

## MATERIALSAFETYDATASHEET

### SECTION1.PRODUCTIDENTIFICATION

**PRODUCTNAME:** Octafluorocyclobutane

**CHEMICALNAME:** Octafluorocyclobutane **FORMULA:** C<sub>4</sub>F<sub>8</sub>

**SYNOMYS:** Halocarbon-C318,Perfluorocyclobutane

**MANUFACTURER:** AirProductsandChemicals,Inc  
7201HamiltonBoulevard  
Allentown,PA18195 -1501

**PRODUCTINFORMATION:** (800)752 -1597

**MSDSNUMBER:** 1309

**REVISION:** 1

**REVIEWDATE:** October1999

**REVISIONDATE:** October1999

### SECTION2.COMPOSITION/INFORMATIONONINGREDIENTS

Octafluorocyclobutaneissoldasapureproduct>99%.

**CASNUMBER:** 115-25-3

**EXPOSURELIMITS:**

**OSHA:** Noneestablished

**ACGIH:** Noneestablished

**NIOSH:** Noneestablished

### SECTION3.HAZARDIDENTIFICATION

#### EMERGENCYOVERVIEW

Octafluorocyclobutaneisanonflammable,colorless,odorlessliquefiedcompressedgaspackagedin cylindersunderitsownvaporpressureof25psigat70 °F.Thisproductcancauserapidssuffocationwhen concentrationsaresufficienttoreduceoxygenlevelsbelow19.5%.SelfContainedBreathingApparatus (SCBA)mayberequiredforrescuerworkers.Contactwithproductcancausefrostbite.

#### EMERGENCYTELEPHONENUMBERS

(800)523 -9374      **ContinentalU.S.,Canada, and Puerto Rico**

(610)481 -7711      **otherlocations**

#### ACUTEPOTENTIALHEALTHEFFECTS:

##### ROUTESEOFEXPOSURE:

**EYECONTACT:** Contactwithliquid(orrapidlyexpandinggas)maycauseirritationandfrostbite.

**INGESTION:** IngestionisnotalikelyrouteofexposureforOctafluorocyclobutane.

**INHALATION:** Thisproductmaycausesuffocationbydisplacingtheoxygeninair.Exposuretoan oxygendeficientatmosphere(lessthan19.5%)maycausedizziness,drowsiness,nausea,vomiting, excessivesalivation,diminishedmentalalertness,lossofconsciousnessanddeath.Exposureto

atmospheres containing less than 12% oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help themselves. Inhalation of high concentrations may also cause mild central nervous system depression and cardiac arrhythmias (heartbeat irregularities).

**SKIN CONTACT:** Contact with liquid (or rapidly expanding gas) may cause irritation and frostbite.

**POTENTIAL HEALTH EFFECTS OF REPEATED EXPOSURE:**

**ROUTE OF ENTRY:** Skin contact

**SYMPTOMS:** Repeated or prolonged contact may cause dermatitis.

**TARGET ORGAN:** Heart, central nervous system, skin

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Persons with preexisting cardiac or central nervous system disorders may have increased susceptibility to the effects of overexposure. May aggravate existing dermatitis.

**CARCINOGENICITY:** This product is not listed as a carcinogen or potential carcinogen by NTP, IARC, or OSHA.

**SECTION 4. FIRST AID MEASURES**

**EYE CONTACT:** Contact with product may cause frostbite. If frostbite is suspected, flush eyes with plenty of lukewarm water for several minutes. Obtain medical attention immediately.

**INGESTION:** Ingestion is not a likely route of exposure for Octafluorocyclobutane.

**INHALATION:** Remove person to fresh air. If not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain prompt medical attention.

**SKIN CONTACT:** Contact with product may cause frostbite. If frostbite is suspected, remove contaminated clothing and flush with plenty of lukewarm water for several minutes. See medical attention immediately.

**NOTE TO PHYSICIAN:** The use of catecholamine drugs, such as epinephrine, should be considered only as a last resort in life threatening emergencies, due to the possibility of cardiac rhythm disturbances.

**SECTION 5. FIREFIGHTING MEASURES**

**FLASHPOINT:**

Not applicable

**AUTOIGNITION:**

Not applicable

**FLAMMABLE RANGE:**

Nonflammable

**EXTINGUISHING MEDIA:** Product is nonflammable and does not support combustion. Use extinguishing media appropriate for surrounding fire.

**SPECIAL FIRE FIGHTING INSTRUCTIONS:** Evacuate all personnel from area. If possible, without risk, remove cylinders from fire area or cool with water. The products of combustion may be toxic; self-contained breathing apparatus (SCBA) may be required by rescue workers.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Most cylinders are designed to vent contents when exposed to elevated temperatures. Pressure in a cylinder can build up due to heat and it may rupture if pressure relief devices should fail to function.

**HAZARDOUS COMBUSTION PRODUCTS:** Carbon monoxide, hydrogen fluoride, and other toxic fluoride compounds.

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

**STEPS TO TAKE IF MATERIAL IS RELEASED OR SPILLED:** Evacuate immediate area. Increase ventilation to release area and monitor oxygen level. Use appropriate protective equipment (SCBA). Shut off source of leak if possible. Isolate any leaking cylinder. If leak is from container, pressure relief device or its valve, contact your supplier. If leak is in user's system, close cylinder valve, safely vent pressure and purge with inert gas before attempting repairs.

## SECTION7.HANDLINGANDSTORAGE

**STORAGE:** Store cylinders in a well -ventilated, secure area, protected from the weather. Cylinders should be stored upright with valve outlet seals and valve protection caps in place. Do not allow storage temperature to exceed 125 °F (52 °C). Storage should be away from heavily traveled areas and emergency exits. Full and empty cylinders should be segregated. Use a first -in first -out inventory system to prevent full containers from being stored for long periods of time.

**HANDLING:** Do not drag, roll, slide or drop cylinder. Use a suitable hand truck designed for cylinder movement. Never attempt to lift a cylinder by its cap. Secure cylinders at all times while in use. Use a pressure reducing regulator or separate control valve to safely discharge gas from cylinder. Use a check valve to prevent reverse flow into cylinder. Use piping and equipment adequately designed to withstand pressure to be encountered. Never apply flame or localized heat directly to any part of the cylinder. Do not allow any part of the cylinder to exceed 125 °F (52 °C). Once cylinder has been connected to process, open cylinder valves slowly and carefully. If user experiences any difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, etc.) into valve cap openings. Doing so may damage valve causing a leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps.

Octafluorocyclobutane is compatible with all common materials of construction. Pressure requirements should be considered when selecting materials and design systems.

**SPECIAL PRECAUTIONS:** Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, Inc. (telephone 703-412-0900) pamphlet CGAP-1, *Safe Handling of Compressed Gases in Containers*. Local regulations may require specific equipment for storage or use. Caution: Users of this product must be aware of the hazards caused by the accumulation of high concentrations, especially in confined spaces. Compliance with OSHA regulations, especially 29 CFR 1910.146 (confined space entry), is essential.

## SECTION8.EXPOSURECONTROLS/PERSONALPROTECTION

### ENGINEERING CONTROLS:

**VENTILATION:** Provide adequate general ventilation and/or local exhaust to prevent accumulation of high concentrations of gas. Oxygen levels in work area should be monitored to ensure they do not fall below 19.5%.

### RESPIRATORY PROTECTION:

**Emergency Use:** Use self-contained breathing apparatus (SCBA) or positive pressure air line with mask and escape pack in areas where oxygen concentration is less than 19.5%. Air purifying respirators will not provide protection.

**EYE PROTECTION:** Safety glasses. Chemical splash goggles and face shield are recommended when handling liquid.

**SKIN PROTECTION:** Leather work gloves are recommended when handling cylinders. Leather gloves are recommended when handling liquid.

**OTHER PROTECTIVE EQUIPMENT:** Safety shoes are recommended when handling cylinders. Safety shower and eyewash stations should be readily available.

## SECTION9.PHYSICALANDCHEMICALPROPERTIES

**APPEARANCE, ODOR AND STATE:** Colorless, odorless gas

**MOLECULAR WEIGHT:** 200.0

**BOILING POINT (At 1 atm) :** 17.6 °F ( -8 °C)

**SPECIFIC GRAVITY (also called vapor density) (Air=1) :** 6.9

**FREEZINGPOINT/MELTINGPOINT (At1atm) : -42.5 °F( -41.4 °C)**

**VAPORPRESSURE (At70 °F(21.1 °C)): 25psig**

**GASDENSITY (At70 °F(21.1 °C)and1atm) : 0.535lb/ft<sup>3</sup>**

## **SECTION10.STABILITYANDREACTIVITY**

**CHEMICALSTABILITY:** Stable

**CONDITIONSTOAvoid:** Cylindersshouldnotbeexposedtotemperaturesinexcessof125 °F(52 °C).

**INCOMPATIBILITY(MaterialstoAvoid):** Alkalioralkalineearthmetals -powderedaluminum,zinc,etc.

**REACTIVITY:**

**A)HAZARDOUSDECOMPOSITIONPRODUCTS:** Thismaterialcanbedecomposedbyhigh temperatures(openflame,glowingmetalsurfaces,etc.)forminghydrofluoricacidandpossibly carbonylfluoride.

**B)HAZARDOUSPOLYMERIZATION:** Willnotoccur

## **SECTION11.TOXICOLOGICALINFORMATION**

**LC<sub>50</sub>(Inhalation):** Simpleasphyxiant;four -hourexposureto 80%Octafluorocyclobutaneproducedno deathsinrats.

**LD<sub>50</sub>(Oral):** Notapplicable

**LD<sub>50</sub>(Dermal):** Notapplicable

**SKINCORROSIVITY:** Octafluorocyclobutaneisnotcorrosivetotheskin.

**ADDITIONALNOTES:** Octafluorocyclobutane hascausedcontractionofthetracheainanesthetized rhesusmonkeysandmaycausecardiacarrhythmias.Rats,mice, rabbitsanddogsexposedto10% Octafluorocyclobutane,sixhoursperday,forninetydaysshowednoadverseeffects.

Octafluorocyclobutanewasmutagenicinabacterial(E.coli)assay.

## **SECTION12.ECOLOGICALINFORMATION**

**AQUATICTOXICITY:** Notavailable

**MOBILITY:** Notavailable

**PERSISTENCEANDBIODEGRADABILITY:** Notavailable

**POTENTIALTOBIOACCUMULATE:** Notavailable

**REMARKS:** Noadverseecologicaleffectsareexpected.OctafluorocyclobutaneDoesnot containany ClassIorClassIIozonedepletingchemicals.

## **SECTION13.DISPOSALCONSIDERATIONS**

**UNUSEDPRODUCT/EMPTYCONTAINER:** Returncontainerandunusedproducttosupplier.Donot attempttodisposeofresidualorunusedquantities.

**DISPOSALINFORMATION:** Foremergencydisposal,securethecylinderandslowlydischargegasto theatmosphereinawellventilatedareaoroutdoors.

## **SECTION14.TRANSPORTINFORMATION**

**DOTSHIPPINGNAME:** Octafluorocyclobutane

**HAZARDCLASS:** 2.2

**IDENTIFICATIONNUMBER:** UN1976

**SHIPPINGLABEL(s):** NonflammableGas

**PLACARD(Whenrequired):** NonflammableGas

**SPECIAL SHIPPING INFORMATION:** Cylinders should be transported in a secure upright position in a well-ventilated truck. Never transport in passenger compartment of a vehicle. Ensure cylinder valve is properly closed, valve outlet cap has been reinstalled, and valve protection cap is secured before shipping cylinder.

**CAUTION:** Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with the owner's written consent is in violation of federal law (49 CFR 173.301).

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK (NAERG) #:** 126

## SECTION 15. REGULATORY INFORMATION

### U.S. FEDERAL REGULATIONS:

#### EPA - ENVIRONMENTAL PROTECTION AGENCY

**CERCLA:** Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (40 CFR Parts 117 and 302)

Reportable Quantity (RQ): None

**SARA TITLE III:** Superfund Amendment and Reauthorization Act

**SECTIONS 302/304:** Emergency Planning and Notification (40 CFR Part 355)

Extremely Hazardous Substances: This product is not listed.

Threshold Planning Quantity (TPQ): None

Reportable Quantity (RQ): None

**SECTIONS 311/312:** Hazardous Chemical Reporting (40 CFR Part 370)

IMMEDIATE HEALTH:	No	PRESSURE:	Yes
DELAYED HEALTH:	No	REACTIVITY:	No
		FIRE:	No

**SECTION 313:** Toxic Chemical Release Reporting (40 CFR Part 372)

This product does not require reporting under Section 313.

#### CLEAN AIR ACT:

**SECTION 112(r):** Risk Management Programs for Chemical Accidental Release (40 CFR Part 68)

This product is not listed as a regulated substance.

Threshold Quantity (TQ): None

#### TSCA: Toxic Substance Control Act

This product is listed on the TSCA inventory.

#### OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

**29 CFR Part 1910.119:** Process Safety Management of Highly Hazardous Chemicals

This product is not listed in Appendix A as a highly hazardous chemical.

Threshold Quantity (TQ): None

#### STATE REGULATIONS:

##### CALIFORNIA:

Proposition 65: Octafluorocyclobutane is not listed as a substance which the State of California requires warning under this statute.

## SECTION 16. OTHER INFORMATION

#### NFPA RATINGS:

HEALTH: 1

FLAMMABILITY: 0

REACTIVITY: 0

SPECIAL:

#### HMIS RATINGS:

HEALTH: 0

FLAMMABILITY: 0

REACTIVITY: 0