

Solstice® N40 (R-448A)
100144800
SECTION 1 Identification of the substance/mixture and of the company/undertaking
1.1. Product identifier

Trade name : Solstice® N40 (R-448A)

1.2. Relevant identified uses of the substance or mixture and uses advised against
1.2.1 Relevant identified uses : Refrigerant

1.3. Details of the supplier of the safety data sheet

 : DEHON SERVICE
 26 Avenue du Petit Parc
 94683 VINCENNES Cedex France
 Tel : +33 (0) 1 43 98 75 00
 Fax : +33 (0) 1 43 98 21 51

e-mail : ContactFDS@climalife.dehon.com

1.4 Emergency telephone number : EMERGENCY TELEPHONE NUMBER (24h/24) : + 33 (0) 1 72 11 00 03
 Anti-poison Center : INRS/ORFILA (France) : +33 (0) 1 45 42 59 59
 Anti-poison Centre (Belgium) : +32 70 245 245
 Anti-poison Centre (Netherlands) : +31 30 274 8888
 Anti-poison Centre (Spain) : +34 91 562 04 20
 Anti-poison Centre (United Kingdom) : +44 870 600 6266
 Poisons Information Centre (Hungary) : +36 80 201 199

SECTION 2 Hazards identification
2.1. Classification of the substance or mixture
2.1.1. Regulation (EC) No 1272/2008 (CLP)
Physical hazards : Gases under pressure - Liquefied gas (Press. Gas) - H280

2.1.2 Directive EEC/67/548 or 1999/45/CE : This product is not classified as a "hazardous preparation" according to European Community regulations

2.2. Label elements
2.2.1 Labelling EC 1272/2008 (CLP)
Hazard pictograms

Signal words : Warning

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

Precautionary statements :

 • **Storage** : P410 + P403 : Protect from sunlight. Store in a well-ventilated place

 * **- Further data** : Contains :
 26% 1,1-Difluoromethane (R-32) / 26% Pentafluoroethane (R-125) / 21% 1,1,1,2-Tetrafluoroethane (R-134a) /
 Greenhouse fluorinated gas falling within Kyoto Protocol (GWP = 1387)

2.3. Other hazards

 : Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing
 Contact with liquid may cause frostbite and serious damage to eyes

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SECTION 3 Composition/information on ingredients

3.1./3.2. Substance / Preparation : Preparation
Components contributing to the hazard :

| Substance name | Contents | CAS No | EC No | Index No | Ref REACH | Classification |
|-------------------------------------|----------|------------|-----------|----------|------------------|--|
| Difluoromethane | : 26 % | 75-10-5 | 200-839-4 | ----- | 01-2119471312-47 | F+; R12 ----- Flam. Gas 1;H220 Liquefied gas;H280 |
| Pentafluoroethane | : 26 % | 354-33-6 | 206-557-8 | ----- | 01-2119485636-25 | Not classified. (DSD/DPD) ----- Liquefied gas;H280 |
| 1,1,1,2-Tetrafluoroethane | : 21 % | 811-97-2 | 212-377-0 | ----- | 01-2119459374-33 | Not classified. (DSD/DPD) ----- Liquefied gas;H280 |
| 2,3,3,3-Tetrafluoroprop-1-ene | : 20 % | 754-12-1 | 468-710-7 | ----- | 01-0000019665-61 | F+; R12 ----- Flam. Gas 1;H220 Liquefied gas;H280 |
| Trans-1,3,3,3-Tetrafluoroprop-1-ene | : 7 % | 29118-24-9 | 471-480-0 | ----- | 01-0000019758-54 | Not classified. (DSD/DPD) ----- Liquefied gas;H280 |

SECTION 4 First aid measures

4.1. Description of first aid measures

- Inhalation** : Move the affected person away from the contaminated area and into the fresh air
Call a POISON CENTER/doctor/physician if you feel unwell
- Skin contact** : In the event of contact with the liquid: treat resulting frostbite as a burn
Rinse with plenty of water. DO NOT remove clothing (since it may stick to the skin).
If skin burns appear, call a doctor immediately
- Eye contact** : Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum)
Consult an eye specialist immediately
- Ingestion** : Not specifically applicable (gas)

4.2. Most important symptoms and effects, both acute and delayed

- Inhalation** : Headaches
Loss of consciousness
Drowsiness
Cardiac disorders
Dizziness
- Skin contact** : Rapid evaporation of the liquid may cause frostbite
- Eye contact** : May cause eye irritation.
- Ingestion** : Not applicable.

4.3. Indication of any immediate medical attention and special treatment needed : No information available

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SECTION 5 Fire-fighting measures

5.1. Extinguishing media

Suitable extinguishing media : Water spray
Carbon dioxide (CO₂)
Alcohol resistant foam
Dry powder

Unsuitable extinguishing media : Strong water jet

5.2. Special hazards arising from the substance or mixture : Non flammable.

Specific hazards : On heating :
Toxic and corrosive vapours are released
Heating will cause a rise in pressure with a risk of bursting.

5.3. Advice for firefighters

Specific fire fighting methods : Cool down the containers exposed to heat with a water spray

Protection of fire-fighters : Complete protective clothing
Self-contained breathing apparatus

SECTION 6 Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures : Avoid contact with skin and eyes
Do not breathe vapours
Do not attempt to take action without suitable protective equipment
Evacuate the danger area.
Ensure that there is a suitable ventilation system
Stop the leak.
Remove all sources of ignition

6.2. Environmental precautions : Do not allow product to spread into the environment

6.3. Methods and material for containment and cleaning up : Mechanically ventilate the spillage area.

6.4 Reference to other sections : For further information refer to section 8 "Exposure controls/personal protection"

SECTION 7 Handling and storage

7.1. Precautions for safe handling

Precautions : Work in a well-ventilated area
Pressurized container . Handle and open container with care.
Protect from sunlight
Do not expose to temperatures exceeding 50°C/ 122°F.
Smoking is forbidden Do not spray on an open flame or other ignition source
Do not pierce or burn, even after use

Industrial hygiene : Do not drink, eat or smoke in the workplace

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions

- Recommended : Store :
- only in the original container
- the container tightly closed
- in a cool, well-ventilated area
- at temperature not exceeding 50 °C
- away from direct sunlight

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SECTION 7 Handling and storage (continued)

7.3. Specific end use(s) : No data

SECTION 8 Exposure controls/personal protection
8.1. Control parameters
Engineering measures : Ensure good ventilation of the work station

8.1.1. Occupational Exposure Limits : Difluoromethane : France : LEP - VME (8h; mg/m³) : 2130
 Difluoromethane : France : LEP - VME (8h; ppm) : 1000
 Pentafluoroethane : France : LEP - VME (8h; ppm) : 1000
 1,1,1,2-Tetrafluoroethane : United Kingdom : WEL - TWA (8h; mg/m³) : 4240
 1,1,1,2-Tetrafluoroethane : United Kingdom : WEL - TWA (8h; ppm) : 1000
 1,1,1,2-Tetrafluoroethane : Germany : MAK - TWA (8h; mg/m³) : 4200
 1,1,1,2-Tetrafluoroethane : Germany : MAK - TWA (8h; ppm) : 1000
 1,1,1,2-Tetrafluoroethane : Germany : TRK - STEL (15min; mg/m³) : 33600
 1,1,1,2-Tetrafluoroethane : Germany : TRK - STEL (15min; ppm) : 8000
 2,3,3,3-Tetrafluoroprop-1-ene : TWA [8h; ppm] : 500 (recommended)
 Trans-1,3,3,3-Tetrafluoroprop-1-ene : TWA [8h; ppm] : 800

8.2. Exposure controls
Personal protection :
- Respiratory protection : In the event of insufficient ventilation: Mask with AX canister
 In a confined area : Self-contained breathing apparatus (ARI)

- Hand protection : Leather or nitrile-rubber protective gloves
 Protective gloves made of Viton

- Eye protection : Safety spectacles with side shields

- Skin protection : Majority cotton clothing

SECTION 9 Physical and chemical properties
9.1. Information on basic physical and chemical properties
9.1.a. Appearance
Physical state : Liquefied gas

Colour : Colourless

9.1.b. Odour : slightly ethereal.

9.1.c. Odour threshold : No information available

9.1.d. pH : Not applicable

9.1.e. Melting point / Freezing point : 1,1-Difluoromethane (R-32) : - 136 °C
 Pentafluoroethane (R-125) : - 103 °C
 1,1,1,2-Tetrafluoroethane (R-134a) : -101 °C

9.1.f. Initial boiling point - boiling range : 1,1-Difluoromethane (R-32) : - 51,6 °C
 Pentafluoroethane (R-125) : - 48,1 °C

9.1.g. Flash point : Not applicable

9.1.h. Evaporation rate : No information available

9.1.i. Flammability : Non flammable.

9.1.j. Explosion limits (lower - upper) : None.

9.1.k. Vapour pressure : 11.20 bar at 21.1 °C
 25.88 bar at 54.4 °C

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SECTION 9 Physical and chemical properties (continued)

| | |
|--|---|
| 9.1.l. Vapour density | : No data |
| 9.1.m. Density | : 1.11 g/cm ³ at 20 °C 0.964 g/cm ³ at 50 °C |
| 9.1.n. Solubility | |
| -in water | : Slightly soluble |
| 9.1.o. Partition coefficient : n-octanol / water | : 1,1-Difluoromethane (R-32) : 0.21 (log Pow) Pentafluoroethane (R-125) : 1.48 (log Pow) 1,1,1,2-Tetrafluoroethane (R-134a) : 1.06 (log Pow) 2,3,3,3-Tetrafluoroprop-1-ene (R-1234yf) : 2.15 (log Pow) Trans-1,3,3,3-Tetrafluoroprop-1-ene (R-1234ze) : 1.6 (log Pow) |
| 9.1.p. Auto-ignition temperature | : No information available |
| 9.1.q. Thermal decomposition | : No information available |
| 9.1.r. Viscosity | : Not applicable |
| 9.1.s. Explosive Properties | : Not explosive material according to EC criteria |
| 9.1.t. Oxidising properties | : Non oxidizing material according to EC criteria |
| 9.2. Other information | : - |

SECTION 10 Stability and reactivity

| | |
|--|---|
| 10.1. Reactivity | : None under normal conditions |
| 10.2. Chemical stability | : Stable at ambient temperature and under normal conditions of use |
| 10.3. Possibility of hazardous reactions | : No dangerous polymerization. |
| 10.4. Conditions to avoid | : - high temperatures, naked flames Heating will cause a rise in pressure with a risk of bursting. |
| 10.5. Incompatible materials | : - strong oxidizing agents - metallic powders - Alkaline hydroxide |
| 10.6. Hazardous decomposition products | : On thermal decomposition (pyrolysis), releases : Carbon oxides (CO, CO ₂) Hydrogen fluoride Carbonyl halogenides Halogenated compounds. |

SECTION 11 Toxicological information

| | |
|--|---|
| 11.1. Information on toxicological effects | |
| • Acute toxicity | |
| On ingredients | |
| Trans-1,3,3,3-Tetrafluoroprop-1-ene | : Rat inhalation LC50 [mg/l/4h] : > 965 |
| Pentafluoroethane | : Rat inhalation LC50 [ppm/4h] : 800000 |
| Difluoromethane | : Rat inhalation LC50 [mg/l/4h] : 2158 |
| 2,3,3,3-Tetrafluoroprop-1-ene | : Rat inhalation LC50 [ppm/4h] : > 400000 |
| 1,1,1,2-Tetrafluoroethane | : Rat inhalation LC50 [ppm/4h] : > 500000 |
| • Skin corrosion/irritation | : No information available |
| • Serious eye damage/irritation | : No information available |

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SECTION 11 Toxicological information (continued)

- Respiratory or skin sensitisation : No information available
- Germ cell mutagenicity : No information available
- Carcinogenicity : No information available
- Reproductive toxicity : No information available
- STOT-single exposure : No information available
- STOT-repeated exposure : No information available
- Aspiration hazard : No information available
- Other information : Contact with liquefied gas may cause frostbite.

SECTION 12 Ecological information
12.1. Toxicity
Effects on the aquatic environment : The product does not have any known adverse effects on the environment.

12.2. Persistence and degradability
Biodegradability

- : No easy biodegradable
- Difluoromethane (R-32) : 5 % biodegradation after 28 days
- Air : Half-life = 1472 days
- Pentafluoroethane (R-125) : 5 % biodegradation after 28 days
- Air : Half-life = 28.3 years (estimated value)
- 1,1,1,2-Tetrafluoroethane (R-134a) :
- Water : 3 % biodegradation after 28 days

12.3. Bioaccumulative potential
Octanol/water partition coefficient

- : Practically not bioaccumulable
- 1,1-Difluoromethane (R-32) : 0.21
- Pentafluoroethane (R-125) : 1.48
- 1,1,1,2-Tetrafluoroethane (R-134a) : 1.06
- Trans-1,3,3,3-Tetrafluoroprop-1-ene (R-1234ze) : 1.6

12.4. Mobility in soil

: No information available

12.5. Results of PBT and vPvB assessment

: No information available

12.6. Other adverse effects
Ozone depletion potential

: ODP (R-11=1)=0

 * **Global warming potential:** : GWP (CO₂=1/100 years) = 1387

SECTION 13 Disposal considerations
13.1. Waste treatment methods
WASTE FROM PRODUCT :
Destruction/Disposal

: Consult the manufacturer or supplier for information regarding recovery and recycling of the product

CONTAMINATED PACKAGING :
Destruction/Disposal

 : Reuse or recycle following decontamination.
 Destroy at an authorised site

NOTE

: The user's attention is drawn to the possible existence of specific european, national or local regulations regarding disposal

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SECTION 14 Transport information

- 14.1. UN number : UN 3163
- 14.2. UN proper shipping name : LIQUEFIED GAS, N.O.S. (Difluoromethane , Pentafluoroethane, 1,1,1,2-Tetrafluoroethane, 2,3,3,3-Tetrafluoroprop-1-ene, Trans-1,3,3,3-Tetrafluoroprop-1-ene)
- 14.3. Transport hazard class(es)
- Rail/road (RID/ADR) : Class : 2
- Sea transport : Class : 2.2
- Air transport (OACI/IATA) : Class : 2.2
- Hazard Label(s) : 2.2



- 14.4. Packing group : -
- 14.5. Environmental hazards : Not classified as dangerous to the aquatic environment
Marine pollutant : NO
- 14.6. Special precautions for user
- Rail/road (RID/ADR) : Tunnel restriction code : (C/E)
Hazard identification number : 20
Classification code : 2A
- Sea transport : EmS Nr : F-C, S-V
Segregation group : -
- Air transport (OACI/IATA) : Cargo aircraft:
Packing instruction: 200
Quantity: 150 kg
Passenger aircraft:
Packing instruction: 200
Quantity: 75 kg
- 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15 Regulatory information

- 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture : Ensure all national/local regulations are observed.
- France : Classified Installations : applicable
- REGULATION EC No 842/2006 : Greenhouse fluorinated gas falling within Kyoto Protocol
- 15.2. Chemical safety assessment : No information available

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SECTION 16 Other information

| | |
|---------------------------------|---|
| Further information | : Product for industrial use only For more information regarding the use of this product, please refer to our technical information or contact the sales department in your region |
| Text of R-Phrases in § 3 | : R12 : Extremely flammable. |
| Text of H-Phrases in § 3 | : H220 - Extremely flammable gas H280 - Contains gas under pressure; may explode if heated |
| * Update | : Modifications are indicated by an asterisk (*) |

This sheet complements the technical sheets but does not replace them. The information given is based on our knowledge of the product, at the time of publication. It is given in good faith.

Besides, the attention of the user is drawn to the possible risks incurred by using the product for any other use than that for which it was intended.

In no way does this exempt the user from knowing and applying all the regulations controlling his activity. He alone will take on the responsibility for taking the precautions involved by the use of the product.

The aim of all the mandatory regulations mentioned is just to help the user to fulfil his obligations regarding the use of hazardous products.

This information must not be considered exhaustive. It does not exempt the user from ensuring that other obligations than those mentioned could apply, related to the storage and use of the product, this being his sole responsibility.

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