



# OCTAFLUOROCYCLOPENTENE (Halocarbon C-1418)

## Material Safety Data Sheet

### 1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	OCTAFLUOROCYCLOPENTENE (Halocarbon C-1418)
Product Code(s)	G-452, 1060
UN-No	UN2810
Recommended Use	Compressed gas.
Trade Name	C-14840Perfluorocyclopentene
Supplier Address*	<p>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</p> <p>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</p> <p>Linde Canada Limited  5860 Chedworth Way  Mississauga, Ontario L5R 0A2  Phone: 905-501-1700  www.lindecana.com</p> <p>* May include subsidiaries or affiliate companies/divisions.</p> <p>For additional product information contact your local customer service.</p>
Chemical Emergency Phone Number	Chemtrec: 1-800-424-9300 for US/ 703-527-3887 outside US

### 2. HAZARDS IDENTIFICATION

**DANGER!**

#### Emergency Overview

Fatal if inhaled.  
Causes eye and respiratory irritation.  
May adversely affect the lung, liver, heart, and kidney.

Appearance Colorless

Physical State Liquid.

Odor Slight

OSHA Regulatory Status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
<u>Potential Health Effects</u>	
Principle Routes of Exposure	Inhalation. Skin contact. Eye contact. Ingestion.
Acute Toxicity	
Inhalation	Fatal if inhaled. May cause nausea, dizziness, headaches, shortness of breath, lethargy, narcosis, unconsciousness and possibly cardiac arrhythmias.
Eyes	Irritating to eyes.
Skin	Non-irritating.
Skin Absorption Hazard	May be harmful if absorbed through skin
Ingestion	Ingestion may cause irritation to mucous membranes.
Chronic Effects	May adversely affect the lung, liver, heart, and kidney.
Aggravated Medical Conditions	Central nervous system. Liver disorders. Kidney disorders. Pre-existing eye disorders. Respiratory disorders.
Environmental Hazard	See Section 12 for additional Ecological Information.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Volume %	Chemical Formula
Octafluorocyclopentene	559-40-0	>99	C <sub>5</sub> F <sub>8</sub>

### 4. FIRST AID MEASURES

General Advice	Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Call a physician immediately.
Skin Contact	Wash off immediately with soap and plenty of water. Get medical attention if irritation develops and persists.
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	Clean mouth with water and afterwards drink plenty of water. Consult a physician.
Notes to Physician	Treat symptomatically.
Protection of First-aiders	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

## 5. FIRE-FIGHTING MEASURES

Flammable Properties	Not flammable.
Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Hazardous Combustion Products	Hydrogen fluoride. Carbonyl fluoride.
<u>Explosion Data</u>	
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. Product has a low boiling point.
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	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
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.
Other Information	Refer to protective measures listed in Sections 7 and 8.

## 7. HANDLING AND STORAGE

Handling	<p>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.</p> <p>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.</p> <p>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.</p>
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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.
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## 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.
Ventilation	Ensure adequate ventilation.
<u>Personal Protective Equipment</u>	
Eye/Face Protection	Goggles. Face-shield.
Skin and Body Protection	Work gloves and safety shoes are recommended when handling cylinders.
Respiratory Protection	
General Use	Wear a positive-pressure supplied-air respirator
Emergency Use	Use positive pressure air line respirator or self-contained breathing apparatus for exposure over exposure limits or emergency use. For exposures above IDLH, an additional escape bottle is required.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless.	Odor	Slight.
Odor Threshold	No information available.	Physical State	Liquid
Flash Point	No information available.	Autoignition Temperature	No information available.
Decomposition Temperature	No information available.	Boiling Point/Range	27°C / 81°F
Freezing Point	< -70°C / < -94°F	Molecular Weight	212.05
Water Solubility	Slightly soluble	Evaporation Rate	No information available
Vapor Pressure	614 mmHg @ 21°C	Vapor Density	>1 (air = 1)
Liquid Density	1.58 (H <sub>2</sub> O =1)	VOC Content (%)	Not applicable.
Flammability Limits in Air			
Upper	Not applicable		
Lower	Not applicable		

## 10. STABILITY AND REACTIVITY

Stability	Stable.
Incompatible Products	Alkaline earth metals. Alkalis.
Conditions to Avoid	None known based on information supplied.

Hazardous Decomposition Products	Hydrogen fluoride. Carbonyl fluoride.
Hazardous Polymerization	Hazardous polymerization does not occur.

## 11. TOXICOLOGICAL INFORMATION

### Acute Toxicity

LD50 Oral:	No information available.
LD50 Dermal:	No information available.
LC50 Inhalation:	1124 ppm/1 hr (Rat)
Eye Contact	Slowly reversible conjunctival irritation was seen in rabbit eyes with inflammation of the iris in 1/6 and slight corneal opacification in 2/6. With the exception of mild conjunctival redness in 1/6, effects were reversible in 21 days.
Skin Contact	Non-irritating.
Repeated Dose Toxicity	Two ppm was concluded to be the no-observed adverse effect level (NOAEL) in a 90 day rat toxicity study. Increased lung and liver weights accompanied by microscopic lung lesions were seen at doses of 7.5 ppm and greater (6H/day; 7 day/week; 13 weeks). At 50 ppm, for 6 H/day for 14 days, increased lung and kidney weights were seen by effects regressed completely 4 weeks after exposure ceased.

### Chronic Toxicity

Chronic Toxicity	May adversely affect the lung, liver, heart, and kidney.
Carcinogenicity	Contains no ingredient listed as a carcinogen.

Irritation	No information available.
Sensitization	No information available.
Mutagenic Effects	Not mutagenic in AMES Test. In vivo tests did not show mutagenic effects.
Reproductive Toxicity	No information available.
Developmental Toxicity	Maternal toxicity was seen in pregnant rats which received 100 ppm octafluorocyclopentane (6H/day; 6-19 post coitum) and marginal effects on lung and body weights were seen at 10 and 30 ppm. A slight reduction in mean fetal weight and slightly increased incidence of major cardiovascular malformations (of equivocal significance) was seen at 100 ppm. The no effect dose level for embryotoxicity was 30 ppm.
Synergistic Materials	None known.
Target Organ Effects	Heart. Liver. Kidney. Respiratory system. Eyes. Skin. Central nervous system (CNS).

## 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.
Contaminated Packaging	Do not re-use empty containers.

## 14. TRANSPORT INFORMATION

### DOT

Proper Shipping Name	Toxic liquids, organic, n.o.s.
Hazard Class	6.1
Subsidiary Class	None
UN-No	UN2810
Packing Group	I
Description	UN2810, Toxic liquids, organic, n.o.s. (Octafluorocyclopentene), 6.1, PG I
Additional Description:	"Toxic-Inhalation Hazard Zone B".
Additional Marking Requirements:	"Inhalation Hazard".
Emergency Response Guide Number	153

### TDG

Proper Shipping Name	Toxic liquid, organic, n.o.s.
Hazard Class	6.1
UN-No	UN2810
Packing Group	I
Description	UN2810, TOXIC LIQUID, ORGANIC, N.O.S., 6.1, PG I

### MEX

Proper Shipping Name	Toxic liquid, organic, n.o.s.
Hazard Class	6.1
UN-No	UN2810
Description	UN2810 Toxic liquid, organic, n.o.s. (Octafluorocyclopentene), 6.1, I
Packing Group	I

### IATA

UN-No	UN2810
Proper Shipping Name	Toxic liquid, organic, n.o.s.
Hazard Class	6.1
Packing Group	I
ERG Code	6L
Description	UN2810, Toxic liquid, organic, n.o.s. (Octafluorocyclopentene), 6.1, PG I
Maximum Quantity for Passenger	1 L
Maximum Quantity for Cargo Only	30 L

Limited Quantity

No information available.

IMDG/IMO

Proper Shipping Name

Toxic liquid, organic, n.o.s.

Hazard Class

6.1

UN-No

UN2810

Packing Group

I

EmS No.

F-A, S-A

Description

UN2810, Toxic liquid, organic, n.o.s.(Octafluorocyclopentene),6.1,PG I

ADR

Proper Shipping Name

Toxic liquid, organic, n.o.s.

Hazard Class

6.1

UN-No

UN2810

Packing Group

I

Classification Code

T1

Description

UN2810 Toxic liquid, organic, n.o.s.(Octafluorocyclopentene),6.1,I

## 15. REGULATORY INFORMATION

International Inventories

TSCA

Complies

DSL

Does not Comply

EINECS/ELINCS

Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDL - 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

Yes

Chronic Health Hazard

Yes

Fire Hazard

No

Sudden Release of Pressure Hazard

No

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**

This product does not contain any substances regulated by state right-to-know regulations.

**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**

D1A Very toxic materials



**16. OTHER INFORMATION**

Prepared By	Product Stewardship 23 British American Blvd. Latham, NY 12110 1-800-572-6501
Issuing Date	15-Jul-2010
Revision Date	04-Nov-2010
Revision Number	1
Revision Note	(M)SDS sections updated. 1.



<u>NFPA</u>	Health Hazard 3	Flammability 1	Stability 0	Physical and Chemical Hazards -
<u>HMIS</u>	Health Hazard 3*	Flammability 1	Physical Hazard 0	Personal Protection -

**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

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.

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End of Safety Data Sheet