# Safety data sheet in accordance with 1907/2006/EC

**Trade name:** R-454C

**Current version :** 2.0.0, issued: 27.06.2024 **Replaced version:** 1.0.0, issued: 14.12.2023 **Region:** GER

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

### 1.1 Product identifier

**Trade name**

**R-454C**

**UFI:**
**DTM2-P0FT-R00M-FJD1**

### 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)**
Flam. Gas 1B; H221
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**


GHS02


GHS04

**Signal word**
Danger

**Hazard statement(s)**

| | |
|---|---|
| H221 | Flammable gas. |
| H280 | Contains gas under pressure; may explode if heated. |

**Precautionary statement(s)**

| | |
|---|---|
| P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. |
| P377 | Leaking gas fire: Do not extinguish, unless leak can be stopped safely. |
| P381 | In case of leakage, eliminate all ignition sources. |
| P410+P403 | Protect from sunlight. Store in a well-ventilated place. |

**UFI:**
DTM2-P0FT-R00M-FJD1

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

### 2.3 Other hazards

This product does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher. 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 | **2,3,3,3-tetrafluoroprop-1-ene** | | | |
| | 754-12-1<br>468-710-7<br>-<br>01-0000019665-61 | Flam. Gas 1B; H221<br>Press. Gas liq.; H280 | >= 70,00 - < 90,00 | Vol% |
| 2 | **difluoromethane** | | | |
| | 75-10-5<br>200-839-4<br>-<br>01-2119471312-47 | Flam. Gas 1B; H221<br>Press. Gas liq.; H280 | >= 10,00 - < 25,00 | Vol% |

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

| No | Note | Specific concentration limits | M-factor (acute) | M-factor (chronic) |
|---|---|---|---|---|
| 1 | - | Flam. Gas 1A; H220: C >= 6,201%<br>Flam. Gas 1B; H221: C >= 12,3% | - | - |

## 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. Call a doctor.

### 4.2 Most important symptoms and effects, both acute and delayed

**Symptoms**
The following symptoms may occur: cardiac arrhytmia; anesthetic effect; Light-headedness; Dizziness; confusion; Unconsciousness; muscle incoordination; respiratory arrest. 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 and supportively.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

**Suitable extinguishing media**
Alcohol resistant foam, CO2, powders, water spray

**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; Exposure to heat may cause bursting of the vessels. Vapours can form a highly flammable mixture with air.

### 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. Use explosion-proof apparatus and fittings.

**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. Provide eye wash fountain in work area.

**Advice on protection against fire and explosion**

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. Vapours can form an explosive mixture with air.

### 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

**Stoarge Class according TRGS 510**

2A Gases (except aerosol dispensers and lighters)

### 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 | **2,3,3,3-tetrafluoroprop-1-ene** | **754-12-1** | **468-710-7** |
| | **TRGS 900** | | |
| | 2,3,3,3-Tetrafluorpropen | | |

| | | | | | |
|---|---|---|---|---|---|
| | WEL long-term (8-hr TWA reference period) | 950 | mg/m³ | 200 | ml/m³ |
| | Ceiling Limit<br>Notes | 2 (II)<br>Y | | | |

**DNEL, DMEL and PNEC values**

**DNEL values (worker)**

| No | Substance name | | | CAS / EC no | |
|---|---|---|---|---|---|
| | Route of exposure | Exposure time | Effect | Value | |
| 1 | **2,3,3,3-tetrafluoroprop-1-ene** | | | **754-12-1<br>468-710-7** | |
| | inhalative | Long term (chronic) | systemic | 950 | mg/m³ |
| | inhalative | Short term (acut) | systemic | 186400 | mg/m³ |
| 2 | **difluoromethane** | | | **75-10-5<br>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 | **2,3,3,3-tetrafluoroprop-1-ene** | | | **754-12-1<br>468-710-7** | |
| | inhalative | Long term (chronic) | systemic | 113,1 | mg/m³ |
| | inhalative | Short term (acut) | systemic | 186400 | mg/m³ |
| 2 | **difluoromethane** | | | **75-10-5<br>200-839-4** | |
| | inhalative | Long term (chronic) | systemic | 750 | mg/m³ |

**PNEC values**

| No | Substance name | | CAS / EC no | |
|---|---|---|---|---|
| | ecological compartment | Type | Value | |
| 1 | **2,3,3,3-tetrafluoroprop-1-ene** | | **754-12-1<br>468-710-7** | |
| | water | fresh water | 0,1 | mg/L |
| | water | marine water | 0,01 | mg/L |
| | water | fresh water sediment | 1,51 | mg/kg dry weight |
| | water | marine water sediment | 0,151 | mg/kg dry weight |
| | soil | - | 1,49 | mg/kg dry weight |
| 2 | **difluoromethane** | | **75-10-5<br>200-839-4** | |
| | water | fresh water | 0,313 | mg/L |
| | water | fresh water sediment | 1,807 | 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. Explosion-proof general and local exhaust ventilation.

### 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. Fire-resistant antistatic protective clothing. 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** |
|---|
| colourless, clear |

| **Odour** |
|---|
| slightly like ether |

| **pH value** |
|---|
| No data available |

| **Boiling point / boiling range** | |
|---|---|
| Value | -45,9 °C |
| Source | supplier |

| **Melting point/freezing point** |
|---|
| No data available |

| **Decomposition temperature** |
|---|
| No data available |

| **Flash point** | |
|---|---|
| Not applicable | |
| Source | supplier |

| **Ignition temperature** | |
|---|---|
| Value | 444 °C |
| Source | supplier |

| **Oxidising properties** |
|---|
| not oxidizing |

| **Explosive properties** | |
|---|---|
| Risk of explosion when heated. | |
| Source | supplier |

| **Flammability** | |
|---|---|
| flammable | |
| Source | supplier |

| **Lower explosion limit** |
|---|

| | | | |
|---|---|---|---|
| Value | | 7,7 | % vol |
| Method | ASTM E 681 | | |
| Source | supplier | | |

| **Upper explosion limit** | | | |
|---|---|---|---|
| Value | | 15,7 | % vol |
| Method | ASTM E 681 | | |
| Source | supplier | | |

| **Vapour pressure** | | | |
|---|---|---|---|
| Value | | 11691 | hPa |
| Reference temperature | | 25 | °C |
| Source | supplier | | |

| **Relative vapour density** | | |
|---|---|---|
| Value | | 3,2 |
| Source | supplier | |
| Comments | Air = 1 | |

| **Evaporation rate** | | |
|---|---|---|
| Value | > | 1 |
| Source | supplier | |
| Comments | CCl4 = 1 | |

| **Relative density** | | | |
|---|---|---|---|
| Value | | 0,99 | |
| Reference temperature | | 25 | °C |
| Source | supplier | | |

| **Density** |
|---|
| No data available |

| **Solubility** |
|---|
| No data available |

| **Partition coefficient n-octanol/water (log value)** | | | | |
|---|---|---|---|---|
| **No** | **Substance name** | **CAS no.** | | **EC no.** |
| **1** | **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 | | | |
| **2** | **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** | |
|---|---|
| Not applicable | |
| Source | supplier |

### 9.2 Other information

| **Other information** |
|---|
| Hot surface ignition temperature (HSIT): > 800 °C (ASTM D 8211) |

## SECTION 10: Stability and reactivity

### 10.1 Reactivity
This material is considered to be non-reactive under normal use conditions.

### 10.2 Chemical stability
The product is chemically stable under recommended conditions of storage, use and temperature.

### 10.3 Possibility of hazardous reactions
Reacts with strong oxidizing agents. Vapours can form a highly flammable mixture with air. Flammable gas.

### 10.4 Conditions to avoid
Heat, naked flames and other ignition sources.

### 10.5 Incompatible materials
Avoid contamination (e.g. rust, dust, ash), risk of decomposition! Oxidizing agents; Acids; Bases; oxygen; Peroxides; Metal as powder

### 10.6 Hazardous decomposition products
None if stored, handled and transported properly. 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 | | > | 405000 | ppmV |
| Duration of exposure | | | 4 | h |
| State of aggregation | | Gas | | |
| Species | | rat | | |
| Method | | OECD 403 | | |
| Source | | ECHA | | |
| Evaluation/classification | | Based on available data, the classification criteria are not met. | | |
| **2** | **difluoromethane** | **75-10-5** | **200-839-4** | |
| LC50 | | > | 520000 | ppmV |
| Duration of exposure | | | 4 | h |
| State of aggregation | | Gas | | |
| Species | | rat | | |
| Method | | OECD 403 | | |
| Source | | ECHA | | |
| Evaluation/classification | | Based on available data, the classification criteria are not met. | | |

| **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** | **2,3,3,3-tetrafluoroprop-1-ene** | **754-12-1** | **468-710-7** |
| 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. |
| Route of exposure | inhalational |
| Type of examination | In vivo mammalian somatic cell study: cytogenicity / erythrocyte micronucleus |
| Species | rat |
| Method | OECD 474 |
| Source | ECHA |
| Evaluation/classification | Based on available data, the classification criteria are not met. |
| **2 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. |
| Type of examination | In vivo mammalian somatic cell study: cytogenicity / erythrocyte micronucleus |
| Species | mouse |
| Method | OECD 474 |
| Source | ECHA |
| Evaluation/classification | Based on available data, the classification criteria are not met. |

| **Reproduction toxicity** | | | |
|---|---|---|---|
| **No** | **Substance name** | **CAS no.** | **EC no.** |
| **1** | **2,3,3,3-tetrafluoroprop-1-ene** | **754-12-1** | **468-710-7** |
| Route of exposure | inhalational | | |
| NOAEC | > | 50000 | ppm |
| Type of examination | 2 generation study | | |
| Species | rat | | |
| Method | OECD 416 | | |
| Source | ECHA | | |
| Evaluation/classification | Based on available data, the classification criteria are not met. | | |
| Route of exposure | inhalational | | |
| NOAEC | | 750 | ppm |
| Type of examination | Prenatal Developmental Toxicity Study | | |
| Species | rabbit | | |
| Method | OECD 414 | | |
| Source | ECHA | | |
| Evaluation/classification | Based on available data, the classification criteria are not met. | | |
| **2** | **difluoromethane** | **75-10-5** | **200-839-4** |
| Route of exposure | inhalational | | |
| NOAEL | | 50000 | ppm |
| Type of examination | Prenatal Developmental Toxicity Study | | |
| Species | rabbit | | |
| 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** | **difluoromethane** | **75-10-5** | **200-839-4** |
| 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** | **2,3,3,3-tetrafluoroprop-1-ene** | **754-12-1** | | **468-710-7** |
| Route of exposure | inhalational | | | |
| NOAEC | > | 50000 | ppm | |
| Species | rat | | | |
| Method | OECD 413 | | | |
| Source | ECHA | | | |
| Evaluation/classification | Based on available data, the classification criteria are not met. | | | |
| **2** | **difluoromethane** | **75-10-5** | | **200-839-4** |
| Route of exposure | inhalational | | | |
| NOAEL | | 49100 | ppm | |
| Species | rat | | | |
| Method | OECD 413 | | | |
| 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** | **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 | | | |
| Evaluation/classification | Based on available data, the classification criteria are not met. | | | |

| **Toxicity to fish (chronic)** |
|---|
| No data available |

| **Toxicity to Daphnia (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 | | 48 | h | |
| Species | Daphnia magna | | | |
| Method | OECD 202 | | | |
| Source | ECHA | | | |
| Evaluation/classification | Based on available data, the classification criteria are not met. | | | |

| **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 | | |
| Evaluation/classification | Based on available data, the classification criteria are not met. | | |

| **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** | **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 | | | |
| **2** | **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** | **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 | | | |
| **2** | **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: 146

### 12.8 Other information

| Other information |
|---|
| Do not discharge product unmonitored 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**
Empty containers contain product residue and may be hazardous. Do not pressurize, cut, weld, braze, solder, drill or expose these containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury and/or death. Residues must be removed from packaging and when emptied completely disposed of in accordance with the regulations for waste removal. Incompletely emptied packaging must be disposed of in the form of disposal specified by the regional disposer.

## SECTION 14: Transport information

### 14.1 UN number or ID number

| | |
|---|---|
| **ADR/RID/ADN** | UN3161 |
| **IMDG** | UN3161 |
| **ICAO-TI / IATA** | UN3161 |

### 14.2 UN proper shipping name

| | |
|---|---|
| **ADR/RID/ADN** | LIQUEFIED GAS, FLAMMABLE, N.O.S. |
| Technical name | 2,3,3,3-tetrafluoroprop-1-ene<br>difluoromethane |
| **IMDG** | LIQUEFIED GAS, FLAMMABLE, N.O.S. |
| Technical name | 2,3,3,3-tetrafluoroprop-1-ene<br>difluoromethane |
| **ICAO-TI / IATA** | Liquefied gas, flammable, n.o.s. |
| Technical name | 2,3,3,3-tetrafluoroprop-1-ene<br>difluoromethane |

### 14.3 Transport hazard class(es)

| | |
|---|---|
| **ADR/RID/ADN - Class** | 2 |
| Label | 2.1 RID:(+13) |
| Classification code | 2F |
| Tunnel restriction code | B/D |
| Hazard identification no. | 23 |
| **IMDG - Class** | 2.1 |
| Label | 2.1 |
| **ICAO-TI / IATA - Class** | 2.1 |
| Label | 2.1 |

### 14.4 Packing group

Not classified as dangerous in the meaning of transport regulations.

### 14.5 Environmental hazards

| | |
|---|---|
| EmS | F-D, S-U |

### 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<br>Adhere to the national sanitary and occupational safety regulations when using this product. |

**National regulations**

**Water Hazard Class (Germany)**

| | |
|---|---|
| Class | 1 |
| Source | Classification according to AwSV (Regulation on facilities for handling substances that are hazardous to water). |

**Other regulations**
Take into account: TRGS 510 "Storage of hazardous substances in non-stationary containers"

### 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.

**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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