

Solstice® ZE Refrigerant

Version 2.3

Revision Date 16.05.2016

Supersedes 1

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

1.1. Product identifier

Product name : Solstice® ZE Refrigerant
SDS-number : 000000016095
Type of product : Substance
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

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

Use of the Substance/Mixture : Refrigerant
Uses advised against : none

1.3. Details of the supplier of the safety data sheet

Company : Honeywell Fluorine Products Europe B.V.
Laarderhoogtweg 18
1101 EA Amsterdam
Netherlands
Telephone : (31) 020 5656911
Telefax : (31) 020 5656600
For further information, please contact: PMTEU Product Stewardship:
SafetyDataSheet@Honeywell.com
Honeywell International, Inc.
115 Tabor Road
Morris Plains, NJ 07950-2546
USA

1.4. Emergency telephone number

Emergency telephone number : +1-703-527-3887 (ChemTrec-Transport)
+1-303-389-1414 (Medical)

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

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Hazard pictograms	:		
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 well-ventilated place.

2.3. Other hazards

Warning! Container under pressure.

SECTION 3: Composition/information on ingredients

3.1. Substance

Chemical name	CAS-No. Index-No. Registration number EC-No.	Classification 1272/2008	Concentration	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene (Active ingredient)	29118-24-9 01-0000019758-54 471-480-0	Press. Gas ; H280	100	1*

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.

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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.

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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

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For personal protection see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling:

Pressurized 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	Basis / Value type	Value / Form of exposure	Exceeding Factor	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene	HONEYWELL TWA	800 ppm		We are not aware of any national exposure limit.

TWA - Time weighted average

DNEL/ PNEC-Values

Component	End-use / Impact	Exposure duration	Value	Exposure routes	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene	Workers / Long-term systemic effects		3902 mg/m ³	Inhalation	

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trans-1,3,3,3-Tetrafluoroprop-1-ene	Consumers / Long-term systemic effects		830 mg/m3	Inhalation	
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Component	Environmental compartment / Value	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene	Fresh water: 0,1 mg/l	Assessment factor: 1000

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

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Colour	:	colourless
Odour	:	slight ether-like
Boiling point/boiling range	:	-19 °C
Flash point	:	Not applicable
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	:	4.271 hPa at 20 °C
Vapour pressure	:	11.152 hPa at 54,4 °C
Density	:	1,17 g/cm ³ at 21,1 °C
pH	:	neutral
Water solubility	:	0,373 g/l
Partition coefficient: n- octanol/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

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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

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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

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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

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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 : 3163
Description of the goods : LIQUEFIED GAS, N.O.S.
(TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE)
Class : 2
Classification Code : 2A
Hazard Identification : 20
Number
ADR/RID-Labels : 2.2
Environmentally hazardous : no

IATA

UN Number : 3163
Description of the goods : Liquefied gas, n.o.s.
(trans-1,3,3,3-Tetrafluoroprop-1-ene)
Class : 2.2
Hazard Labels : 2.2

IMDG

UN Number : 3163
Description of the goods : LIQUEFIED GAS, N.O.S.
(TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE)
Class : 2.2
Hazard Labels : 2.2
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

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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

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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.