

Honeywell Solstice® N13 Refrigerant (R-450A)

000000016417

Version 2.7

Revision Date 06.11.2025

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 : SOLSTICE ADVANCED MATERIALS IRELAND LIMITED
1st Floor, Liffey Trust Centre,
117-126 Sheriff Street Upper
D01 YC43 Dublin
Ireland
Solstice Advanced Materials
US, Inc.
115 Tabor Road
Morris Plains, NJ 07950-2546
USA

Telephone : +353 1 447 9350
For further information,
please contact: : SafetyDataSheet@solstice.com

1.4. Emergency telephone number

Emergency telephone number : +1-703-527-3887 (ChemTrec-Transport)
+1 303-739-1378 (Medical)
: Poison Control Center:
United Kingdom: (+44) 844 892 0111

SECTION 2: Hazards identification**2.1. Classification of the substance or mixture****REGULATION (EC) No 1272/2008**

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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	:	P410 + P403	Protect from sunlight. Store in a well-ventilated place.
Special labelling of certain products:	:	Contains fluorinated greenhouse gases	

2.3. Other hazards

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite. This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher. The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Chemical name	CAS-No. Index-No. EC-No.	Classification 1272/2008	Concentration	Remarks

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trans-1,3,3,3-Tetrafluoroprop-1-ene	29118-24-9 471-480-0	Press. Gas ; H280	58 %	
Norflurane	811-97-2 212-377-0	Press. Gas ; H280	42 %	

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.

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

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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.

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

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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.

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.
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:

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Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. Do not breathe vapor. 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.
Norflurane	HONEYWELL TWA	1.000 ppm		
Norflurane	EH40 WEL TWA	4.240 mg/m3 1.000 ppm		

HONEYWELL - Limit established by Solstice Advanced Materials
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/m3	Inhalation	

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trans-1,3,3,3-Tetrafluoroprop-1-ene	Consumers / Long-term systemic effects		830 mg/m3	Inhalation	
Norflurane	Workers / Long-term systemic effects		13936 mg/m3	Inhalation	
Norflurane	Consumers / Long-term systemic effects		2476 mg/m3	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, 511; 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.

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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**

- | | | |
|-------------------------------------|---|-------------------------------|
| (a) Physical state | : | gaseous |
| (b) Colour | : | clear
and
colourless |
| (c) Odour | : | slight
ether-like |
| (d) Melting point/freezing point | : | No data available |
| (e) Boiling point/boiling range | : | No data available |
| (g) Lower and upper explosion limit | : | Lower explosion limit
None |

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- : Upper explosion limit
None
- (h) Flash point : Not applicable
- (i) Auto-ignition temperature : No data available
- (j) Decomposition temperature : 250 °C
Decomposition temperature
To avoid thermal decomposition, do not overheat.
- (m) Solubility(ies) : Water solubility:
No data available
- (n) Partition coefficient: n-octanol/water : log Pow 1,06
Medium: 1,1,1,2-tetrafluoroethane (HFC-134a)
- (n) Partition coefficient: n-octanol/water : log Pow 1,6
Medium: trans-1,3,3,3-Tetrafluoroprop-1-ene
- (o) Vapour pressure : 554 kPa
at 20 °C

1.389 kPa
at 54,4 °C
- (p) Density and / or relative density : No data available
- (q) Relative vapour density : No data available
- (r) Particle characteristics : No data available

9.2 Other Information

Polymer characteristics : No data available

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

Calcium

Powdered metals

Aluminium

Magnesium

Zinc

10.6. Hazardous decomposition products

Halogenated compounds

Hydrogen fluoride

Carbon oxides

Carbonyl halides

SECTION 11: Toxicological information**11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008****(a) Acute toxicity**

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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)

Acute toxicity (other routes of administration):

No data available

(b) Skin corrosion/irritation:

Species: Rabbit

Result: No skin irritation

Method: OECD Test Guideline 404

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

(c) Serious eye damage/eye irritation:

No data available

(d) Respiratory or skin sensitisation:

No data available

(h) STOT-single exposure:

No data available

(i) STOT - repeated exposure:

No data available

(j) Aspiration hazard:

No data available

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11.2. Information on other hazards

Endocrine disrupting properties
No data available

Other information:
No data available

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

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12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

No data available

12.6. Endocrine disrupting properties

No data available

12.7. Other adverse effects

No data available

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**14.1 UN number or ID number**

ADR/RID:3163

IMDG:3163

IATA:3163

14.2 UN proper shipping name

ADR/RID:LIQUEFIED GAS, N.O.S.(TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE, 1,1,1,2-TETRAFLUROETHANE)

IMDG:LIQUEFIED GAS, N.O.S.(TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE,1,1,1,2-TETRAFLUROETHANE)

IATA:Liquefied gas, n.o.s.(trans-1,3,3,3-Tetrafluoroprop-1-ene, 1,1,1,2-Tetrafluoroethane)

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14.3 Transport hazard class(es)

ADR/RID:2.2

IMDG: 2.2

IATA: 2.2

14.4 Packaging group

No data available

14.5 Environmental hazards

ADR/RID:no

Marine pollutant: no

14.6 Special precautions for user

IMDG Code segregation group according chapter 3.1.4.4 : NONE,

14.7 Maritime transport in bulk according to IMO instruments

No data available

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

Global warming potential :
605

Other inventory information

USA. List of Active Substances on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory, as amended
All substances listed as active on the TSCA inventory

Australian Inventory of Industrial Chemicals
All components are listed on the inventory, regulatory obligations/restrictions apply

Canada. Domestic Substances List (DSL), as amended
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. Existing Chemicals Inventory (KECI)
On the inventory, or in compliance with the inventory

Philippines. Inventory of Chemicals and Chemical Substances (PICCS)
Not in compliance with the inventory

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China. Inventory of Existing Chemical Substances (IECSC)
On the inventory, or in compliance with the inventory

Taiwan Chemical Substance Inventory (TCSI)
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.

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 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.

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