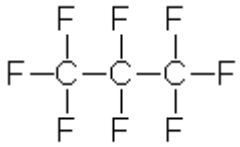
1. IDENTIFICATION OF THE SUBSTANCE/COMPOUND AND COMPANY

1.1. Identification of the product Name:	**Octafluoropropane**
Chemical nomenclature:	IUPAC name: Octafluoropropane
Synonyms:	Perfluoropropane, Khladon 218, R218
Molecular formula:	C_3F_8
Structural formula	
Molar mass:	188,02
EC number:	200-941-9 (EINECS)
REACH Pre-Registration	Reference number 05-2114096818-30-0000 30/06/2008
C&L bulk notification	Reference number 02-2119708805-36-0000
CAS number:	76-19-7
1.2. Use of substance/ compound	Is used as reaction mass for plasmochemical etching of semiconducting materials, and as a refrigerant.
Recommended use	For industrial or professional use only, not for use in everyday life.
1.3. Company identification	
Manufacturer	Joint Stock Company «HaloPolymer Perm» 614042, Russia, Perm, ul. Lasvinskaya 98 Phone № +7(342) 250-61-50 Web site: www.halopolymer.ru
Only REACH representative in EU:	JSC «HaloPolymer Perm» (Submitting legal entity URALCHEM Assist GmbH) Johannssenstrasse 10 30159, Hannover, Germany Tel: +49 511 45 99 444
1.4 Emergency telephone number: Great Britain USA	 +7-342-282-85-45 (24 hours) +44 (0) 203 394 9870 (24/7) 1-877 271 7077

2. HAZARDS IDENTIFICATION

2.1. Substance classification 2.1.1. Classification in accordance with the Regulation (EC) No 1272/2008 [CLP/GHS]	Liquefied gas, H280
2.1.2. Classification in accordance with the Directive 67/548/EEC	Not classified as a dangerous product.
2.2 Label elements 2.2.1 Labeling according to the Regulation (EC) No 1272/2008 [CLP/GHS]	Hazard pictograms  GHS04 Signal word: **Warning** Hazard statements: H280 (Contains gas under pressure; may explode if heated). Precautionary statements:

	P 403 Store in a well-ventilated place. P 410 Protect from sunlight.
2.3 Other hazards:	Contact with liquid may cause frostbite. Asphyxiation. The product may act as a narcotic. Thermal decomposition will evolve toxic and corrosive vapours.

3. COPMOSITION/INFORMATION ON INGREDIENTS

3.1. Composition

Identification name	CAS number	EU (ELINECS/EINECS)	Volume concentration, %
Octafluoropropane	76-19-7	200-941-9 (EINECS)	Not less than 99,92 (class A) Not less than 99,8 (class B)

4. FIRST AID MEASURE

4.1 Description of first aid measures	
4.1.1 Inhalation:	Fresh air, rest, heat. Free from clothes that hampers breathing. At respiratory impairment – oxygen inhalation. At respiratory standstill – mouth-to-mouth ventilation. Hospitalization.
4.1.2 Eye contact:	Rinse with running water. Get medical attention.
4.1.3 Skin contact:	Rinse with running water. In case of frostbite put on an antibacterial dressing. Get medical attention.
4.1.4. Ingestion:	Unlikely route of exposure.
4.2. The most important symptoms and effects (acute and late)	
4.1.1. Inhalation:	Headache, dizziness, asthenia, somnolency, intoxication, respiratory impairment and movement disorder, spasms.
4.1.2 Eye contact:	Eye contact with liquid freon may cause frostbite.
4.1.3. Skin contact:	Skin contact with liquid freon may cause frostbite.
4.1.4. Ingestion:	Unlikely route of exposure.
4.3. Medical aid measures:	None known.

5. FIRE-FIGHTING MEASURES

5.1 Octafluoropropane is a noncombustible and explosion-proof substance.

5.1.1. Suitable fire-fighting measures:	Containers (tanks) may explode at heating, in case of fire they must be cooled by water from a maximum distance, do not approach.
5.1.2 Unsuitable fire-fighting measures:	None known.
5.1.3 Explosion hazards:	Exposure to extreme heat can give rise to thermal decomposition
5.1.4 Protective equipment for firemen:	Firemen should wear self-contained breathing apparatus (SCBA) and heat-resistant suits and gloves to protect the skin, eyes and respiratory system from contact with toxic fumes. Firefighters and their equipment should be thoroughly decontaminated with a water wash-down after fire and smoke exposure. Machinery and equipment that is involved in a fire must also be decontaminated prior to commencing repair or salvage operation.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions:	For personal protection see Sections 5 and 8.

6.2 Environmental precautions:	Avoid release to the environment.
6.3 Methods of cleaning up:	Consider evacuation. Ensure adequate ventilation. Shut off leaks if without risk. In case of intensive gas leak ventilate the area. Isolate the area until the gas dissipates. Use sprayed water for dissipation (isolation). Wear appropriate personal protective equipment, avoid direct contact. The vapour is heavier than air; beware of pits and confined spaces.
For disposal information see Section 13.	

7. HANDLING AND STORAGE

7.1 Handling:	
7.1.1 General recommendations:	For industrial or professional use only. Usual safety precautions for handling chemicals should be observed: avoid inhalation of gas, avoid contact with eyes and skin, keep container tightly closed. Store work clothes separately from other clothing, food and tobacco products. Do not smoke. Keep personal hygiene, take a shower after work.
7.1.2 Technical measures:	Closed design equipment for product handling and exhaust ventilation should be applied to insure limits set up in Section 8 of this MSDS. Routine measurement of substance content in the air of working area is necessary.
7.1.3 Fire prevention measures:	Prevention of flammable medium development, absence of ignition sources, prohibition of open flame usage.
7.2 Storage:	
7.2.1 Conditions of storage:	Containers and tanks with octafluoropropane should be stored in the storage premises. Protect from sunlight and heating. Octafluoropropane may be stored in the open area; in this case containers and tanks should be covered by tarpaulin or they must be stored under the shed for protecting the gas from sunlight. Guaranteed shelf life - 3 year from the date of manufacturing.
7.2.2 Incompatible materials:	Should be stored apart from oxidants, acids, alkalis.
7.2.3 Packing materials:	Tanks of capacity from 5 to 100 dm^3 and containers according to the effective normative documents, intended for excess pressure not less than 1, 6 MPa, provided with oxygen valves of VK-74 type, needle valves or any other valves of bellows, gate or diaphragm type. Tanks of 5, 10, 12 dm^3 capacity should be packed up into wooden boxes.
7.2.4 Other information:	Per each 1 dm^3 of the container capacity no more than 1, 1 kg of liquefied octafluoropropane should be pour in.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Exposure limit values:	
Maximum allowable concentration:	3000 mg/m^3 (within the CIS)
8.2 Exposure limits of decomposition products:	

PRODUCT NAME	Molecular formula	CAS number	REGIONS				
			CIS	USA			UK
			MAC	ACGIH, TLV	OSHA, PEL	NIOSH, REL	EH40, TLV/TWA
Hydrogen Fluoride	HF	7664-39-3	0,5 mg/m^3	3 ppm 2,6 mg/m^3	3 ppm 2,6 mg/m^3	3 ppm 2,5 mg/m^3	1,8 ppm 1,5 mg/m^3
Carbonyl Fluoride	COF_2	353-50-4	none	2 ppm 5,4 mg/m^3	none	2 ppm 5,4 mg/m^3	none
Fluorine	F_2	7782-41-4	0,03 mg/m^3	none	none	none	- 0,2 mg/m^3

Carbon Monoxide	CO	630-08-0	20 mg/m^3	25 ppm 29 mg/m^3	50 ppm 55 mg/m^3	35 ppm 40 mg/m^3	30 ppm 35 mg/m^3
Carbon Dioxide	CO_2	124-38-9	5000 mg/m^3	5000 ppm 9000 mg/m^3	5000 ppm 9000 mg/m^3	5000 ppm 9000mg/m^3	5000 ppm 9150 mg/m^3

MAC = Maximum Allowable Concentration
TLV = Threshold Limit Value
REL = Recommended Exposure Limit
PEL = Permissible Exposure Limit
TLV/TWA = Threshold Limit Value-Time-Weighted Average

8.3. Exposure controls:	
8.3.1. Technical measures:	Industrial premises where the operations with octafluoropropane are being held should be equipped with the influx-and-extract or local venting, and leaktight equipment, to provide exposure limits given in this section.
8.3.2 Monitoring procedures:	Monitoring the air of the working area.
8.4 Personal protection:	
8.4.1 Respiratory protection: 	Respirator ShMP with the filter DOT for respirators of A2B3E3P3 or BKF (GOST 12.4.121, GOST R 12.4.193-99, EN141, GOST R 12.4.194-99, EN143). In case of emergency – insulating respirator.
8.4.2. Hand protection: 	Cotton gloves or gauntlets.
8.4.3. Eye protection: 	Protective goggles (GOST 12.4.013-97, EN166-168, 170, EN166-2001)
8.4.4. Skin protection: 	Working clothes: cotton suit (GOST 27653-88)
8.4.5 Hygiene measures:	General industrial hygiene regulations are to be observed. Hygienic shower before the end of the working day Eating, drinking and smoking should be prohibited in the working area.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 General information:	
Appearance	Gas
Color	Colorless
Odor	Odorless
9.2 Important health, safety and environmental information:	
pH value of an aqueous dispersion:	Not established
Boiling point / Boiling range:	- 36,8 °C (P=0,101 MPa)
Flash point:	Noncombustible
Flammability:	Noncombustible
Explosive properties:	Explosion-proof
Vapour pressure:	0,7631 MPa (20°C)
Density (gas) :	7,848 kg/m^3 (20°C)
Density (liquid) :	1543 kg/m^3 (-15°C), 1353 kg/m^3 (20°C)
Water solubility:	Insoluble
Solubility in other solvents:	Slightly soluble in fats
Partition coefficient: n-octanol / water :	None known

9.3 Other information:	
Melting point:	- 148,3°C
Critical temperature:	71,9°C
Critical pressure:	2,677 MPa
Critical density:	628 kg/m^3
10. STABILITY AND REACTIVITY	
10.1. Reactivity:	Renewable, may react with sodium.
10.2. Stability:	Stable under normal conditions. Decomposes at the temperature above 730°C
10.3 Possibility of hazardous reactions:	Stable under normal conditions.
10.3 Conditions to avoid:	Heat.
10.4 Materials to avoid:	Oxidizing agents, acids, alkalis.
10.5 Hazardous decomposition product(s):	Thermal decomposition products - hydrogen fluoride, difluorophosgene, fluorine, oxides of carbon.
11. TOXICOLOGICAL INFORMATION	
11.1 Acute animal toxicity data:	
Inhalation:	CL_{50}, mg/m^3 | Exposure time, h | Kind of animal 5694000 | 2 | mice
11.2. Routes of exposure:	Inhalation, eye contact, skin contact.
11.3 Chronic effects from long-term exposure:	Inhalation of 8294 mg/m³ of gas by rats (4 hours each day during 30 days) changed behavioral reactions, improved haemoglobin level.
11.4 Sensitization, carcinogenicity, мutagenicity, reproductive toxicity:	Mutagenic activity is not defined; the rest activities have not been examined.
12. ECOLOGICAL INFORMATION	
12.1. Ecotoxicity:	Low toxicity to aquatic organisms.
12.2. Persistence and degradability:	Extremely stable substance in abiotic conditions ($t_{1/2}$ > 30 days). Transforms in the environment.
12.3. Bioaccumulation potential:	BCF = 50. The substance has low potential for bioaccumulation.
12.4 Mobility in soil:	Koc = 1038. The product has moderate mobility in soil.
12.5 Results of PBT and VPVB assessment:	Not classified.
12.6 Other adverse effects:	Does not contribute to ozone depletion. ODP=0. For large quantities - May contribute to global warming. HGWP> 8. GWP> 34000.
13. DISPOSAL CONSIDERATIONS	
13.1 Disposal considerations:	Return the packing with unused product to the supplier.
13.2 Packing disposal:	The packing is recoverable. Subject to return.
14. TRANSPORT INFORMATION	
14.1 UN number:	2424
14.2 Shipping name:	Octafluoropropane (refrigerated gas R-218)

14.3 Transport hazard class(es):	class 2 (classification code 2212) Sign of danger: 
14.4 Packing group:	Not applicable
14.5 Dangers for environment:	None known
14.6 Safety tips for user:	R20: Harmful by inhalation
14.7 According to the MARPOL Annex II 73/78 and IBC:	Not classified as a Marine Pollutant.

15. REGULATORY INFORMATION

15.1 Montreal Protocol on Substance that deplete the Ozone Layer approved by the government of the U.S.S.R. in November 1988. The Kyoto Protocol to the United Nations Framework Convention on Climate Change (ratified by the Federal law of the RF from 04.11.2004 № 128-FZ: the Administrative Regulations on the Classification of Substances hazardous to Waters (Germany, 17.05.99)	Octafluoropropane does not belong to the substances that deplete the ozone layer. Regulated as a greenhouse gas. According to the Classification of Water Hazard Classes (WGK, Germany), octafluoropropane is concerned as a substance of class 1 (low-hazard substances as compared to dangerous to water).
15.2 The Legislation of the Russian Federation:	The Regulations of the Russian Federation “About the Protection of Consumer”, “About Environment Protection”, “About the Sanitation and Epidemiological Control”, “About the Technical Regulation”.

16. OTHER INFORMATION

16.1 R-phrases, S-phrases:	According to Directive 67/548/EEC & Directive 1999/45/EC None None
16.3 List of informational sources used in the preparation of the Safety Data Sheet:	1 Data card of Russian Register of Potentially Hazardous Chemical and Biological Substances. Octafluoropropane. Certificate of state registry VT 002720 from 24.04.2005. 2 TU 2412-147-05807960-2003 Octafluoropropane (Khladon 218, perfluoropropane). 3 “Industrial fluoroorganic products”, Reference book /B.N. Maksimov, V.G. Barabanov/, Publishing house “Chimia”, Saint-Petersburg, 1996. 4 “Indexes of dangerous substances and materials“, editor V.K. Gusev, I.D. Sytin Foundation, Moscow, 2002.

ANNEX
Exposure Scenario

Information item	Proposed ES1
Product Identification	
Product name as it appears on SDS	Octafluoropropane
Short title exposure scenario	
Internal name	Octafluoropropane
Sector(s) of Use (SU)	SU 3 Industrial Manufacturing (all)
Process Category(ies) (PROC)	PROC 2 Use in closed, continuous PROC ess with occasional controlled exposure (e.g. sampling), Industrial setting
Product OR Article category	
Product Category(ies). (PC)	PC_16_n PC 16 Heat Transfer Fluids
Article Category(ies). (AC)	
Environmental Release Category(ies) (ERC)	ERC7 Industrial use of substances in closed systems
Processes and activities	
Life Cycle Stage	Use
Optional: Provide additional information on processes and activities if needed	Liquefied gas Incombustible
Max. process temperature.	700°C
Human health - Workers	
Type of use	Industrial
Physical form under conditions of use	Gas
Dustiness category for solid substances.	
Max. duration of inhalatory exposure.	15 minutes to 1 hour
Outdoor or indoor operation and application of Local Exhaust Ventilation (LEV)	Indoor with LEV
Use of respiratory protection equipment (RPE).	>90%
Use of dermal protective clothes and gloves.	Yes
Dilution factor of the product.	1
Consumer exposure	
Product Sub-category(ies)	
Article Sub-category(ies)	
Is the Product a spray?	No
Maximum fraction of the product in the consumer	1

product used per consumer per event	
Max. dermal contact area with skin	2 inside hands / one hand / palm of hands
Max. oral contact area with mouth	1 some fingertips
Maximum amount used per consumer per event	Not applicable
Optional : provide risk management measures if needed	Avoid spraying directly into eyes or nose
Environmental exposure	
Maximum amount of product used per year. If the amount used is variable, use the higher value as the maximum tonnage to be coverd.	10
Use of sewage/waste water treatment plant (STP) for selected ERC	No
Max. number of emission days per year	20
Industry sector for spERC	
Industry sector spERC - will overwrite ERC in risk assessment	
Treatment of waste air	Carbon Filter
Treatment of waste solids	Other (specify below)
	Not required
Treatment of waste liquids (not for waste water - see 6.2.4)	Other
Treatment of waste water	
Pre-treatment	None
Sewage/waste water treatment plant (STP) description:	
- give flow rates and describe capacity of STP	
- elimination rate in STP	
- dry weather river flow rate	
- describe sludge solids disposal	
Waste Management Measures	
Information on measures to control risk during production and use stages of substance, preparation or article	This material and its container must be disposed of in a safe way

Information on measures to control risk at the end of service life of substance, preparation or article	This material and its container must be disposed of in a safe way
Exposure prediction	
Do you have relevant measurement data available (worker exposure, environmental release, consumer safety) for the applicable PROC's, ERC's and PC's/AC's.	Yes
If yes, please attach this information. Please indicate the conditions under which the measurements have been taken.	PDK (CIS) 3000 mg/m3
Boundaries set by Exposure Scenario	
Please provide additional information that you deem relevant for this use, Operational Conditions and Risk Management Measures	Harmful by inhalation. Do not breathe gas/fumes/vapour/spray (appropriate wording to be specified by the manufacturer). In caseof insufficient ventilation, wear suitable respiratory equipment