SAFETY DATA SHEET

ACCORDING TO EC-REGULATION 1272/2008 (CLP/GHS).

1. SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name	1,1-difluoroethylene
Chemical name	1,1-difluoroethylene
Trade name	1,1-difluoroethylene
Alternative names	Monomer-2; 1,1-difluoroethylene; Vinylidene fluoride; VDF
Formula	$C_2H_2F_2$
EC No.	200-867-7
REACH registration No.	01-2119474211-48-0009
CAS No.	75-38-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified use(s)	Intended for production of various polymers and copolymers, and as raw material in organic synthesis
Uses advised against	None when used as intended

1.3 Details of the supplier of the Safety Data Sheet

1.3.1	Manufacturer	«HaloPolymer Kirovo-Chepetsk», LLC per. Pozharny, 2, 613040, Kirovo-Chepetsk, Kirov Region, The Russian Federation.
	Telephone	+7-83361-9-4281
	Fax	+7-83361-9-3594
	Website	www.halopolymer.com
1.3.2	Only representative of a non-Community manufacturer	URALCHEM Assist GmbH Johannssenstrasse 10 30159, Hannover, Germany
	Telephone	+49-511/45 99 444
	Fax	+49-511/45 99 446
	E-mail	info@uralchem-assist.de

1.4 Emergency telephone number

Manufacturer/supplier:	+7-83361-9-4250 [24 hours.]
Emergency number	
Europe	112
Great Britain	+44 (0) 203 394 9870 (24/7)
The USA	+1-877 271 7077 Consult the relevant national official advisory body if necessary

2. SECTION 2: HAZARDS IDENTIFICATION

Classification and labeling have been performed according to Regulation (EC) No. 1272/2008 (CLP/GHP)

2.1 Classification of the substance

2.1.1 Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard class and category:
Flammable gases (Flam. Gas 1)
Gases under pressure (Liquefied gas)

Hazard statement:
H220: Extremely flammable gas.
H280: Contains gas under pressure; may explode if heated.

2.2 Label elements

Labeling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard Pictogram:

GHS02

GHS04

Signal word: Danger

Hazard statements:
H220: Extremely flammable gas.
H280: Contains gas under pressure; may explode if heated.

Precautionary Statements:
P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.
P403 Store in a well-ventilated place.
P410 + P403: Protect from sunlight. Store in a well-ventilated place.

2.3 Other hazards
Liquefied gas; containers with the product may explode if heated. Thermal decomposition will evolve toxic and corrosive vapours. Liquid product causes tissue frostbite.

2.4 Additional Information
See Section 11

3. SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Product identifier type in accordance with Article 18(2) of Regulation (EC) No 1272/2008	Identifier number	Identification name	Weight % content (or range)	EC Number
CAS number	75-38-7	1,1-difluoroethylene	over 99.97	200-867-7

3.2 Mixtures
Not applicable.

3.3 Additional Information
None.

4. SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation
Move to fresh air.
Oxygen or artificial respiration if needed.
Victim to lie down in the recovery position, cover and keep him warm.
Call a physician immediately

Skin Contact
Take off contaminated clothing and shoes immediately.
Wash off immediately with plenty of water.
Keep warm and in a quiet place.
Call a physician or poison control centre immediately.
Wash contaminated clothing before re-use.

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Call a physician or poison control centre immediately.
Take victim immediately to hospital.

Ingestion
Call a physician or poison control centre immediately.
Take victim immediately to hospital.

If swallowed, rinse mouth with water (only if the person is conscious).
Do NOT induce vomiting.
Artificial respiration and/or oxygen may be necessary.

4.2	**Most important symptoms and effects, both acute and delayed**	Repeated exposure to 1,1-difluoroethylene can cause headache, dizziness, disorientation, nausea and vomiting.
4.3	**Indication of immediate medical attention and special treatment needed**	No specific requirements

5. SECTION 5: FIRE-FIGHTING MEASURES

5.1	**Extinguishing Media**	
	Suitable Extinguishing Media	Use large volumes of water as fog. Large fires: sprayed water or fog. Small ignitions: dry chemical or CO_2.
	Unsuitable Extinguishing Media	All fire-extinguishing means except carbon-dioxide fire extinguishers, inert gases, and sprayed water.
5.2	**Special hazards arising from the substance or mixture**	Extremely flammable
5.3	**Advice for fire-fighters**	Do not extinguish the fire unless the flow of gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out. Vapors are heavier than air and will collect in low areas. Vapors may travel long distances to ignition sources and flashback. Vapors in confined areas may explode when exposed to fire. Containers may explode in fire. Storage containers and parts of containers may rocket great distances, in many directions. If material or contaminated runoff enters waterways, notify downstream users of potentially contaminated waters. Notify local health and fire officials and pollution control agencies. From a secure, explosion-proof location, use water spray to cool exposed containers. If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors or shows any signs of deforming), withdraw immediately to a secure position. If cylinders are exposed to excessive heat from fire or flame contact, withdraw immediately to a secure location.

6. SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1	**Personal precautions, protective equipment and emergency procedures**	Advice for non-emergency personnel: - Prevent further leakage or spillage if safe to do so. - Keep away from Incompatible products (see Section 10). Advice for emergency responders: - Evacuate personnel to safe areas. - Keep people away from and upwind of spill/leak. - Ventilate the area. - Wear suitable protective clothing. Refer to protective measures listed in sections 7 and 8.
6.2	**Environmental precautions**	Should not be released into the environment.
6.3	**Methods and material for containment and cleaning up**	Allow small spillages to evaporate provided there is adequate ventilation.
6.4	**Reference to other sections**	See Sections 7, 8 and 13
6.5	**Additional Information**	None

7. SECTION 7: HANDLING AND STORAGE

7.1	**Precautions for safe handling**	Work under hood. Do not inhale substance. Advice on protection against fire and explosion: Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.
7.2	**Conditions for safe storage, including any incompatibilities**	Store gas cylinders in a cool, dry place and use the safety precautions necessary with all liquefied gases. High concentrations cause a deficiency of oxygen with the risk of unconsciousness or death. Check oxygen content is at least 19% before entering storage or spill area. Store in tightly closed containers in a cool, well-ventilated area away

from heat. Sources of ignition, such as smoking and open flames, are prohibited where this chemical is used, handled, or stored in a manner that could create a potential fire or explosion hazard. Use only nonsparking tools and equipment, especially when opening and closing containers of this chemical

7.3 Specific end use(s)

Intended for production of various polymers and copolymers, and as raw material in organic synthesis

8. SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational Exposure Limits

Substance	1,1-Difluoroethene			
CAS No.	75-38-7			
	Limit value - Eight hours		Limit value - Short term	
	ppm	mg/m³	ppm	mg/m³
Belgium	500	1330		
Canada - Ontario	500			
Spain	500			
USA - NIOSH	1		5 (1)	
	Remarks			
USA - NIOSH	(1) ceiling limit value (15 min)			

8.1.2 Biological limit value

No information available.

8.1.3 PNECs and DNELs

Long-term - systemic effects
DNEL for workers, Inhalation - 1045 mg/m^3
DNEL for the general population - 260 mg/m^3

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

8.2.2 Personal protection equipment

Eye/face protection

Safety glasses and face shield. At work use shock-proof safety glasses without ventilation.

Skin protection

Protective gloves. Use butyl rubber and Viton as protective materials.

Respiratory protection

Misuse of respirators is dangerous. As per OSHA 1910.134 such equipment may be used only with a written admission that takes into account working conditions, staff training requirements, results of respirator test, and medical checkup.
If there is a probability that the exposure level is above 1 ppm, use approved NIOSH with full face-piece and forced air supply or of similar design. To increase the level of protection, use it together with a self-contained breathing apparatus.

	Skin and body protection	Appropriate protective clothing, shoes, headwear that prevent the contact of vinylidene fluoride with skin. Use butyl rubber and Viton as protective materials. All protective clothes must be clean, available each day, and put on before working.
	Hygiene measures	Follow the industrial hygiene precautions (in rooms where the product is handled): - workers whose clothes are become dirty with 1,1- difluoroethylene must change into the clean clothes in proper time; - eating, smoking, and drinking are not allowed; - it is necessary to wash hands before eating, drinking, smoking, or going to the toilet; - after working shift it is necessary to take a shower-bath.
8.2.3	**Environmental Exposure Controls**	Control of product content in atmospheric air. Use closed systems, ventilation. To avoid the product release to atmosphere, the workroom air must be cleaned and directed for dispersion to atmosphere. Waste water of production process must be treated according to the manufacturing instructions.

9. SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1	**Information on basic physical and chemical properties**	
	Physical state at 20°C and 101.3 kPa	Liquefied gas
	Colour	Colourless.
	Odour	Odourless.
	Melting Point (°C) / Freezing Point (°C)	-144
	Boiling point	-83
	Flash Point (°C)	≤-65
	Flammability (solid, gas)	extremely flammable
	Explosive limit ranges	5.8 to 20.3%
	Vapour Pressure @ 20°C (hPa)	35900
	Surface tension	Not applicable
	Relative density (g/cm^3) @ 20ºC	Not available
	Solubility (Water) (mg/L) @ 28ºC	254
	Stability in organic solvents and identity of relevant degradation products	Not applicable
	Partition Coefficient (n-Octanol/water) @ 20ºC	1.24
	Self-ignition temperature (°C)	640
	Viscosity (mPa.s)	Not applicable
	Explosive properties	Not applicable
	Oxidising properties	Not applicable
9.2	**Other information**	None

10.SECTION 10: STABILITY AND REACTIVITY

10.1	**Reactivity**	Polymerizes with evolution of heat. Avoid contact with air, light, water or storage and use above room temperature. Closed containers may rupture violently.
10.2	**Chemical stability**	Stable under recommended storage conditions.
10.3	**Possibility of hazardous reactions**	The substance may polymerize releasing a large amount of heat, with fire or explosion hazard.
10.4	**Conditions to avoid**	A very dangerous fire hazard when exposed to heat, flame, or oxidizers. Explosive in the form of vapor when exposed to heat or flame. Violent reaction with hydrogen chloride when heated under pressure.
10.5	**Incompatible materials**	Reacts violently with oxidants and many other materials, causing fire and explosion hazard.
10.6	**Hazardous Decomposition Product(s)**	The substance decomposes on heating or on burning producing toxic and corrosive fumes including hydrogen fluoride, fluorine and fluorides.

11.SECTION 11: TOXICOLOGICAL INFORMATION

11.1	**Information on toxicological effects**	
11.1.1	**Acute toxicity**	
	Inhalation / Skin Contact / Eye Contact	Inhalation: LCLo (rat)(1 h): > 200000 ppm (Animals were observed for 7 days after exposure, no effects were noted) Based on the 4 hours LC50of > 50000 ppm (130000 mg/m3) in rats and the absence of other major significant effects, vinylidene fluoride does not need to be classified for acute toxicity according to EU Directive 67/548/EEC and EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008.
11.1.2	**Skin corrosion/irritation**	The gaseous nature of vinylidene fluoride precludes the conduct of conventional skin tests in animals.
11.1.3	**Serious eye damage/irritation**	The gaseous nature of vinylidene fluoride precludes the conduct of conventional eye irritation tests in animals.
11.1.4	**Respiratory or skin sensitization**	The gaseous nature of vinylidene fluoride precludes the conductance of conventional skin sensitisation studies in animals
11.1.5	**Mutagenicity**	Negative mutagenicity tests support no classification
11.1.6	**Carcinogenicity**	Based on the absence of neoplastic lesions in rats exposed to concentrations up to 10000 ppm (26000 mg/m3) for 2 years, classification of vinylidene fluoride for carcinogenicity is not warranted according to EU Directive 67/548/EEC and EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008.
11.1.7	**Reproductive toxicity**	Based on the available data, classification for effects on fertility and developmental toxicity is not warranted according to EU Directive 67/548/EEC or EU Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation (EC) No. 1272/2008.
11.2	**Other information**	None

12.SECTION 12: ECOLOGICAL INFORMATION

12.1	**Toxicity**	Based on all available ecotoxicological data for daphnids, fish and algae, VDF not need to be classified according to Directive 67/548/EEC since the lowest estimated effect concentration is 150 mg/L in green algae. And although VDF is not expected to be readily biodegradable based on results with structural analogues, the substance is not bioaccumulative based on its low log Kow of 1.24.
12.2	**Persistence and degradability**	Not available
12.3	**Bioaccumulative potential**	VDF has a calculated log Kow of 1.24. This value indicates that possible bioaccumulation in the food chain is not significant. Based on its limited water solubility and the substance being a gas, it can be concluded that VDF will volatilize rapidly, and therefore partition nearly exclusively to air (>99%) and will not remain in the water. Significant contact with the organisms in the food chain can therefore considered to be negligible.
12.4	**Mobility in soil**	The test substance is a gas under all environmental conditions and only slightly soluble in water. It has a high vapour pressure and therefore environmental releases will result in virtually all of the substance compartmentalising into the atmosphere. Any potential atmospheric deposition to land and water would result in rapid redistribution from soil and water due to its volatility and low sorption to soil.
12.5	**Results of PBT and VPVB assessment**	An assessment of the PBT status of VDF has been made using all available data. The information available suggests that VDF does not meet the PBT screening criteria as outlined in Directive 2006/121/EC
12.6	**Other adverse effects**	No information available.

13.SECTION 13: DISPOSAL CONSIDERATIONS

13.1	**Waste treatment methods**	Pressurized gas bottle: dispose of only in empty condition! Dispose of contents in accordance with local, state or national legislation.
13.2	**Additional Information**	
13.2.1	Contaminated packaging:	Where possible recycling is preferred to disposal or incineration. Dispose as unused product according to the local and national standards.

14.SECTION 14: TRANSPORT INFORMATION

14.1	**Land transport (ADR/RID):**	
	UN-No.:	1959
	Proper shipping name	1,1-difluoroethylene
	Transport hazard class(es)	2.1
	Labels	Label 2.1 : flammable gas
14.2	**Inland water ways transport (ADN):**	
	UN-No.:	1959
	Proper Shipping Name:	1,1-difluoroethylene
	Class:	2.1
	Hazard Label(s):	Label 2.1 : flammable gas
14.3	**Marine transport (IMDG)**	
	UN-No.:	1959
	Proper Shipping Name:	1,1-difluoroethylene (REFRIGERANT GAS R 1132a)
	Class:	2.1
	Hazard Label(s):	Label 2.2 : flammable gas.
	EmS number	F-D,S-U
14.4	**Additional information:**	None

15.SECTION 15: REGULATORY INFORMATION

15.1	**Safety, health and environmental regulations/legislation specific for the substance or mixture**	
15.1.1	**EU regulations**	
	Authorisations and/or restrictions on use	None known.
15.1.2	**National regulations**	Hazard classification - In accordance with: State Standard of Russian Federation (GOST 12.1.007). Label elements - In accordance with: State Standard of Russian Federation (GOST 31340-07).
15.2	**Chemical Safety Assessment**	Available.

16.SECTION 16: OTHER INFORMATION

16.1 Classification of the substance

16.1.1 Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard class and category:
Flammable gases (Flam. Gas 1)
Gases under pressure (Liquefied gas)

Hazard statement:
H220: Extremely flammable gas.
H280: Contains gas under pressure; may explode if heated.

Label elements
Hazard Pictogram:

GHS02

GHS04

Signal word:	Danger
Hazard statements:	H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.
Precautionary Statements	P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking. P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381 Eliminate all ignition sources if safe to do so. P403 Store in a well-ventilated place. P410 + P403: Protect from sunlight. Store in a well-ventilated place.

16.2 LEGEND

STOT	Specific Target Organ Toxicity
DNEL	Derived No Effect Level
PNEC	Predicted No Effect Concentration
PBT	PBT: Persistent, Bioaccumulative and Toxic

Additional Information

Occupational sanitary-hygienic standards of Russian Federation:
ОБУВ= 30 мг/м3
(ОБУВ) – Ориентировочные безопасные уровни воздействия загрязняющих веществ

Annex to the extended Safety Data Sheet (eSDS)

No information available.