SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name

R449A

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

Relevant identified uses of the substance or mixture
Industrial Use
Professional use
Refrigerant

Uses advised against
Consumer use

1.3 Details of the supplier of the safety data sheet

Address
TEGA - Technische Gase und Gasetechnik GmbH
Werner-von-Siemens-Straße 18
97076 Würzburg

Telephone no.	+49 931 2093-220
Fax no.	+49 931 2093-180
e-mail	kaeltemittel@tega.de

Advice on Safety Data Sheet
sdb_info@umco.de

1.4 Emergency telephone number

For medical advice (in German and English):
+49 (0)551 192 40 (Giftinformationszentrum Nord)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification in accordance with Regulation (EC) No 1272/2008 (CLP)
Press. Gas liq.; H280

Classification information
This product is assessed and classified using the methods and criteria below referred to in Article 9 of Regulation (EC) n° 1272/2008:
Physical hazards: determined through assessment data based on the methods or standards referred to in part 2 of Annex I to CLP
Health hazards and environmental hazards: determined through toxicological and ecotoxicological assessment data based on the methods or standards referred to in Part 3, 4 and 5 of Annex I to CLP.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP Regulation)

Hazard pictograms

GHS04

Signal word
Warning

Hazard statement(s)

H280	Contains gas under pressure; may explode if heated.

Precautionary statement(s)

P410+P403 Protect from sunlight. Store in a well-ventilated place.

Supplemental label elements
Contains fluorinated greenhouse gases (HFC-134a, HFC-125, HFC-32, HFC-1234yf).

2.3 Other hazards

Danger of suffocation by displacement of air / oxygen. Contact with the liquid can cause cold burns or frostbite. Abuse or intentional inhalation can be fatal as a result of effects on the heart without alarming symptoms.

PBT assessment
The product is not considered to be a PBT.

vPvB assessment
The product is not considered to be a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Substances

Not applicable. The product is not a substance.

3.2 Mixtures

Chemical characterization
Fluorinated hydrocarbons

Hazardous ingredients

No	Substance name		Additional information	
	CAS / EC / Index / REACH no	Classification (EC) 1272/2008 (CLP)	Concentration	%
1	**norflurane**			
	811-97-2 212-377-0 - 01-2119459374-33	Press. Gas liq.; H280	>= 25.00 - < 50.00	Vol%
2	**2,3,3,3-tetrafluoroprop-1-ene**			
	754-12-1 468-710-7 - 01-0000019665-61	Flam. Gas 1A; H220 Press. Gas liq.; H280	>= 25.00 - < 50.00	Vol%
3	**pentafluoroethane**			
	354-33-6 206-557-8 - 01-2119485636-25	Press. Gas liq.; H280	>= 10.00 - < 25.00	Vol%
4	**difluoromethane**			
	75-10-5 200-839-4 - 01-2119471312-47	Flam. Gas 1A; H220 Press. Gas liq.; H280	>= 10.00 - < 25.00	Vol%

Full Text for all H-phrases and EUH-phrases: pls. see section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove affected person from danger area, lay him down. Seek medical advice immediately.

After inhalation
Remove affected persons from dangerous area by observing suitable respiratory protection measures. Ensure supply of fresh air. Irregular breathing/no breathing: artificial respiration. Call a doctor immediately.

After skin contact
In case of contact with skin wash off immediately with soap and water. Rinse with much water in case of frostbites. Remove chlothes only after unfreezing. Cover wounds with sterile dressing. Call a doctor immediately.

After eye contact
Remove contact lenses. Rinse eye thoroughly under running water keeping eyelids wide open and protecting the unaffected eye (at least 10 to 15 minutes). Seek medical assistance.

After ingestion
Rinse the mouth thoroughly with water. Do not induce vomiting. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms
The following symptoms may occur: cardiac arrhytmia; respiratory arrest. anesthetic effect; Light-headedness; Dizziness; confusion; Unconsciousness; muscle incoordination; nausea; Skin irritation; reddening of the skin; Eye irritation; red eyes; Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

4.3 Indication of any immediate medical attention and special treatment needed
Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Product itself is non-combustible; adapt fire extinguishing measures to surrounding areas.

Unsuitable extinguishing media
High power water jet

5.2 Special hazards arising from the substance or mixture
In the event of fire, the following can be released: Carbon monoxide and carbon dioxide; Hydrogen fluoride (HF); Carbonyl fluoride; fluorine compounds; Liquefied gas: Spilled liquid can cause cold burns. This gas is heavier than air and may accumulate in low areas. The product is not flammable. Exposure to heat may cause bursting of the vessels.

5.3 Advice for firefighters
Use self-contained breathing apparatus. Wear full protective suit. Containers close to fire should be transferred to a safe place. Cool closed containers exposed to fire with water. Pressure increase, bursting and explosion hazard during heating. Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Refer to protective measures listed in sections 7 and 8. Provide good room ventilation even at ground level (vapours are heavier than air). Do not breathe gas. Keep away from ignition sources. Use personal protective clothing. Cordon and mark contaminated area. Remove persons to safety. Avoid skin contact with leaking liquid (danger of frostbite!).

For emergency responders
No data available. Personal protective equipment (PPE) - see Section 8.

6.2 Environmental precautions
Avoid release in the environment. Suppress gases/vapours/mists with water spray jet.

6.3 Methods and material for containment and cleaning up
Ensure adequate ventilation. Dispose of absorbed material in accordance with the regulations.

6.4 Reference to other sections
Information regarding safe handling, see section 7. Information regarding personal protective measures, see section 8. Information regarding waste disposal, see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Only qualified and trained persons are authorised to handle. Provide good ventilation at the work area (local exhaust ventilation, if necessary). To be used only according to instructions for use. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose containers heat or sources of ignition. In case of accidental release: danger due to low temperature of the liquid product. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Comply with the health and safety at work laws.

General protective and hygiene measures
Wash hands before breaks and after work. Do not inhale gases. Do not eat, drink or smoke during work time. Keep away from foodstuffs and beverages. Have emergency shower available.

Advice on protection against fire and explosion
The product is not combustible. Isolate from sources of heat, sparks and open flame. Take precautionary measures against electrostatic loading (earthing necessary during loading operations). Electrical equipment should be protected to the appropriate standard.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Keep container tightly closed in a cool, well-ventilated place, open and handle carefully. Protect from heat and direct sunlight.

Recommended storage temperature

Value	<	50	°C

Storage stability

Value	>	10	a
Comments	When stored properly, the storage life is unlimited.		

Requirements for storage rooms and vessels
Containers which are opened must be carefully closed and kept upright to prevent leakage. Always keep in containers of same material as the original.

Incompatible products
Do not store together with: self-heating substances and mixtures; self-reactive substances and mixtures; flammable substances; oxidizing agents; pyrophoric substances; explosives; toxic substances and mixtures; toxic substances and mixtures

7.3 Specific end use(s)
No data available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limit values

No	Substance name	CAS no.		EC no.	
1	**norflurane**	**811-97-2**		**212-377-0**	
	List of approved workplace exposure limits (WELs) / EH40				
	1,1,1,2-Tetrafluoroethane (HFC134a)				
	WEL long-term (8-hr TWA reference period)	4240	mg/m³	1000	ppm

DNEL, DMEL and PNEC values

DNEL values (worker)

No	Substance name			CAS / EC no	
	Route of exposure	Exposure time	Effect	Value	
1	**norflurane**			**811-97-2** **212-377-0**	
	inhalative	Long term (chronic)	systemic	13936	mg/m³
2	**2,3,3,3-tetrafluoroprop-1-ene**			**754-12-1** **468-710-7**	
	inhalative	Long term (chronic)	systemic	950	mg/m³

3	**pentafluoroethane**			**354-33-6 206-557-8**	
	inhalative	Long term (chronic)	systemic	16444	mg/m³
4	**difluoromethane**			**75-10-5 200-839-4**	
	inhalative	Long term (chronic)	systemic	7035	mg/m³

DNEL value (consumer)

No	Substance name			CAS / EC no	
	Route of exposure	Exposure time	Effect	Value	
1	**norflurane**			**811-97-2 212-377-0**	
	inhalative	Long term (chronic)	systemic	2476	mg/m³
2	**2,3,3,3-tetrafluoroprop-1-ene**			**754-12-1 468-710-7**	
	inhalative	Long term (chronic)	systemic	186400	mg/m³
3	**pentafluoroethane**			**354-33-6 206-557-8**	
	inhalative	Long term (chronic)	systemic	1753	mg/m³
4	**difluoromethane**			**75-10-5 200-839-4**	
	inhalative	Long term (chronic)	systemic	750	mg/m³

PNEC values

No	Substance name		CAS / EC no	
	ecological compartment	Type	Value	
1	**norflurane**		**811-97-2 212-377-0**	
	water	fresh water	0.1	mg/L
	water	marine water	0.01	mg/L
	water	fresh water sediment	0.75	mg/kg dry weight
	sewage treatment plant	-	73	mg/L
2	**2,3,3,3-tetrafluoroprop-1-ene**		**754-12-1 468-710-7**	
	water	fresh water	0.1	mg/L
	water	Aqua intermittent	1	mg/L
3	**pentafluoroethane**		**354-33-6 206-557-8**	
	water	fresh water	0.1	mg/L
	water	fresh water sediment	0.6	mg/kg dry weight
4	**difluoromethane**		**75-10-5 200-839-4**	
	water	fresh water	0.142	mg/L
	water	Aqua intermittent	1.42	mg/L
	water	fresh water sediment	0.543	mg/kg dry weight

8.2 Exposure controls

Appropriate engineering controls
Ensure adequate ventilation, local exhaust at the work station if necessary. If these are not sufficient to maintain concentrations of particulates and solvent vapour below the OEL, suitable respiratory protection must be worn.

Personal protective equipment

Respiratory protection
Self-contained breathing apparatus. In case of insufficient ventilation or long-term effect use breathing apparatus. Danger of suffocation due to high concentrations in breathing air.
Respiratory filter (gas) : AX

Eye / face protection

Tightly fitting safety glasses (EN 166).

Hand protection
Low-temperature-resistant gloves (EN 511). Sufficient protection is given wearing suitable protective gloves checked according to i.e. EN 374, in the event of risk of skin contact with the product. Before use, the protective gloves should be tested in any case for its specific work-station suitability (i.e. mechanical resistance, product compatibility and antistatic properties). Adhere to the manufacturer's instructions and information relating to the use, storage, care and replacement of protective gloves. Protective gloves shall be replaced immediately when physically damaged or worn. Design operations thus to avoid permanent use of protective gloves.
Appropriate Material Leather

Other
Chemical-resistant work clothes. Protective shoes.

Environmental exposure controls
Information regarding waste disposal, see chapter 13.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

State of aggregation
gas

Form
liquified gas

Colour
clear

Odour
slightly like ether

pH value
No data available

Boiling point / boiling range	
Value	-46 °C
Source	supplier

Melting point/freezing point
No data available

Decomposition temperature
No data available

Flash point
No data available

Ignition temperature
No data available

Oxidising properties
not oxidizing

Explosive properties
The product does not have explosive properties.

Flammability	
The product is not combustible.	
Source	supplier

Lower explosion limit	
none	
Method	ASTM E 681
Source	supplier

Upper explosion limit	
none	
Method	ASTM E 681
Source	supplier

Vapour pressure			
Value		12748	hPa
Reference temperature		25	°C

Relative vapour density	
Value	3.07
Source	supplier
Comments	Air = 1

Evaporation rate		
Value	>	1
Source	supplier	
Comments	CCl4 = 1	

Relative density		
Value	1.1	
Reference temperature	25	°C

Density
No data available

Solubility
No data available

Partition coefficient n-octanol/water (log value)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**norflurane**	**811-97-2**		**212-377-0**
log Pow			1.06	
Reference temperature			25	°C
with reference to	pH 6.0			
Method	OECD 107			
Source	ECHA			
2	**2,3,3,3-tetrafluoroprop-1-ene**	**754-12-1**		**468-710-7**
log Pow	appr.		2	
Reference temperature			25	°C
with reference to	pH 7			
Method	OECD 117			
Source	ECHA			
3	**pentafluoroethane**	**354-33-6**		**206-557-8**
log Pow			1.48	
Reference temperature			25	°C
with reference to	pH 6.34			
Method	OECD 107			
Source	ECHA			
4	**difluoromethane**	**75-10-5**		**200-839-4**
log Pow			0.21	
Reference temperature			25	°C
with reference to	pH 6,1			
Method	OECD 107			
Source	ECHA			

Kinematic viscosity
No data available

Particle characteristics

9.2 Other information

Other information

No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity
Dangerous reactions are not expected if the product is handled according to its intended use.

10.2 Chemical stability
Stable under recommended storage and handling conditions (See section 7).

10.3 Possibility of hazardous reactions
Stable under recommended storage and handling conditions (See section 7). Reacts with strong oxidizing agents.

10.4 Conditions to avoid
Temperatures > 50°C. Heat, naked flames and other ignition sources.

10.5 Incompatible materials
strong oxidizing agents

10.6 Hazardous decomposition products
None, if handled according to intended use. In case of fire: see section 5.

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute oral toxicity

No data available

Acute dermal toxicity

No data available

Acute inhalational toxicity

No	Substance name	CAS no.	EC no.
1	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7

LC50	>	405800	ppmV
Duration of exposure		4	h
State of aggregation	Gas		
Species	rat		
Method	OECD 403		
Source	ECHA		

Skin corrosion/irritation

No data available

Serious eye damage/irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No	Substance name	CAS no.	EC no.
1	norflurane	811-97-2	212-377-0

Type of examination	Genotoxicity in vitro
Species	Salmonella typhimurium
Method	OECD 471
Source	ECHA
Evaluation/classification	Based on available data, the classification criteria are not met.
Type of examination	Genotoxicity in vitro
Species	Human Lymphocyte
Method	OECD 473
Source	ECHA
Evaluation/classification	Based on available data, the classification criteria are not met.

Route of exposure	inhalational
Type of examination	Genotoxicity in vivo
Species	mouse
Method	EPA
Source	ECHA
Evaluation/classification	Based on available data, the classification criteria are not met.

2	**2,3,3,3-tetrafluoroprop-1-ene**	**754-12-1**	**468-710-7**
Type of examination		Genotoxicity in vitro	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
Type of examination		Genotoxicity in vivo	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
3	**pentafluoroethane**	**354-33-6**	**206-557-8**
Type of examination		in vitro gene mutation study in bacteria	
Species		Salmonella typhimurium / Escherichia coli	
Method		OECD 471	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
Type of examination		In vitro Mammalian Chromosomal Aberration Test	
Species		Chinese hamster Ovary (CHO)	
Method		OECD 473	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
Route of exposure		inhalational	
Type of examination		Mammalian Erythrocyte Micronucleus Test, In vivo	
Species		mouse	
Method		OECD 474	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
4	**difluoromethane**	**75-10-5**	**200-839-4**
Type of examination		in vitro gene mutation study in bacteria	
Species		Salmonella typhimurium / Escherichia coli	
Method		OECD 471	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
Type of examination		In vitro Mammalian Chromosomal Aberration Test	
Species		Human Lymphocyte	
Method		OECD 473	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	

Reproduction toxicity			
No	**Substance name**	**CAS no.**	**EC no.**
1	**norflurane**	**811-97-2**	**212-377-0**
Route of exposure		inhalational	
Species		mouse	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
2	**2,3,3,3-tetrafluoroprop-1-ene**	**754-12-1**	**468-710-7**
Type of examination		2 generation study	
Method		OECD 416	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	
Type of examination		Prenatal Developmental Toxicity Study	
Method		OECD 414	
Source		ECHA	
Evaluation/classification		Based on available data, the classification criteria are not met.	

Carcinogenicity			
No	**Substance name**	**CAS no.**	**EC no.**

1	norflurane	811-97-2	212-377-0
Route of exposure	inhalational		
Species	rat		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		

STOT - single exposure
No data available

STOT - repeated exposure			
No	Substance name	CAS no.	EC no.
1	norflurane	811-97-2	212-377-0
Route of exposure	inhalational		
Species	rat		
Method	OECD 453		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
2	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7
Route of exposure	inhalational		
Species	rat		
Method	OECD 413		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
3	pentafluoroethane	354-33-6	206-557-8
Route of exposure	inhalational		
Species	rat		
Method	OECD 413		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		
4	difluoromethane	75-10-5	200-839-4
Route of exposure	inhalational		
Species	rat		
Source	ECHA		
Evaluation/classification	Based on available data, the classification criteria are not met.		

Aspiration hazard
No data available

11.2 Information on other hazards

Endocrine disrupting properties
No data available.

Other information
No data available.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish (acute)				
No	Substance name	CAS no.	EC no.	
1	norflurane	811-97-2	212-377-0	
LC50		450	mg/l	
Duration of exposure		96	h	
Species	Salmo gairdneri			
Method	EU C.1			
Source	ECHA			
Evaluation/classification	Based on available data, the classification criteria are not met.			
2	2,3,3,3-tetrafluoroprop-1-ene	754-12-1	468-710-7	
LC50	>	197	mg/l	
Duration of exposure		96	h	

Species	Cyprinus carpio
Method	OECD 203
Source	ECHA

Toxicity to fish (chronic)
No data available

Toxicity to Daphnia (acute)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**norflurane**	**811-97-2**		**212-377-0**
EC50		980		mg/l
Duration of exposure		48		h
Species	Daphnia magna			
Method	EU C.2			
Source	ECHA			
Evaluation/classification	Based on available data, the classification criteria are not met.			
2	**2,3,3,3-tetrafluoroprop-1-ene**	**754-12-1**		**468-710-7**
EC50		>	83	mg/l
Duration of exposure			48	h
Species	Daphnia magna			
Method	OECD 202			
Source	ECHA			

Toxicity to Daphnia (chronic)
No data available

Toxicity to algae (acute)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**2,3,3,3-tetrafluoroprop-1-ene**	**754-12-1**		**468-710-7**
EC50		>	100	mg/l
Duration of exposure			72	h
Species	Pseudokirchneriella subcapitata			
Method	OECD 201			
Source	ECHA			

Toxicity to algae (chronic)
No data available

Bacteria toxicity
No data available

12.2 Persistence and degradability

Biodegradability				
No	**Substance name**	**CAS no.**		**EC no.**
1	**norflurane**	**811-97-2**		**212-377-0**
Type	aerobic biodegradation			
Value	appr.	3	%	
Duration		28	d	
Method	OECD 301 D			
Source	ECHA			
Evaluation	not readily biodegradable			
2	**2,3,3,3-tetrafluoroprop-1-ene**	**754-12-1**		**468-710-7**
Type	aerobic biodegradation			
Value	<	5	%	
Duration		28	d	
Method	OECD 301 F			
Source	ECHA			
Evaluation	not readily biodegradable			
3	**pentafluoroethane**	**354-33-6**		**206-557-8**
Type	aerobic biodegradation			
Value	appr.	5	%	
Duration		28	d	

Method	Closed Bottle Test (OECD 301D)		
Source	ECHA		
Evaluation	not readily biodegradable		
4 difluoromethane	**75-10-5**		**200-839-4**
Type	aerobic biodegradation		
Value		5	%
Duration		28	d
Method	OECD 301 D		
Source	ECHA		
Evaluation	not readily biodegradable		

12.3 Bioaccumulative potential

Partition coefficient n-octanol/water (log value)				
No	**Substance name**	**CAS no.**		**EC no.**
1	**norflurane**	**811-97-2**		**212-377-0**
log Pow			1.06	
Reference temperature			25	°C
with reference to	pH 6.0			
Method	OECD 107			
Source	ECHA			
2	**2,3,3,3-tetrafluoroprop-1-ene**	**754-12-1**		**468-710-7**
log Pow	appr.		2	
Reference temperature			25	°C
with reference to	pH 7			
Method	OECD 117			
Source	ECHA			
3	**pentafluoroethane**	**354-33-6**		**206-557-8**
log Pow			1.48	
Reference temperature			25	°C
with reference to	pH 6.34			
Method	OECD 107			
Source	ECHA			
4	**difluoromethane**	**75-10-5**		**200-839-4**
log Pow			0.21	
Reference temperature			25	°C
with reference to	pH 6,1			
Method	OECD 107			
Source	ECHA			

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	
PBT assessment	The product is not considered to be a PBT.
vPvB assessment	The product is not considered to be a vPvB.

12.6 Endocrine disrupting properties

No data available.

12.7 Other adverse effects

Other adverse effects
Contains fluorinated greenhouse gases. Product: Global warming potential within 100 years: 1397.05

12.8 Other information

Other information
Do not discharge product uncontrolled into the environment.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
dispose of in accordance with local regulation.
Allocation of a waste code number, according to the European Waste Catalogue, should be carried out in agreement with the regional waste disposal company.

Packaging
Disposal should be observed in conformity with the Regional Waste Disposal Authority.

SECTION 14: Transport information

14.1 Transport ADR/RID/ADN

Class	2
Classification code	2A
Hazard identification no.	20
UN number	UN1078
Proper shipping name	REFRIGERANT GAS, N.O.S.
Technical name	norflurane 2,3,3,3-tetrafluoroprop-1-ene
Tunnel restriction code	C/E
Label	2.2 RID: (+13)

14.2 Transport IMDG

Class	2.2
UN number	UN1078
Proper shipping name	REFRIGERANT GAS, N.O.S.
Technical name	norflurane 2,3,3,3-tetrafluoroprop-1-ene
EmS	F-C, S-V
Label	2.2

14.3 Transport ICAO-TI / IATA

Class	2.2
UN number	UN1078
Proper shipping name	Refrigerant gas, n.o.s.
Technical name	norflurane 2,3,3,3-tetrafluoroprop-1-ene
Label	2.2

14.4 Other information
No data available.

14.5 Environmental hazards
Information on environmental hazards, if relevant, please see 14.1 - 14.3.

14.6 Special precautions for user
To be transported always in closed, upright and safe containers. Make sure that persons handling these containers are aware of the rules of conduct in case of incident or spillage.

14.7 Maritime transport in bulk according to IMO instruments
Not relevant

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Regulation (EC) No 1907/2006 (REACH) Annex XIV (List of substances subject to authorisation)
According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substances considered as substances requiring authorisation as listed on Annex XIV of the REACH regulation (EC) 1907/2006.

REACH candidate list of substances of very high concern (SVHC) for authorisation
According to available data and the information provided by preliminary suppliers, the product does not contain substances that are considered substances meeting the criteria for inclusion in annex XIV (List of Substances Subject to Authorisation) as laid down in Article 57 and article 59 of REACH (EC) 1907/2006.

Regulation (EC) No 1907/2006 (REACH) Annex XVII: RESTRICTIONS ON THE MANUFACTURE, PLACING ON THE MARKET AND USE OF CERTAIN DANGEROUS SUBSTANCES, MIXTURES AND ARTICLES
According to the data available and/or specifications supplied by upstream suppliers, this product does not contain any substances subject to restriction as listed in Annex XVII of the REACH regulation (EC) 1907/2006.

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances
This product is not subject to Part 1 or 2 of Annex I.

Other regulations
REGULATION (EU) No 517/2014 on fluorinated greenhouse gases Adhere to the national sanitary and occupational safety regulations when using this product.

15.2 Chemical safety assessment

Chemical safety assessments have been conducted for the substances in this mixture. For a mixture a chemical safety assessment according to (EC) 1907/2006 is not mandatory.

SECTION 16: Other information

Sources of key data used to compile the data sheet:
Regulation (EC) No 1907/2006 (REACH), 1272/2008 (CLP) as amended in each case.
Directives 2000/39/EC, 2006/15/EC, 2009/161/EU, (EU) 2017/164.
National Threshold Limit Values of the corresponding countries as amended in each case.
Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.
The data sources used to determine physical, toxic and ecotoxic data, are indicated directly in the corresponding section.

Full text of the H- and EUH- phrases drawn up in sections 2 and 3 (provided not already drawn up in these sections)
H220 Extremely flammable gas.

Creation of the safety data sheet
UMCO GmbH

This information is based on our present knowledge and experience.
The safety data sheet describes products with a view to safety requirements.
It does not however, constitute a guarantee for any specific product properties and shall not establish a legally valid contractual relationship.

Alterations/supplements:
Alterations to the previous edition are marked in the left-hand margin.

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