1. IDENTIFICATION

Product identifier
Product Name
OCTAFLUOROPROPANE (R218)

Other means of identification
Safety data sheet number
LIND-P094
UN/ID no.
UN2424
Synonyms
Perfluoropropane; Freon 218; HFC-218; PFC-218; R-218; RC218; Refrigerant Gas R218

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)

2. HAZARDS IDENTIFICATION

Classification
OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).
Gases under pressure | Liquefied gas
Simple asphyxiants | Yes

Label elements

Signal word | Warning

Hazard Statements
Contains gas under pressure; may explode if heated
May displace oxygen and cause rapid suffocation
May cause frostbite

Precautionary Statements - Prevention
Do not handle until all safety precautions have been read and understood
Do not get in eyes, on skin, or on clothing
Use and store only outdoors or in a well ventilated place
Use backflow preventive device in piping
Close valve after each use and when empty

Precautionary Statements - Response
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical attention/advice.
IF ON SKIN: Get immediate medical advice/attention. Thaw frosted parts with lukewarm water. Do not rub affected area.

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

Hazards not otherwise classified (HNOC)
Not applicable

Other 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>Octafluoropropane</td>
<td>76-19-7</td>
<td>100</td>
<td>C₃ F₈</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.
LIND-P094 OCTAFLUOROPROPANE (R218)

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
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.

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

Ingestion
Not an expected route of exposure.

Self-protection of the first aider
RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Most important symptoms and effects, both acute and delayed

Symptoms
High concentrations may cause asphyxia from lack of oxygen or act as a narcotic causing central nervous system depression. May cause nausea, dizziness, headaches, shortness of breath, lethargy, narcosis, unconsciousness and possibly cardiac arrhythmias. Contact with liquid may cause cold burns/frostbite.

Indication of any immediate medical attention and special treatment needed

Note to physicians
A patient adversely affected by exposure to this product should not be given adrenaline (epinephrine) or similar heart stimulant since these would increase the risk of cardiac arrhythmias.

5. FIRE-FIGHTING MEASURES

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

Specific extinguishing methods
Continue to cool fire exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists.

Specific hazards arising from the chemical
Non-flammable gas. Cylinders may rupture under extreme heat.

Hazardous combustion products
Hydrogen fluoride. Carbonyl fluoride.

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, protective equipment and emergency procedures

Personal precautions
Evacuate personnel to safe areas. Ensure adequate ventilation, especially in confined areas. Monitor oxygen level. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

Environmental precautions

Environmental precautions
Prevent spreading of vapors through sewers, ventilation systems and confined areas.

Methods and material for containment and cleaning up
Methods for containment

Stop the flow of gas or remove cylinder to an 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

Product is non-corrosive and may be used with any common structural material. Silver and carbon bearing alloys can act as catalysts for decomposing the product at high temperatures. Alloys containing more than 2% magnesium should not be used if water is present.

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. Use an adjustable strap wrench to remove over-tight or rusted caps. 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 only with adequate ventilation. Use 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.

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

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.

Incompatible materials

May react violently with chemically active metals such as sodium, potassium and barium, powdered magnesium, powdered aluminum and organometallics.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

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

Appropriate engineering controls

Engineering Controls

Local exhaust ventilation to prevent accumulation of high concentrations and maintain air-oxygen levels at or above 19.5%. Oxygen detectors should be used when asphyxiating gases may be released. Systems under pressure should be regularly checked for leakages. Showers. Eyewash stations. Ventilation systems.
Individual protection measures, such as personal protective equipment

Eye/face protection
Wear safety glasses with side shields (or goggles). If splashes are likely to occur, wear: Goggles. Face-shield.

Skin and body protection
Work gloves and safety shoes are recommended when handling cylinders. Wear cold insulating gloves when handling liquid.

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

General Hygiene Considerations
Handle in accordance with good industrial hygiene and safety practice. Do not get in eyes, on skin, or on clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Compressed gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Colorless.</td>
</tr>
<tr>
<td>Odor</td>
<td>Slight ethereal.</td>
</tr>
<tr>
<td>Odor threshold</td>
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<tr>
<td>pH</td>
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</tr>
<tr>
<td>Melting point</td>
<td>-183 °C / -279 °F</td>
</tr>
<tr>
<td>Evaporation rate</td>
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<td>Lower flammability limit:</td>
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<tr>
<td>Upper flammability limit:</td>
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</tr>
<tr>
<td>Flash point</td>
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<tr>
<td>Autoignition temperature</td>
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<tr>
<td>Decomposition temperature</td>
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<tr>
<td>Water solubility</td>
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<tr>
<td>Partition coefficient</td>
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<tr>
<td>Kinematic viscosity</td>
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<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>
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<tbody>
<tr>
<td>Octafluoropropane</td>
<td>188.01</td>
<td>-39.1 °C</td>
<td>7.69 bar @ 20 °C</td>
<td>6.2</td>
<td>7.965</td>
<td>71.89 °C</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity
Not reactive under normal conditions.

Chemical stability
Stable under normal conditions.

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

Possibility of Hazardous Reactions
None under normal processing.

Conditions to avoid
Heat, flames and sparks.
11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
High concentrations may cause ventricular fibrillation and CNS effects.

Skin contact
Prolonged skin contact may defat the skin and produce dermatitis. Contact with liquid may cause cold burns/ frostbite.

Eye contact
May cause slight irritation. Contact with liquid may cause cold burns/ frostbite.

Ingestion
Not an expected route of exposure.

Information on toxicological effects

Symptoms
High concentrations may cause asphyxia from lack of oxygen or act as a narcotic causing central nervous system depression. May cause nausea, dizziness, headaches, shortness of breath, lethargy, narcosis, unconsciousness and possibly cardiac arrhythmias.

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

Irritation
Not classified.

Sensitization
Not classified.

Germ cell mutagenicity
Not classified.

Carcinogenicity
This product does not contain any carcinogens or potential carcinogens listed by OSHA, IARC or NTP.

Reproductive toxicity
Not classified.

STOT - single exposure
Not classified.

STOT - repeated exposure
Not classified.

Chronic toxicity
Possible risks of irreversible effects.

Target Organ Effects
Heart, Central nervous system (CNS).

Aspiration hazard
Not applicable.

Numerical measures of toxicity

Product Information
Oral LD50

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.
**Other adverse effects**
Contains fluorinated greenhouse gas.

**Global warming potential (GWP)**
8830

### 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**

<table>
<thead>
<tr>
<th>UN/ ID no.</th>
<th>UN2424</th>
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</thead>
<tbody>
<tr>
<td>Proper shipping name</td>
<td>Octafluoropropane</td>
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<tr>
<td>Hazard Class</td>
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<tr>
<td>Special Provisions</td>
<td>T50</td>
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<td>Description</td>
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<td>Emergency Response Guide Number</td>
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**TDG**

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<tbody>
<tr>
<td>Proper shipping name</td>
<td>Octafluoropropane</td>
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<tr>
<td>Hazard Class</td>
<td>2.2</td>
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**MEX**

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<tbody>
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<td>Octafluoropropane</td>
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<tr>
<td>Hazard Class</td>
<td>2.2</td>
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**IATA**

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<th>UN2424</th>
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<td>Refrigerant gas R 218</td>
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<td>Hazard Class</td>
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<td>ERG Code</td>
<td>2L</td>
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**IMDG**

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<th>UN2424</th>
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</thead>
<tbody>
<tr>
<td>Proper shipping name</td>
<td>Octafluoropropane</td>
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<tr>
<td>Hazard Class</td>
<td>2.2</td>
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<tr>
<td>EmS-No.</td>
<td>F-C, S-V</td>
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<td>Description</td>
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**ADR**

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<th>UN2424</th>
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<tbody>
<tr>
<td>Proper shipping name</td>
<td>Octafluoropropane</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>2.2</td>
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<tr>
<td>Classification code</td>
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<tr>
<td>Tunnel restriction code</td>
<td>(C/ E)</td>
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<tr>
<td>Description</td>
<td>UN2424, Octafluoropropane, 2.2, (C/ E)</td>
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</tbody>
</table>
15. REGULATORY INFORMATION

International Inventories

- **TSCA** Complies
- **DSL** Complies
- **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**

<table>
<thead>
<tr>
<th>Category</th>
<th>Yes</th>
<th>No</th>
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</thead>
<tbody>
<tr>
<td><strong>Acute Health Hazard</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Chronic Health Hazard</strong></td>
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<tr>
<td><strong>Fire Hazard</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sudden release of pressure hazard</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reactive Hazard</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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, 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.

**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>Octafluoropropane 76-19-7</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Canada
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>
</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-Feb-2015
Revision Date 17-Feb-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

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user’s intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

End of Safety Data Sheet