHER INFORMATION**

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health hazards</th>
<th>Flammability</th>
<th>Instability</th>
<th>Physical and Chemical Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>W3 OX</td>
</tr>
</tbody>
</table>

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.

**Issue Date** 17-Mar-2010
**Revision Date** 31-Mar-2015
**Revision Note** Initial Release.

**General Disclaimer**
For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde LLC, Linde Merchant Production, Inc. or Linde Gas North America LLC (or any of their affiliates and subsidiaries) and the purchaser.

**DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES**
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End of Safety Data Sheet