

**Honeywell Solstice® N13 Refrigerant (R-450A)**

000000016417

Version 2.3

Revision Date 18.05.2017

Supersedes 1

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

**1.1. Product identifier**

Product name : Honeywell Solstice® N13 Refrigerant (R-450A)  
SDS-number : 000000016417  
Type of product : Mixture  
Remarks : SDS according to Art. 31 of Regulation (EC) 1907/2006.

**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)  
Country based Poison Control Center : see chapter 15.1

**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**

Not applicable

**3.2. Mixture**

Chemical name	CAS-No. Index-No. REACH Registration Number EC-No.	Classification 1272/2008	Concentration	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene	29118-24-9 01-0000019758-54 471-480-0	Press. Gas ; H280	>= 50 % - <= 100 %	1*
Norflurane	811-97-2 01-2119459374-33 212-377-0	Press. Gas ; H280	>= 25 % - < 50 %	1*

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

Remaining components of this product are non-hazardous and/or are present at concentrations below reportable limits.

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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. Take off all contaminated clothing immediately. Keep warm and in a quiet place. Show this safety data sheet to the doctor in attendance.

*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:*

The product is not flammable.

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

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

**5.2. Special hazards arising from the substance or mixture**

Contents under pressure.

This product is not flammable at ambient temperatures and atmospheric pressure.

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

Container may rupture on heating.

Cool closed containers exposed to fire with water spray.

Do not allow run-off from fire fighting to enter drains or water courses.

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

Fire may cause evolution of:

Hydrogen fluoride

Carbon oxides

Halogenated compounds

Carbonyl halides

**5.3. Advice for firefighters**

In the event of fire and/or explosion do not breathe fumes.

Wear self-contained breathing apparatus and protective suit.

No unprotected exposed skin areas.

Exposure to decomposition products may be a hazard to health.

In the event of fire, cool tanks with water spray.

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**SECTION 6: Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**Wear full protective clothing and self-contained breathing apparatus. Keep people away from and upwind of spill/leak. Ventilate the area. Ensure that the oxygen content is  $\geq 19.5\%$ .**6.2. Environmental precautions**

Prevent further leakage or spillage if safe to do so. The product evaporates readily.

**6.3. Methods and materials for containment and cleaning up**

Ventilate the area.

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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:*

Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Do not burn. 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:*

Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. Do not breathe vapour. Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. 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.

**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.

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Norflurane	HONEYWELL TWA	1.000 ppm		
Norflurane	EH40 WEL TWA	4.240 mg/m <sup>3</sup> 1.000 ppm		

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 <sup>3</sup>	Inhalation	
trans-1,3,3,3-Tetrafluoroprop-1-ene	Consumers / Long-term systemic effects		830 mg/m <sup>3</sup>	Inhalation	
Norflurane	Workers / Long-term systemic effects		13936 mg/m <sup>3</sup>	Inhalation	
Norflurane	Consumers / Long-term systemic effects		2476 mg/m <sup>3</sup>	Inhalation	

Component	Environmental compartment / Value	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene	Fresh water: 0,1 mg/l	Assessment factor: 1000
Norflurane	Fresh water: 0,1 mg/l	Assessment factor: 1000
Norflurane	Marine water: 0,01 mg/l	Assessment factor: 10000
Norflurane	Fresh water sediment: 0,75 mg/kg	Assessment factor: 100
Norflurane	Sewage treatment plant: 73 mg/l	Assessment factor: 10

**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

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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

General room ventilation is adequate for storage and handling.

Perform filling operations only at stations with exhaust ventilation facilities.

### 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:*

Safety goggles

*Skin and body protection:*

Wear suitable protective equipment.

### 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	:	clear and colourless
Odour	:	slight ether-like
Melting point/range	:	no data available
Boiling point/boiling range	:	no data available
Flash point	:	Not applicable
Ignition temperature	:	no data available

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Lower explosion limit	:	None
Upper explosion limit	:	None
Vapour pressure	:	554 kPa at 20 °C
Vapour pressure	:	1.389 kPa at 54,4 °C
Density	:	no data available
Partition coefficient: n-octanol/water	:	log Pow 1,06 Medium: 1,1,1,2-tetrafluoroethane (HFC-134a)
Partition coefficient: n-octanol/water	:	log Pow 1,6 Medium: trans-1,3,3,3-Tetrafluoroprop-1-ene

### 9.2 Other Information

no additional data available

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## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Stable under normal conditions.

### 10.2. Chemical stability

>250 °C

Decomposition temperature

To avoid thermal decomposition, do not overheat.

### 10.3. Possibility of hazardous reactions

Hazardous polymerisation does not occur.

### 10.4. Conditions to avoid

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

Heat, flames and sparks.

### 10.5. Incompatible materials

Finely divided aluminium

Potassium



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Calcium  
Powdered metals  
Aluminium  
Magnesium  
Zinc

### 10.6. Hazardous decomposition products

Halogenated compounds  
Hydrogen fluoride  
Carbon oxides  
Carbonyl halides

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## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

*Acute oral toxicity:*

Not applicable

*Acute dermal toxicity:*

no data available

*Acute inhalation toxicity:*

LC50

Species: Rat

Value: > 207000 ppm

Exposure time: 4 h

Test substance: trans-1,3,3,3-Tetrafluoroprop-1-ene

LC50

Species: Rat

Value: > 500000 ppm

Exposure time: 4 h

Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)

*Skin irritation:*

Species: Rabbit

Result: No skin irritation

Method: OECD Test Guideline 404

Test substance: trans-1,3,3,3-Tetrafluoroprop-1-ene

*Eye irritation:*

no data available

*Respiratory or skin sensitisation:*

no data available

*Aspiration hazard:*

no data available

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*Other information:*

May cause cardiac arrhythmia.

### SECTION 12: Ecological information

#### 12.1. Toxicity

*Toxicity to fish:*

NOEC

Species: Cyprinus carpio (Carp)

Value: > 117 mg/l

Exposure time: 96 h

Test substance: trans-1,3,3,3-Tetrafluoroprop-1-ene

*Toxicity to aquatic plants:*

NOEC

Growth inhibition

Species: Algae

Value: > 170 mg/l

Exposure time: 72 h

Test substance: trans-1,3,3,3-Tetrafluoroprop-1-ene

*Toxicity to aquatic invertebrates:*

EC50

Species: Daphnia magna (Water flea)

Value: > 160 mg/l

Exposure time: 48 h

Test substance: trans-1,3,3,3-Tetrafluoroprop-1-ene

#### 12.2. Persistence and degradability

no data available

#### 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.

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**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, 1,1,1,2-TETRAFLUOROETHANE)  
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, 1,1,1,2-Tetrafluoroethane)  
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, 1,1,1,2-TETRAFLUOROETHANE)  
Class : 2.2  
Hazard Labels : 2.2  
EmS Number : F-C, S-V  
Marine pollutant : no

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**SECTION 15: Regulatory information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****Poison Control Center**

Country	Phone Number
Austria	+4314064343
Belgium	070 245245
Bulgaria	(+)35929154233
Croatia	(+3851)23-48-342
Cyprus	no data available
Czech Republic	+420224919293; +420224915402
Denmark	82121212
Estonia	16662; (+372)6269390
Finland	9471977
France	+33(0)145425959
Greece	no data available
Hungary	(+36-80)201-199
Iceland	5432222
Ireland	+353(1)8092166
Italy	no data available
Germany	Berlin : 030/19240
	Bonn : 0228/19240
	Erfurt : 0361/730730
	Freiburg : 0761/19240
	Göttingen : 0551/19240
	Homburg : 06841/19240
	Mainz : 06131/19240
Munich : 089/19240	

Country	Phone Number
Latvia	+37167042473
Liechtenstein	no data available
Lithuania	+370532362052
Luxembourg	070245245; (+352)80002-5500
Malta	no data available
Netherlands	030-2748888
Norway	22591300
Poland	no data available
Portugal	808250143
Romania	no data available
Slovakia (NTIC)	+421 2 54 774 166
Slovenia	no data available
Spain	+34915620420 112 (begär Giftinformation);+46104566786
Sweden	112 (begär Giftinformation);+46104566786
United Kingdom	no data available

**Other inventory information**US. Toxic Substances Control Act  
On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act

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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  
Not 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.

Norflurane : 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 and toxic substance

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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.