

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

Version 1.3

Revision Date 10/30/2014

Print Date 03/25/2019

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 (CO₂)
 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/m ³ (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 (CO₂)
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

IATA	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

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

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

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

	HMIS III	NFPA
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