

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

Version 1.6

Revision Date 02.11.2014

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

**1.1. Product identifier**

Product name : Honeywell Solstice® N13 Refrigerant (R-450A)  
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. Honeywell International, Inc.  
Laarderhoogtweg 18 101 Columbia Road  
1101 EA Amsterdam Morristown, NJ 07962-1057  
Netherlands USA  
Telephone : (31) 020 5656911  
Telefax : (31) 020 5656600  
For further information, please contact: PMTEU Product Stewardship:  
SafetyDataSheet@Honeywell.com

**1.4. Emergency telephone number**

Emergency telephone number : (32) 16 391 209 (Mon-Fri, 9.00-17.00h) +1-703-527-3887 (ChemTrec)  
+1-303-389-1414 (Medical)

**2. HAZARDS IDENTIFICATION**

**2.1. Classification of the substance or mixture**

**REGULATION (EC) No 1272/2008**

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

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

Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC.


**2.2. Label elements**

**REGULATION (EC) No 1272/2008**

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

Version 1.6

Revision Date 02.11.2014

Hazard pictograms	:		
Signal word	:	Warning	
Hazard statements	:	H280	Contains gas under pressure; may explode if heated.
Precautionary statements	:	P281	Use personal protective equipment as required.
		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**

The product does not need to be labelled in accordance with EC directives or respective national laws.

Special labelling of certain products: : Contains fluorinated greenhouse gases covered by the Kyoto Protocol.

**2.3. Other hazards**

**Potential health effects**

Skin	:	Rapid evaporation of the liquid may cause frostbite.
Eyes	:	May irritate eyes.
Ingestion	:	Unlikely route of exposure.
Inhalation	:	High vapour concentrations can cause headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness.
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.

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**3. COMPOSITION/INFORMATION ON INGREDIENTS**

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

Version 1.6

Revision Date 02.11.2014

Type of product : Mixture

Chemical Name	CAS-No. Index-No. Registration number EC-No.	Classification 1272/2008	Classification 67/548/EEC	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/M-factor see Annexes of 1272/2008  
N.C.\* - Non-hazardous substance - for information only

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**

**4.1 Description of first aid measures**

- General advice : Show this safety data sheet to the doctor in attendance. Keep warm and in a quiet place.
- 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**

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

Version 1.6

Revision Date 02.11.2014

no data available

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

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**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.

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

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

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

Heating will cause pressure rise with risk of bursting

Cool closed containers exposed to fire with water spray.

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.

**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.

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

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**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. Allow to evaporate.

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

Version 1.6 Revision Date 02.11.2014

**6.4. Reference to other sections**

For personal protection see section 8.

**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 data available :

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**8.1. Control parameters**

**Occupational exposure limits:**

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

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

Version 1.6

Revision Date 02.11.2014

Norflurane	HONEYWEL L	TWA	1.000 ppm			
Norflurane	EH40 WEL	TWA	4.240 mg/m3 1.000 ppm			

TWA - time weighted average

**DNEL/ PNEC-Values**

No DNEL-data available.

No PNEC data available.

**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.

**Environmental exposure controls**

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

**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 : Remarks: In case of insufficient ventilation wear suitable respiratory equipment.  
 Wear a positive-pressure supplied-air respirator.

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.

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

Version 1.6

Revision Date 02.11.2014

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**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
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

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**10. STABILITY AND REACTIVITY**

**10.1. Reactivity**

Stable under normal conditions.

**10.2. Chemical stability**

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

Version 1.6

Revision Date 02.11.2014

>250 °C  
Decomposition temperature  
To avoid thermal decomposition, do not overheat.

**10.3. Possibility of hazardous reactions**

Hazardous polymerisation does not occur.  
Note: Stable under normal conditions.

**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  
Calcium  
Powdered metals  
Aluminium  
Magnesium  
Zinc

**10.6. Hazardous decomposition products**

In case of fire hazardous decomposition products may be produced such as:  
Hydrogen fluoride  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)  
Carbonyl halides

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**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

Acute inhalation toxicity : LC50  
Species: Rat  
Value: > 500000 ppm



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

Version 1.6

Revision Date 02.11.2014

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

Sensitisation : no data available

Further information : May cause cardiac arrhythmia.

**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**

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

Version 1.6

Revision Date 02.11.2014

no data available

**12.5. Results of PBT and vPvB assessment**

no data available

**12.6. Other adverse effects**

no data available

**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.

**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

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

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

Version 1.6

Revision Date 02.11.2014

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(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

### 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 : 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.  
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

Chemical safety assessment : A Chemical Safety Assessment has been carried out.

### 16. OTHER INFORMATION

#### Text of R-phrases and H-statements referred to under heading 3

trans-1,3,3,3-Tetrafluoroprop-1-ene : H280 Contains gas under pressure; may explode if heated.

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

Version 1.6

Revision Date 02.11.2014

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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 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.

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