

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) / 20% 2,3,3,3-Tetrafluoroprop-1-ene (R-1234yf) / 7% Trans-1,3,3,3-Tetrafluoroprop-1-ene (R-1234ze)
 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

Specific hazards : On heating :
Toxic and corrosive vapours are released

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.
Stop the leak.
Ensure that there is a suitable ventilation system
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.
Avoid the build-up of electrostatic charge
Smoking is forbidden

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
- in a cool, well-ventilated area
- the container tightly closed
- at temperature not exceeding 50 °C
- away from any source of ignition

Incompatible products : Strong oxidizing agents
Alkaline earth metals
Metallic powders

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SECTION 7 Handling and storage (continued)
Packaging materials

- Recommended : Ordinary steel
- Not suitable : Alloys containing more than 2% magnesium
- 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.

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SECTION 9 Physical and chemical properties (continued)

- 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
- 9.1.l. Vapour density : 41.79 kg/m³ at 20 °C
101.24 kg/m³ at 50 °C
- 9.1.m. Density : Liquid :
1.11 g/cm³ at 20 °C
0.964 g/cm³ 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
- alkaline earth metals.
- Finely divided metals.
- Alkaline hydroxide
- 10.6. Hazardous decomposition products : On thermal decomposition (pyrolysis), releases :
Carbon oxides (CO, CO₂)
Hydrogen fluoride
Carbonyl halogenides
Halogenated compounds.

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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

• 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 severe ocular lesions
 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) :
 Water : 5 % biodegradation after 28 days
 Air : Half-life = 1472 days
 Pentafluoroethane (R-125) :
 Water : 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

: This mixture contains no substance meeting PBT and vPvB criteria

12.6. Other adverse effects
Ozone depletion potential : ODP (R-11=1)=0

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SECTION 12 Ecological information (continued)
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

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

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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

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
This safety data sheet has been written in conformity with the regulation (UE) 453/2010.

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.

End of document

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