

Safety Data Sheet

Version 3.2
Revision Date 08/01/2016

SDS Number 300000000153
Print Date 12/16/2017

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Octafluorocyclopentene

Chemical formula : C5F8

Synonyms : Octafluorocyclopentene, Perfluorocyclopentene

Product Use Description : General Industrial

Manufacturer/Importer/Distributor : Versum Materials US, LLC
8555 South River Parkway
Tempe, AZ 85284
Exporter EIN No.475632014
www.versummaterials.com

Telephone : (602)282-1000

Emergency telephone number (24h) : 800-523-9374 USA
+1 610 481 7711 International

2. HAZARDS IDENTIFICATION

GHS classification

Acute toxicity - Inhalation Category 3
Skin irritation - Category 2
Eye irritation - Category 2A
Specific target organ toxicity - single exposure - Inhalation Category 3

GHS label elements

Hazard pictograms/symbols



Signal Word: Danger

Hazard Statements:

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H315:Causes skin irritation.
H319:Causes serious eye irritation.
H331:Toxic if inhaled.
H335:May cause respiratory irritation.

Precautionary Statements:

Prevention : P261:Avoid breathing dust/fume/gas/mist/vapours/spray.
P264:Wash hands thoroughly after handling.
P271:Use only outdoors or in a well-ventilated area
P280:Wear eye protection/face protection.
P280e:Wear protective gloves.

Response : P302+P352 :IF ON SKIN: Wash with plenty of soap and water.
P304+P340 :IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338 :IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P311 :Call a POISON CENTER/doctor.
P332+P313 :If skin irritation occurs: Get medical advice/attention.
P337+P313 :If eye irritation persists: Get medical advice/attention.
P362 :Take off contaminated clothing and wash before re use.

Storage : P403+P233:Store in a well-ventilated place. Keep container tightly closed.
P405:Store locked up.

Disposal : P501:Disposal of contents/container to be specified in accordance with regulations.

Hazards not otherwise classified

Use a back flow preventative device in the piping.
Do not open valve until connected to equipment prepared for use.
Close valve after each use and when empty.
Read and follow the Safety Data Sheet (SDS) before use.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration (Volume)
Octafluorocyclopentene	559-40-0	100 %

Concentration is nominal. For the exact product composition, please refer to technical specifications.

4. FIRST AID MEASURES

General advice : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial

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respiration if breathing stopped.

- Eye contact : In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Keep eye wide open while rinsing.
- Skin contact : Flush with copious amounts of water until treatment is available.
- Ingestion : Ingestion is not considered a potential route of exposure.
- Inhalation : In case of shortness of breath, give oxygen. Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Consult a doctor.
- Inhalation : No data available.

Immediate Medical Attention and Special Treatment

- Treatment : If exposed or concerned: Get medical attention/advice.

5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media : All known extinguishing media can be used.
- Specific hazards : Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Product is nonflammable and does not support combustion. Gas is heavier than air and may collect in low areas or travel along the ground where there may be an ignition source present. Combustion by-products may be toxic. Move away from container and cool with water from a protected position. Keep adjacent cylinders cool by spraying with large amounts of water until the fire burns itself out.
- Special protective equipment for fire-fighters : Use self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

- Personal Precautions, Protective Equipment, and Emergency Procedures : Evacuate personnel to safe areas. Use self-contained breathing apparatus or positive pressure air line with mask and escape pack in areas where concentration is unknown or above the exposure limits. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ventilate the area.
- Environmental precautions : Should not be released into the environment. Prevent further leakage or spillage if safe to do so.
- Methods for cleaning up : Ventilate the area. Approach suspected leak areas with caution.
- Additional advice : If possible, stop flow of product. Increase ventilation to the release area and monitor concentrations. If leak is from cylinder or cylinder valve, call the

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emergency telephone number. If the leak is in the user's system, close the cylinder valve, safely vent the pressure, and purge with an inert gas before attempting repairs.

7. HANDLING AND STORAGE

Handling

Only experienced and properly instructed persons should handle compressed gases/cryogenic liquids. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 50°C (122°F). Before using the product, determine its identity by reading the label. Know and understand the properties and hazards of the product before use. When doubt exists as to the correct handling procedure for a particular gas, contact the supplier. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Use an adjustable strap wrench to remove over-tight or rusted caps. Before connecting the container, check the complete gas system for suitability, particularly for pressure rating and materials. Before connecting the container for use, ensure that back feed from the system into the container is prevented. Ensure the complete gas system is compatible for pressure rating and materials of construction. Ensure the complete gas system has been checked for leaks before use. Employ suitable pressure regulating devices on all containers when the gas is being emitted to systems with lower pressure rating than that of the container. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Open valve slowly. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Close valve after each use and when empty. Replace outlet caps or plugs and container caps as soon as container is disconnected from equipment. Do not subject containers to abnormal mechanical shock. Never attempt to lift a cylinder by its valve protection cap or guard. Do not use containers as rollers or supports or for any other purpose than to contain the gas as supplied. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Keep container valve outlets clean and free from contaminants particularly oil and water. Do not smoke while handling product or cylinders. Never re-compress a gas or a gas mixture without first consulting the supplier. Never attempt to transfer gases from one cylinder/container to another. Always use backflow protective device in piping. Installation of a cross purge assembly between the cylinder and the regulator is recommended. When returning cylinder install valve outlet cap or plug leak tight. Never use direct flame or electrical heating devices to raise the pressure of a container. Containers should not be subjected to temperatures above 50°C (122°F).

Storage

Use a back flow preventative device in the piping. Do not open valve until connected to equipment prepared for use. Close valve after each use and when empty. Read and follow the Safety Data Sheet (SDS) before use. Containers should be stored in a purpose build compound which should be well ventilated, preferably in the open air. Full containers should be stored so that oldest stock is used first. Observe all regulations and local requirements regarding storage of containers. Stored containers should be periodically checked for general condition and leakage. Local codes may have special requirements for toxic gas storage. Protect containers stored in the open against rusting and extremes of weather. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent toppling. The container valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Container valve guards or caps should be in place. Keep containers tightly closed in a cool, well-ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Full and empty cylinders should be segregated. Do not allow storage temperature to exceed 50°C (122°F). Return

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empty containers in a timely manner.

Technical measures/Precautions

Containers should be segregated in the storage area according to the various categories (e.g. flammable, toxic, etc.) and in accordance with local regulations. Keep away from combustible material.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures

Provide natural or mechanical ventilation to prevent accumulation above exposure limits.

Personal protective equipment

- | | |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Respiratory protection | : Use self-contained breathing apparatus or positive pressure air line with mask and escape pack in areas where concentration is unknown or above the exposure limits. Users of breathing apparatus must be trained. |
| Hand protection | : Sturdy work gloves are recommended for handling cylinders. Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. |
| Eye protection | : Safety glasses recommended when handling cylinders. A full faceshield should be worn in addition to safety glasses when connecting, disconnecting or opening cylinders. |
| Skin and body protection | : Safety shoes are recommended when handling cylinders. |
| Special instructions for protection and hygiene | : Ensure adequate ventilation, especially in confined areas. Provide good ventilation and/or local exhaust to prevent accumulation of concentrations above exposure limits. |

9. PHYSICAL AND CHEMICAL PROPERTIES

- | | |
|---------------------|------------------------------------------------------------------------------------|
| Appearance | : Liquid. Colorless. |
| Odor | : Poor warning properties at low concentrations. |
| Odor | : Mixture contains one or more component(s) which have the following odor: Slight. |
| Odor threshold | : No data available. |
| pH | : No data available. |
| Melting point/range | : No data available. |

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Boiling point/range	: 81 °F (27 °C)
Flash point	: No data available.
Evaporation rate	: No data available.
Flammability (solid, gas)	: Not applicable.
Upper/lower explosion/flammability limit	: Not applicable.
Vapor pressure	: 11.60 psia (0.80 bara) at 68 °F (20 °C)
Water solubility	: Not known, but considered to have low solubility.
Relative vapor density	: Not applicable.
Relative density	: 1.58 (water = 1)
Partition coefficient (n-octanol/water)	: No data available.
Auto-ignition temperature	: No data available.
Decomposition temperature	: No data available.
Viscosity	: No data available.
Molecular Weight	: 212.05 g/mol

10. STABILITY AND REACTIVITY

Chemical Stability	: Stable under normal conditions.
Conditions to avoid	: No data available.
Materials to avoid	: No data available.
Hazardous decomposition products	: No data available.
Possibility of hazardous Reactions/Reactivity	: No data available.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Likely routes of exposure

Acute toxicity

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Acute Oral Toxicity	: No data is available on the product itself.
Inhalation	: LC50 (1 h) : 9.7482 mg/l Species : Rat.
Acute Dermal Toxicity	: No data is available on the product itself.
Skin corrosion/irritation	: No data available.
Serious eye damage/eye irritation	: No data available.
Sensitization.	: No data available.

Chronic toxicity or effects from long term exposures

Carcinogenicity	: No data available.
Reproductive toxicity	: No data is available on the product itself.
Germ cell mutagenicity	: No data is available on the product itself.
Specific target organ systemic toxicity (single exposure)	: No data available.
Specific target organ systemic toxicity (repeated exposure)	: No data available.
Aspiration hazard	: No data available.

Delayed and Immediate Effects and Chronic Effects from Short and Long Term Exposure

Administration of Octafluorocyclopentene to pregnant rats for six hours per day between days six and nineteen post coitum produced evidence of maternal toxicity at 100 ppm and a marginal effect on lung and body weight at 10 and 30 ppm. With respect to the conceptus, a slight reduction in mean fetal weight at 100 ppm was accompanied by a slightly increased incidence of major cardiovascular malformations that was of equivocal biological significance, but not by any other evidence of disturbance to development. A dose level of 30 ppm was regarded as a "no effect level" for any embryotoxic potential of octafluorocyclopentene., Rats that were administered Octafluorocyclopentene at 50 ppm, six hours per day for fourteen days, exhibited increased lung and kidney weights. These effects were not observed after four weeks of withdrawal. Rats that were administered Octafluorocyclopentene at 7.5 ppm or more, six hours per day for ninety days, exhibited increased lung and liver weights accompanied by microscopic lung lesions(no liver lesions). Two ppm was concluded to be the "no-observed adverse effect level" (NOAEL)., This material was not mutagenic in a bacterial assay. This material did not cause chromosome damage in an in vivo micronucleus assay.Administration of Octafluorocyclopentene to pregnant rats for six hours per day between days six and nineteen post coitum produced evidence of maternal toxicity at 100 ppm and a marginal effect on lung and body weight at 10 and 30 ppm. With respect to the conceptus, a slight reduction in mean fetal weight at 100 ppm was accompanied by a slightly increased incidence of major cardiovascular malformations that was of equivocal biological significance, but not by any other evidence of

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disturbance to development. A dose level of 30 ppm was regarded as a "no effect level" for any embryotoxic potential of octafluorocyclopentene., Rats that were administered Octafluorocyclopentene at 50 ppm, six hours per day for fourteen days, exhibited increased lung and kidney weights. These effects were not observed after four weeks of withdrawal. Rats that were administered Octafluorocyclopentene at 7.5 ppm or more, six hours per day for ninety days, exhibited increased lung and liver weights accompanied by microscopic lung lesions(no liver lesions). Two ppm was concluded to be the "no-observed adverse effect level" (NOAEL)., This material was not mutagenic in a bacterial assay. This material did not cause chromosome damage in an in vivo micronucleus assay.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Aquatic toxicity : May cause pH changes in aqueous ecological systems.

Toxicity to other organisms : No data available.

Persistence and degradability

Biodegradability : No data is available on the product itself.

Mobility : Because of its high volatility, the product is unlikely to cause ground pollution.

Bioaccumulation : Refer to Section 9 "Partition Coefficient (n-octanol/water)".

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products : In accordance with local and national regulations. Contact supplier if guidance is required. Return unused product in original cylinder to supplier. Must not be discharged to atmosphere.

Contaminated packaging : Return cylinder to supplier.

14. TRANSPORT INFORMATION

DOT

UN/ID No. : UN2810
Proper shipping name : Toxic, liquids, organic, n.o.s., (Octafluorocyclopentene)
Class or Division : 6.1
Packing group : III
Label(s) : 6.1
Marine Pollutant : No

IATA

UN/ID No. : UN2810
Proper shipping name : Toxic liquid, organic, n.o.s., (Octafluorocyclopentene)

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Class or Division : 6.1
Packing group : III
Label(s) : 6.1
Marine Pollutant : No

IMDG

UN/ID No. : UN2810
Proper shipping name : TOXIC LIQUID, ORGANIC, N.O.S., (Octafluorocyclopentene)
Class or Division : 6.1
Packing group : III
Label(s) : 6.1
Marine Pollutant : No

TDG

UN/ID No. : UN2810
Proper shipping name : TOXIC LIQUID, ORGANIC, N.O.S., (Octafluorocyclopentene)
Class or Division : 6.1
Packing group : III
Label(s) : 6.1
Marine Pollutant : No

Further Information

The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact customer service.

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA) 12(b) Component(s):
Octafluorocyclopentene

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Included on Inventory.
Canada	DSL	Not on Inventory.
Australia	AICS	Not on Inventory.
Japan	ENCS	Included on Inventory.
South Korea	ECL	Included on Inventory.
Philippines	PICCS	Not on Inventory.
China	SEPA	Included on Inventory.

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification
Acute Health Hazard Sudden Release of Pressure Hazard.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)

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This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

16. OTHER INFORMATION

NFPA Rating

Health : 3
Fire : 1
Instability : 0

Prepared by : Versum Materials, Product Regulatory Department

Telephone : (602)282-1000

Preparation Date : 12/16/2017

For additional information, please visit our Versum Materials' Product Stewardship web site.
<http://www.versummaterials.com/productstewardship/>
