



Material Safety Data Sheet

This MSDS adheres to the standards and regulatory requirements of China and may not meet the regulatory requirements in other countries.

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

Product Name in English : Refrigerant 1234yf

SDS-number : 000000016095

Type of product : Substance

Use of the Substance/Mixture : Refrigerant

Uses advised against : none

Remarks : SDS according to Art. 31 of Regulation (EC) 1907/2006.

Chemical Name : trans-1,3,3,3-Tetrafluoroprop-1-ene

CAS-No. : 29118-24-9

Registration number : 01-0000019758-54

Supplier: SUPERFY INDUSTRIAL LIMITED

Address: Quzhou Economy Develop Area, Quzhou City, Zhejiang Province, China

Postcode: 324000

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture REGULATION (EC) No 1272/2008

Gases under pressure Liquefied gas H280 Contains gas under pressure; may explode if heated.

2.2. Label elements REGULATION (EC) No 1272/2008

Signal word : Warning

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

Precautionary statements : P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. P280 Wear protective gloves/ eye protection/ face protection.

P284 In case of inadequate ventilation wear respiratory protection.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P410 + P403 Protect from sunlight. Store in a wellventilated place.

2.3. Other hazards

Warning! Container under pressure.

SECTION 3: Composition/information on ingredients

3.1. Substance

Chemical Name trans-1,3,3,3- Tetrafluoroprop-1- ene (Active ingredient)

CAS-No. 29118-24-9

Index-No. 01-0000019758-54

Registration number EC-No. 471-480-0

Classification 1272/2008: Press. Gas ; H280

Concentration 100

Remarks1*

1* - For specific concentration limits see Annexes of 1272/2008

3.2. Mixture

Not applicable Occupational Exposure Limit(s), if available, are listed in Section 8. For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: First aider needs to protect himself. Move out of dangerous area. Keep warm and in a quiet place. Show this safety data sheet to the doctor in attendance. Take off all contaminated clothing immediately.

Inhalation: If inhaled, remove to fresh air. Get medical attention if irritation develops and persists.

Skin contact: Rapid evaporation of the liquid may cause frostbite. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. Call a physician if irritation develops or persists.

Eye contact: Immediately flush eye(s) with plenty of water. Call a physician immediately.

Ingestion: Ingestion is unlikely because of the physical properties and is not expected to be hazardous. As this product is a gas, refer to the inhalation section.

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

no data available

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

no data available

See Section 11 for more detailed information on health effects and symptoms

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Water mist

Dry powder

Foam

Carbon dioxide (CO₂)

Extinguishing media which shall not be used for safety reasons: High volume water jet

5.2. Special hazards arising from the substance or mixture

Heating will cause pressure rise with risk of bursting

Some risk may be expected of corrosive and toxic decomposition products.

Fire may cause evolution of:

Hydrogen fluoride

However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

5.3. Advice for firefighters

Wear full protective clothing and self-contained breathing apparatus.

Exposure to decomposition products may be a hazard to health.

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. In the event of fire, cool tanks with water spray.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Provide adequate ventilation. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid skin contact with leaking liquid (danger of frostbite). Use personal protective equipment. Keep people away from and upwind of spill/leak.

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. The product evaporates readily. Prevent spreading over a wide area (e.g. by containment or oil barriers).

6.3. Methods and materials for containment and cleaning up

Do not direct water spray at the point of leakage. Allow to evaporate.

6.4. Reference to other sections

For personal protection see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling:

resurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Exhaust ventilation at the object is necessary.

Advice on protection against fire and explosion:

Do not spray on a naked flame or any incandescent material. Keep away from direct sunlight. Fire or intense heat may cause violent rupture of packages. Vapours may form explosive mixtures with air. The product is not easily combustible.

Hygiene measures:

Avoid breathing vapours, mist or gas. Keep working clothes separately.

7.2. Conditions for safe storage, including any incompatibilities

Further information on storage conditions:

Keep containers tightly closed in a cool, well-ventilated place. Keep only in the original container at temperature not exceeding 50°C Keep away from direct sunlight.

Advice on common storage:

Do not store together with: Oxidizing agents

7.3. Specific end use(s)

no additional data available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters Occupational exposure limits:

Components :trans-1,3,3,3-Tetrafluoroprop-1-ene

Basis Value type: SINOLOONG TWA

Value / Form of exposure:800 ppm

Exceeding Factor:

Remarks: We are not aware of any national exposure limit, Assessment factor: 1000
Component: trans-1,3,3,3-Tetrafluoroprop-1-ene, trans-1,3,3,3-Tetrafluoroprop-1-ene,
trans-1,3,3,3-Tetrafluoroprop-1-ene, trans-1,3,3,3-Tetrafluoroprop-1-ene
End-use / Impact: Workers / Long-term systemic effects, Consumers / Long-term
systemic effects
Value: 3902 mg/m³, 830 mg/m³
Exposure routes: Inhalation
Environmental compartment / Value: Fresh water: 0,1 mg/l

8.2. Exposure controls

Occupational exposure controls

The Personal Protective Equipment must be in accordance with EN standards: respirator EN 136, 140, 149; safety glasses EN 166; protective suit: EN 340, 463, 468, 943-1, 943-2; gloves EN 374, safety shoes EN-ISO 20345.

The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Avoid inhalation of vapour or mist.

Engineering measures

Local exhaust

Personal protective equipment

Respiratory protection:

In case of insufficient ventilation wear suitable respiratory equipment. Self-contained breathing apparatus (EN 133)

Hand protection:

Protective gloves against cold (EN 511) Gloves must be inspected prior to use. Replace when worn.

Eye protection:

Goggles

Skin and body protection:

Wear suitable protective equipment. Protective footwear

Environmental exposure controls

Handle in accordance with local environmental regulations and good industrial practices.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form : Liquefied gas

Colour : colourless

Odour : slight ether-like Boiling

point/boiling range : -19 °C

Flash point : does not flash

Auto-ignition temperature : 368 °C

Lower explosion limit : No LEL and UEL was assigned at standard testing conditions, 20°C.

Exhibits flame limits at temperatures in excess of 28° C.

Upper explosion limit : No LEL and UEL was assigned at standard testing

conditions, 20°C. Exhibits flame limits at temperatures in excess of 28° C.

Vapour pressure : 4.192 hPa at 20 °C

Vapour pressure : 10.998 hPa at 54,4 °C

Density : 1,17 g/cm³ at 21,1 °C

pH : neutral

Water solubility : 0,373 g/l

Partition coefficient: noctanol/water : log Pow 1,6

Relative vapour density : 4 (Air = 1.0)

9.2 Other Information no additional data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions.

10.2. Chemical stability

Hazardous decomposition products formed under fire conditions. To avoid thermal decomposition, do not overheat.

10.3. Possibility of hazardous reactions

Hazardous polymerisation does not occur.

10.4. Conditions to avoid Pressurized container.

Protect from sunlight and do not expose to temperatures exceeding 50 °C. Can form a combustible mixture with air at pressures above atmospheric pressure.

10.5. Incompatible materials

Reactions with alkali metals.

10.6. Hazardous decomposition products

Pyrolysis products containing fluoride

Fluorocarbons

Hydrogen fluoride

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute oral toxicity:

Not applicable Study technically not feasible.

Acute dermal toxicity:

no data available

Study technically not feasible.

Acute inhalation toxicity:

LC0

Species: Rat

Value: > 207000 ppm

Exposure time: 4 h

Method: OECD Test Guideline 403

Skin irritation:

Species: Rabbit

Result: No skin irritation

Method: OECD Test Guideline 404

Eye irritation: no data available Study technically not feasible.

Respiratory or skin sensitisation:

Species: human

Result: Does not cause skin sensitisation.

Repeated dose toxicity:

Species: Rat

Application Route: Inhalation

Exposure time: 90 d

NOEL: 5000 ppm

Method: OECD Test Guideline 413

Note: Subchronic toxicity

Carcinogenicity:

Note: no data available

Germ cell mutagenicity:

Test Method: Chromosome aberration test in vitro

Cell type: Human lymphocytes

Result: negative Method: OECD Test Guideline 473 Test

Method: Ames test Result: negative

Test Method: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)

Species: Mouse

Cell type: Micronucleus

Application Route: Inhalation

Method: OECD Test Guideline 474

Result: negative

Reproductive toxicity:

Test Type: Two-generation study

Method: OECD Test Guideline 416

Species: Rat Route of Application: Inhalation

General Toxicity - Parent: NOEL: > 20.000 ppm

General Toxicity F1: NOEL: > 20.000 ppm

Method: OECD Test Guideline 414

Species: Rat

Route of Application: Inhalation

General Toxicity Maternal: NOEC: 15.000 ppm

Developmental Toxicity: NOAEC: 15.000 ppm

Aspiration hazard: no data available

Other information: Cardiac Sensitization (dog): No effects

SECTION 12: Ecological information

12.1. Toxicity

Toxicity to fish:

LC0

static test

Species: Cyprinus carpio (Carp)

Value: > 117 mg/l

Exposure time: 96 h
Method: OECD Test Guideline 203
Toxicity to aquatic plants: NOEC
Growth rate

Species: Algae
Value: > 170 mg/l

Exposure time: 72 h
Method: OECD Test Guideline 201
NOEC
Biomass

Species: Algae Value: > 170 mg/l

Exposure time: 72 h
Method: OECD Test Guideline 201
Toxicity to aquatic invertebrates:
EC50
static test

Species: Daphnia magna (Water flea)
Value: > 160 mg/l

Exposure time: 48 h
Method: OECD Test Guideline 202

12.2. Persistence and degradability

Biodegradability : aerobic
Result: Not readily biodegradable.

12.3. Bioaccumulative potential **no data available**

12.4. Mobility in soil

no data available

12.5. Results of PBT and vPvB assessment

no data available

12.6. Other adverse effects no data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product:

Dispose according to legal requirements. Contact manufacturer.

Packaging:

Legal requirements are to be considered in regard of reuse or disposal of used packaging materials

Further information:

Provisions relating to waste:

EC Directive 2006/12/EC; 2008/98/EEC Regulation No. 1013/2006

For personal protection see section 8.

SECTION 14: Transport information

ADR/RID UN

Number : 3161

Description of the goods : LIQUEFIED GAS, N.O.S.
(TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE)

Class : 2.1

Classification Code : 2A

Hazard Identification Number : 20

ADR/RID-Labels : 2.1

Environmentally hazardous : no IATA

UN Number : 3161

Description of the goods : Liquefied gas, n.o.s. (trans-1,3,3,3-Tetrafluoroprop-1-ene)

Class : 2.1

Hazard Labels : 2.1

IMDG UN Number : 3161

Description of the goods : LIQUEFIED GAS, N.O.S.
(TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE)

Class : 2.1

Hazard Labels : 2.1

EmS Number : F-C, S-V

Marine pollutant : no

SECTION 15: Regulatory information

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

US. Toxic Substances Control Act

On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act

On the inventory, or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) All components of this product are on the Canadian DSL

Japan. Kashin-Hou Law List On the inventory, or in compliance with the inventory

Korea. Toxic Chemical Control Law (TCCL) List On the inventory, or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act Not in compliance with the inventory

China. Inventory of Existing Chemical Substances On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand On the inventory, or in compliance with the inventory

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Text of H-statements referred to under heading 3

trans-1,3,3,3-Tetrafluoroprop-1-ene : H280

Contains gas under pressure; may explode if heated.

Further information

All directives and regulations refer to amended versions. Vertical lines in the left hand margin indicate a relevant amendment from the previous version.

Abbreviations: EC European Community

CAS Chemical Abstracts Service

DNEL Derived no effect level

PNEC Predicted no effect level

vPvB Very persistent and very bioaccumulative substance

PBT Persistent, bioaccumulative und toxic substance

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.