

**Honeywell Solstice® N13 Refrigerant (R-450A)****00000016417**

Version 1.3

Revision Date 10/30/2014

Print Date 05/24/2016

**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Honeywell Solstice® N13 Refrigerant (R-450A)

MSDS Number : 00000016417

Product Use Description : Refrigerant

Manufacturer or supplier's details : Honeywell International Inc.  
115 Tabor Road  
Morris Plains, NJ 07950-2546

For more information call : 800-522-8001  
+1-973-455-6300  
(Monday-Friday, 9:00am-5:00pm)

In case of emergency call : **Medical: 1-800-498-5701 or +1-303-389-1414**  
: **Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887**  
:  
: (24 hours/day, 7 days/week)

**SECTION 2. HAZARDS IDENTIFICATION****Emergency Overview**

Form : Liquefied gas

Color : clear and colourless

Odor : slight ether-like

**Classification of the substance or mixture**

Classification of the substance or mixture : Gases under pressure, Liquefied gas  
Simple Asphyxiant

**GHS Label elements, including precautionary statements**

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Symbol(s)

:



Signal word

: Warning

Hazard statements

: Contains gas under pressure; may explode if heated.  
May displace oxygen and cause rapid suffocation.

Precautionary statements

: **Prevention:**  
Use personal protective equipment as required.**Storage:**

Protect from sunlight. Store in a well-ventilated place.

Hazards not otherwise  
classified: May cause frostbite.  
May cause cardiac arrhythmia.  
May cause eye and skin irritation.**Carcinogenicity**

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical nature

: Mixture

Chemical Name	CAS-No.	Concentration
trans-1,3,3,3-Tetrafluoroprop-1-ene	29118-24-9	58.00 %
1,1,1,2-Tetrafluoroethane	811-97-2	42.00 %

**SECTION 4. FIRST AID MEASURES**

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- Inhalation : Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician.
- 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 : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.
- Ingestion : Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Call a physician immediately.

**Notes to physician**

- Treatment : Treat frost-bitten areas as needed.

**SECTION 5. FIREFIGHTING MEASURES**

- 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.
- Specific hazards during firefighting : 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.  
In case of fire hazardous decomposition products may be

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produced such as:  
Hydrogen fluoride  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)  
Carbonyl halides

Special protective equipment 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.

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

Personal precautions : Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Remove all sources of ignition. Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid accumulation of vapours in low areas. Unprotected personnel should not return until air has been tested and determined safe. Ensure that the oxygen content is  $\geq 19.5\%$ .

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

Methods for cleaning up : Ventilate the area. Allow to evaporate.

**SECTION 7. HANDLING AND STORAGE****Handling**

Handling : Handle with care.

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Avoid inhalation of vapour or mist.  
 Do not get in eyes, on skin, or on clothing.  
 Wear personal protective equipment.  
 Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.  
 Follow all standard safety precautions for handling and use of compressed gas cylinders.  
 Use authorized cylinders only.  
 Protect cylinders from physical damage.  
 Do not puncture or drop cylinders, expose them to open flame or excessive heat.  
 Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.  
 Do not remove screw cap until immediately ready for use.  
 Always replace cap after use.

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.

**Storage**

Requirements for storage areas and containers : Keep containers tightly closed in a cool, well-ventilated place.  
 Keep away from direct sunlight.

Further information on storage conditions : Keep only in the original container at temperature not exceeding 50°C

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

Protective measures : Do not breathe vapour.  
 Avoid contact with skin, eyes and clothing.  
 Ensure that eyewash stations and safety showers are close to the workstation location.

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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- Eye protection : Wear as appropriate:  
Safety glasses with side-shields  
If splashes are likely to occur, wear:  
Goggles or face shield, giving complete protection to eyes
- Hand protection : Leather gloves  
In case of contact through splashing:  
Protective gloves  
Neoprene gloves  
Polyvinyl alcohol or nitrile- butyl-rubber gloves
- Skin and body protection : Avoid skin contact with leaking liquid (danger of frostbite).  
Wear cold insulating gloves/ face shield/ eye protection.
- Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.  
Wear a positive-pressure supplied-air respirator.  
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.  
For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
- 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.

**Exposure Guidelines**

Components	CAS-No.	Value	Control parameters	Update	Basis
trans-1,3,3,3-Tetrafluoroprop-1-ene	29118-24-9	TWA : time weighted average	(800 ppm)	2012	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides
trans-1,3,3,3-Tetrafluoroprop-1-ene	29118-24-9	TWA : time weighted average	(800 ppm)	31.03.11	Honeywell:Limit established by Honeywell International Inc.

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1,1,1,2-Tetrafluoroethane	811-97-2	TWA : time weighted average	(1,000 ppm)		Honeywell:Limit established by Honeywell International Inc.
1,1,1,2-Tetrafluoroethane	811-97-2	TWA : time weighted average	4,240 mg/m3 (1,000 ppm)	2007	WEEL:US. AIHA Workplace Environmental Exposure Level (WEEL) Guides

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical state	: Liquefied gas
Color	: clear and colourless
Odor	: slight ether-like
Boiling point/boiling range	: Note: not determined
Flash point	: Note: Not applicable
Lower explosion limit	: Note: Not applicable
Upper explosion limit	: Note: Not applicable
Vapor pressure	: 554 kPa at 20 °C(68 °F) 1,389 kPa at 54.4 °C(129.9 °F)
Density	: Note: not determined

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Ignition temperature : Note: no data available

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

**SECTION 10. STABILITY AND REACTIVITY**

Chemical stability : Stable under normal conditions.

Possibility of hazardous reactions : Hazardous polymerisation does not occur.

Conditions to avoid : Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.  
Can form a combustible mixture with air at pressures above atmospheric pressure.  
Do not mix with oxygen or air above atmospheric pressure.

Incompatible materials to avoid : Potassium  
Calcium  
Powdered metals  
Finely divided aluminium  
Finely divided magnesium  
Zinc

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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**SECTION 11. TOXICOLOGICAL INFORMATION**

Acute inhalation toxicity  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : 100000 ppm  
Species: Mouse  
Note: Acute (4-Hour) Inhalation Toxicity Screening Study  
(mouse): No lethality at >100,000 ppm.

LC50: > 207000 ppm  
Exposure time: 4 h  
Species: Rat

1,1,1,2-Tetrafluoroethane : LC50: > 500000 ppm  
Exposure time: 4 h  
Species: Rat

Skin irritation  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : Species: Rabbit  
Result: No skin irritation  
Method: OECD Test Guideline 404

Sensitisation  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : Cardiac sensitization  
Species: dogs  
Note: Did not cause sensitisation on laboratory animals.

1,1,1,2-Tetrafluoroethane : Cardiac sensitization  
Species: dogs  
Note: No-observed-effect level  
50 000 ppm  
Lowest observed effect level  
75 000 ppm

Repeated dose toxicity  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : Species: Rat  
Application Route: Inhalation  
Exposure time: (13 Weeks)  
NOEL: 5000 ppm  
Causes mild effects on the heart.

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- 1,1,1,2-Tetrafluoroethane : Species: Rat  
NOEL: 40000 ppm
- Genotoxicity in vitro  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : Test Method: Chromosome aberration test in vitro  
Cell type: Human lymphocytes  
Result: negative
- 1,1,1,2-Tetrafluoroethane : Note: In vitro tests did not show mutagenic effects  
: Test Method: Ames test  
Result: negative
- Genotoxicity in vivo  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : Test Method: Mutagenicity (in vivo mammalian bone-marrow  
cytogenetic test, chromosomal analysis)  
Species: Mouse  
Cell type: Micronucleus  
Application Route: Inhalation  
Result: negative
- Teratogenicity  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : Species: Rabbit  
Method: Prenatal Developmental Inhalation Toxicity Study  
Note: Did not show teratogenic effects in animal experiments.  
Species: Rat  
Method: Prenatal Developmental Inhalation Toxicity Study  
Note: Did not show teratogenic effects in animal experiments.
- Further information : Note: May cause cardiac arrhythmia.

**SECTION 12. ECOLOGICAL INFORMATION**

Toxicity to fish

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trans-1,3,3,3-  
Tetrafluoroprop-1-ene : NOEC: > 117 mg/l  
Exposure time: 96 h  
Species: Cyprinus carpio (Carp)

Toxicity to daphnia and other aquatic invertebrates  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : EC50: > 160 mg/l  
Exposure time: 48 h  
Species: Daphnia magna (Water flea)

Toxicity to algae  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : Growth inhibition  
NOEC: > 170 mg/l  
Exposure time: 72 h  
Species: Algae

Biodegradability  
trans-1,3,3,3-  
Tetrafluoroprop-1-ene : aerobic  
Result: Not readily biodegradable.

**Further information on ecology**

Additional ecological information  
1,1,1,2-Tetrafluoroethane : Accumulation in aquatic organisms is unlikely.  
This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

**SECTION 13. DISPOSAL CONSIDERATIONS**

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

**SECTION 14. TRANSPORT INFORMATION**

DOT UN/ID No. : UN 3163  
Proper shipping name : LIQUEFIED GAS, N.O.S.

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	(trans-1,3,3,3-Tetrafluoroprop-1-ene, 1,1,1,2-Tetrafluoroethane)
Class	2.2
Packing group	
Hazard Labels	2.2

<b>IATA</b>	UN/ID No.	: UN 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
	Packing instruction (cargo aircraft)	: 200
	Packing instruction (passenger aircraft)	: 200

<b>IMDG</b>	UN/ID No.	: UN 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

**SECTION 15. REGULATORY INFORMATION****Inventories**

US. Toxic Substances Control Act : On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act : Not in compliance with the inventory

: trans-1,3,3,3-Tetrafluoroprop-1-ene 29118-24-9

Canada. Canadian Environmental Protection Act (CEPA). Domestic : All components of this product are on the Canadian DSL.

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## Substances List (DSL)

Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory List

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  
 : trans-1,3,3,3-Tetrafluoroprop-1-ene 29118-24-9

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

: trans-1,3,3,3-Tetrafluoroprop-1-ene 29118-24-9

**National regulatory information**

**SARA 302 Components** : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components** : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards** : Sudden Release of Pressure Hazard  
Acute Health Hazard

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**California Prop. 65** : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

**WHMIS Classification** : A: Compressed Gas  
This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

**SECTION 16. OTHER INFORMATION**

	<b>HMIS III</b>	<b>NFPA</b>
Health hazard	: 1	2
Flammability	: 1	1
Physical Hazard	: 0	
Instability	:	0

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

**Further information**

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.

Changes since the last version are highlighted in the margin. This version replaces all previous

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versions.

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Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group