

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

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.
101 Columbia Road
Morristown, NJ 07962-1057
USA

1.4. Emergency telephone number

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

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

Hazard pictograms : 

Signal word : Warning

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

Precautionary statements : P281 Use personal protective equipment as

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

P260
P308 + P313
P410 + P403

required.
Do not breathe dust/ fume/ gas/ mist/
vapours/ spray.
IF exposed or concerned: Get medical
advice/ attention.
Protect from sunlight. Store in a well-
ventilated place.

2.3. Other hazards

Warning! Container under pressure.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Not applicable

3.2. Mixture

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	>= 50 - <= 100	1*
Norflurane (Active ingredient)	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

N.C.* - Non-hazardous substance - for information only

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

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.

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:

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

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. :

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.

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

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

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.

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 additional data available

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.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

Norflurane	HONEYWELL TWA	1.000 ppm		
Norflurane	EH40 WEL TWA	4.240 mg/m ³ 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 ³	Inhalation	
trans-1,3,3,3-Tetrafluoroprop-1-ene	Consumers / Long-term systemic effects		830 mg/m ³	Inhalation	
Norflurane	Workers / Long-term systemic effects		13936 mg/m ³	Inhalation	
Norflurane	Consumers / Long-term systemic effects		2476 mg/m ³	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 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.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

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.

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

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

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

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

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 (CO₂)

Carbonyl halides

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute oral toxicity:

Not applicable

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

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

Other 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

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

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

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

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

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

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
Not in compliance with the inventory

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Honeywell

Honeywell Solstice® N13 Refrigerant (R-450A)

Version 2.0

Revision Date 20.07.2015

Supersedes 1

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.

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

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.