

Solstice™ yf Refrigerant (R-1234yf)

Version 3.2

Revision Date 15.10.2012

Supersedes 2

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

Product information

Product name : Solstice™ yf Refrigerant (R-1234yf)
Type of product : Substance
Chemical Name : 2,3,3,3-Tetrafluoroprop-1-ene
EC-No. : 468-710-7
Registration number : 01-0000019665-61
Use of the Substance/Mixture : Refrigerant
Uses advised against : none

Company/Undertaking Identification

Company : Honeywell International, Inc. Honeywell International, Inc.
101 Columbia Road 101 Columbia Road
07962-1057 Morristown Morristown, NJ 07962-1057
USA USA
Telephone :
Telefax :
Emergency telephone number :
For further information, please contact: : PMTEU Product Stewardship:
SafetyDataSheet@Honeywell.com

2. HAZARDS IDENTIFICATION

Classification

REGULATION (EC) No 1272/2008


Flammable gases 1
H220 Extremely flammable gas.
Gases under pressure Liquefied gas
H280 Contains gas under pressure; may explode if heated.

DIRECTIVES 67/548/EEC or 1999/45/EC

F+ Extremely flammable
R12 Extremely flammable.

Label elements

REGULATION (EC) No 1272/2008

Hazard pictograms : 

Signal word : Danger

Hazard statements : H220 Extremely flammable gas.

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	H280	Contains gas under pressure; may explode if heated.
Precautionary statements	: P281	Use personal protective equipment as required.
	P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
	P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
	P308 + P313	IF exposed or concerned: Get medical advice/ attention.
	P410 + P403	Protect from sunlight. Store in a well-ventilated place.

DIRECTIVES 67/548/EEC or 1999/45/EC

Symbol(s) : 

R-phrase(s) : R12 Extremely flammable.

S-phrase(s) : S 9 Keep container in a well-ventilated place.
S16 Keep away from sources of ignition - No smoking.

Potential health effects

Skin : Rapid evaporation of the liquid may cause frostbite.
Eyes : May irritate eyes.
Ingestion : Unlikely route of exposure.
Inhalation :
Chronic Exposure : None known.
Further information : Warning! Container under pressure.

Potential environmental effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical characterization

Chemical Name : 2,3,3,3-Tetrafluoroprop-1-ene
CAS-No. : 754-12-1

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Occupational Exposure Limit(s), if available, are listed in Section 8.
For the full text of the R-phrases/ H-statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

- General advice : First aider needs to protect himself. Take off all contaminated clothing immediately.
- Inhalation : When inhaled remove to fresh air and seek medical aid. If breathing is irregular or stopped, administer artificial respiration. If unconscious place in recovery position and seek medical advice.
- Skin contact : Rapid evaporation of the liquid may cause frostbite. In case of contact with liquid, thaw frosted parts with water, then remove clothing carefully. Wash with plenty of water Wash contaminated clothing before re-use. Consult a physician.
- Eye contact : Protect unharmed eye. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.
- Ingestion : Rinse mouth. Call a physician immediately.
- Further information : Adrenaline derivatives are contra-indicated. Treat symptomatically.

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

5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
- Specific hazards during firefighting : Extremely flammable.
Some risk may be expected of corrosive and toxic decomposition products.
In case of fire hazardous decomposition products may be produced such as:
Carbon monoxide
Hydrogen halides
Carbonyl halides
Pyrolysis products containing fluoride
Cool closed containers exposed to fire with water spray.
Heating will cause pressure rise with risk of bursting and subsequent explosion
- Special protective equipment for firefighters : Wear full protective clothing and self-contained breathing apparatus.
- Further information : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Wear full protective clothing and self-contained breathing apparatus. Keep people away from and upwind of spill/leak.

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- Environmental precautions : Ventilate the area.
 : The product evaporates readily. Prevent product from entering drains.
- Methods for cleaning up : Use low-sparking handtools and explosion-proof electrical equipment Allow to evaporate.
- Additional advice : Inform the responsible authorities in case of gas leakage, or of entry into waterways, soil or drains. Pay attention to the spreading of gases especially at ground level (heavier than air) and to the direction of the wind.

For personal protection see section 8.

7. HANDLING AND STORAGE

Handling

- Advice on safe handling : Exhaust ventilation at the object is necessary. Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Use suitably rated equipment.
- Advice on protection against fire and explosion : Keep product and empty container away from heat and sources of ignition. Fire or intense heat may cause violent rupture of packages. Use suitably rated equipment.
- Hygiene measures : Provide adequate ventilation. Do not smoke. When using do not eat or drink.

Storage

- Further information on storage conditions : Keep containers tightly closed in a cool, well-ventilated place. Containers should be protected against falling down. Protect from warmth. Do not store at temperature exceeding 50 °C
 Keep away from direct sunlight.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure limits:

Components	Basis	Value type	Control parameters	Exceeding Factor	Form of exposure	Remarks
2,3,3,3-Tetrafluoroprop-1-ene	WEEL	TWA	500 ppm			We are not aware of any national exposure limit.

TWA - time weighted average

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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.

Environmental exposure controls

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

Engineering measures

Highly effective exhaust ventilation

Personal protective equipment

- Respiratory protection : Remarks: In case of insufficient ventilation wear suitable respiratory equipment.
- Hand protection : Wear suitable gloves.
Heat insulating gloves
- Eye protection : Goggles
- Skin and body protection : Wear suitable protective equipment.

DNEL/ PNEC-Values

No DNEL-data available.

No PNEC data available.

9. PHYSICAL AND CHEMICAL PROPERTIES

- Form : compressed liquefied gas
- Colour : colourless
- Odour : slight, original odour
- molecular weight : 114 g/mol
- Melting point/range : no data available
- Boiling point/boiling range : -29,4 °C
- Flash point : not applicable
- Flammability (solid, gas) : Extremely flammable gas.
Method: Flammability (gases)
- Autoignition temperature : 405 °C
- Lower explosion limit : 6,2 %(V)

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		lower flammability limit
Upper explosion limit	:	12,3 %(V) upper flammability limit
Vapour pressure	:	6.067 hPa at 21,1 °C
Vapour pressure	:	14.203 hPa at 54,4 °C
Density	:	1,1 g/cm ³ at 25 °C
pH	:	no data available
Water solubility	:	198,2 mg/l at 24 °C Method: 92/69/EEC, A.6
Partition coefficient: n-octanol/water	:	log Pow 2,15 Method: 92/69/EEC, A.8
Relative vapour density	:	4
Evaporation rate	:	not determined

10. STABILITY AND REACTIVITY

Conditions to avoid	:	Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material. Heat, flames and sparks.
Materials to avoid	:	Reactions with alkali metals. Reactions with light metals. Zinc Magnesium
Hazardous decomposition products	:	Risk of formation of toxic pyrolysis products containing fluorine. Carbon monoxide Carbon dioxide (CO ₂) Carbonyl halides Hydrogen halides

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	:	not applicable
Acute dermal toxicity	:	not applicable
Acute inhalation toxicity	:	LC50 Species: rat Value: > 400000 ppm

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	Exposure time: 4 h
Skin irritation	: slight irritation
Eye irritation	: slight irritation
Sensitisation	: no data available
Repeated dose toxicity	: Species: rat Application Route: Inhalation Exposure time: 672 h NOAEL : 233 mg/kg 50000 ppm
Further information	: Concentration above the admissible concentration at the workplace may cause dizziness, headache and inebriation. 2,3,3,3-Tetrafluoropropene: Mouse Micronucleus (4-hour): No toxicological significant signs reported. No increase in the frequency of micronuclei. Cardiac Sensitization: No effects for exposures up to 12% (120, 189 ppm).

12. ECOLOGICAL INFORMATION

Persistence and degradability

Biodegradability : Result: Not readily biodegradable.

Ecotoxicity effects

Toxicity to fish : LC50
Species: Cyprinus carpio (Carp)
Value: > 197 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
No demonstrable toxic effect in saturated solution.

Toxicity to aquatic plants : EC50
Species: Scenedesmus capricornutum (fresh water algae)
Value: > 100 mg/l

Acute toxicity to aquatic invertebrates : EC50
Species: Daphnia magna (Water flea)
Value: > 83 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Further information

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS

Product : Dispose according to legal requirements.

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- 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; 91/689/EEC
Regulation No. 1013/2006

For personal protection see section 8.

14. TRANSPORT INFORMATION

ADR/RID

- UN Number : 3161
Description of the goods : LIQUEFIED GAS, FLAMMABLE, N.O.S.
(R-1234yf)
Class : 2
Classification Code : 2F
Hazard identification No : 23
ADR/RID-Labels : 2.1
Environmentally hazardous : no

IATA

- UN Number : 3161
Description of the goods : Liquefied gas, flammable, n.o.s.
(R-1234yf)
Class : 2.1
Hazard Labels : 2.1

IMDG

- UN Number : 3161
Description of the goods : LIQUEFIED GAS, FLAMMABLE, N.O.S.
(R-1234yf)
Class : 2.1
Hazard Labels : 2.1
EmS Number : F-D, S-U
Marine pollutant : no

15. REGULATORY INFORMATION

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 : Not 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 list.
- Japan. Kashin-Hou Law : On the inventory, or in compliance with the inventory

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

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List

- Korea. Existing Chemicals Inventory (KECI) : 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 : Not in compliance with the inventory
- New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand : Not in compliance with the inventory

16. OTHER INFORMATION

Further information

All directives and regulations refer to amended versions.

Vertical lines in the left hand margin indicate an amendment from the previous version.

Abbreviations:

EC European Community

CAS Chemical Abstracts Service

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.