

Solstice® ZD, Solstice® 1233zd (E)

000000018007

Version 2.13

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 : Solstice® ZD, Solstice® 1233zd (E)
SDS-number : 000000018007
Type of product : Substance
Remarks : SDS according to Art. 31 of Regulation (EC) 1907/2006.

Chemical name : trans-1-Chloro-3,3,3-trifluoropropene
CAS-No. : 102687-65-0

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

Use of the Substance/Mixture : Refrigerant
Heat transfer fluid

Uses advised against : none

Short title of exposure scenarios : see Annex

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)

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: 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

Gases under pressure Liquefied gas
H280 Contains gas under pressure; may explode if heated.
Long-term (chronic) aquatic hazard Category 3
H412 Harmful to aquatic life with long lasting effects.

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.
		H412	Harmful to aquatic life with long lasting effects.
Precautionary statements	:	P273	Avoid release to the environment.
		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

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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**

Chemical name	CAS-No. Index-No. EC-No.	Classification 1272/2008	Concentration	Remarks
trans-1-Chloro-3,3,3-trifluoropropene	102687-65-0 700-486-0	Aquatic Chronic 3; H412 Press. Gas Liquefied gas; H280	100 %	

3.2. Mixtures

Not applicable

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.

Inhalation:

Move to fresh air. Artificial respiration and/or oxygen may be necessary. Call a physician immediately.

Skin contact:

After contact with skin, wash immediately with plenty of water. Take off contaminated clothing and shoes immediately. Wash clothing before reuse. Call a physician immediately.

Eye contact:

Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 5 minutes. Call a physician immediately.

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Ingestion:

Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician immediately.

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

No data available

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

See Section 11 for more detailed information on health effects and symptoms.

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SECTION 5: Firefighting measures**5.1. Extinguishing media***Suitable extinguishing media:*

The product is not flammable.

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Water spray

Carbon dioxide (CO₂)

Dry chemical

Foam

5.2. Special hazards arising from the substance or mixture

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.

Exposure to decomposition products may be a hazard to health.

Fire may cause evolution of:

Hydrogen fluoride

Gaseous hydrogen chloride (HCl).

Carbon oxides

Halogenated compounds

Carbonyl halides

5.3. Advice for firefighters

Wear full protective clothing and self-contained breathing apparatus.

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

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Evacuate personnel to safe areas. Wear personal protective equipment. Unprotected persons must be kept away. Ensure adequate ventilation. In case of insufficient ventilation wear suitable respiratory equipment. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

6.2. Environmental precautions

Should not be released into the environment. Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers).

6.3. Methods and materials for containment and cleaning up

Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see section 13). Minimize contact of spilled material with soils to prevent runoff to surface waterways. Place spilled material in an appropriate container for disposal.

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:*

Do not breathe vapours or spray mist. Do not use in areas without adequate ventilation.

Advice on protection against fire and explosion:

Keep product and empty container away from heat and sources of ignition.

Hygiene measures:

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Ensure adequate ventilation, especially in confined areas. Remove and wash contaminated clothing before re-use. Contaminated work clothing should not be allowed out of the workplace. Keep working clothes separately. Wash hands before breaks and immediately after handling the product.

7.2. Conditions for safe storage, including any incompatibilities*Requirements for storage areas and containers:*

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Keep away from direct sunlight. Keep only in the original container in a cool, well ventilated place away from acids.

7.3. Specific end use(s)

Specific use information:

Restricted to professional users.

For industrial use only.

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-Chloro-3,3,3-trifluoropropene	HONEYWELL TWA	800 ppm		We are not aware of any national exposure limit.

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-Chloro-3,3,3-trifluoropropene	Workers / Long-term systemic effects		1779 mg/m ³	Inhalation	
trans-1-Chloro-3,3,3-trifluoropropene	Consumers / Long-term systemic effects		379 mg/m ³	Inhalation	
trans-1-Chloro-3,3,3-trifluoropropene	Consumers / Long-term systemic effects		109mg/kg bw/d	Ingestion	

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Component	Environmental compartment / Value	Remarks
trans-1-Chloro-3,3,3-trifluoropropene	Fresh water: 0,038 mg/l	Assessment factor: 1000
trans-1-Chloro-3,3,3-trifluoropropene	Marine water: 0,0038 mg/l	Assessment factor: 10000
trans-1-Chloro-3,3,3-trifluoropropene	Fresh water sediment: 0,691 mg/kg dw	
trans-1-Chloro-3,3,3-trifluoropropene	Marine sediment: 0,0691 mg/kg dw	
trans-1-Chloro-3,3,3-trifluoropropene	Soil: 0,126 mg/kg dw	

8.2. Exposure controls

Occupational exposure controls

Do not breathe vapours or spray mist.

Engineering measures

Use with local exhaust ventilation.

Perform filling operations only at stations with exhaust ventilation facilities.

Personal protective equipment

Respiratory protection:

In case of insufficient ventilation wear suitable respiratory equipment.

Self-contained breathing apparatus (EN 133)

Hand protection:

Glove material: Viton®

Vitoject® 890

Gloves must be inspected prior to use.

Replace when worn.

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Remarks: Supplementary note: The specifications are based on information and tests from similar substances by analogy.
Due to varying conditions (e.g.temperature or other strains) it must be considered that the usage of a chemical protective glove in practice may be much shorter than the permeation time determined in accordance with EN 374.
Since actual conditions of practical use often deviate from standardised conditions according EN 374 the glove manufacturer recommends to use the chemical protective glove in practice not longer than 50% of the recommended permeation time.
Manufacturer's directions for use should be observed because of great diversity of types .
Suitable gloves tested according EN 374 are supplied e.g. from KCL GmbH, D-36124 Eichenzell, Vertrieb@kcl.de

Eye protection:
Safety goggles

Skin and body protection:
Protective footwear

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 | : | colourless |
| (c) Odour | : | slight |
| (d) Melting point/freezing point | : | < -90 °C
Method: OECD Test Guideline 102 |
| (e) Boiling point/boiling range | : | 19 °C
Method: OECD Test Guideline 103 |
| (f) Flammability | : | The product is not flammable.
Method: Flammability (gases) |
| (g) Lower and upper | : | Lower explosion limit |

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9.2 Other Information

Polymer characteristics : No data available

Oxidizing properties : The substance or mixture is not classified as oxidizing.

Evaporation rate : No data available

Viscosity, dynamic : No data available

SECTION 10: Stability and reactivity**10.1. Reactivity**

Stable under recommended storage conditions.

10.2. Chemical stability

No data available

10.3. Possibility of hazardous reactions

Polymerisation can occur.

10.4. Conditions to avoidPressurized container. Protect from sunlight and do not expose to temperatures exceeding 55 °C.
Can form a combustible mixture with air at pressures above atmospheric pressure.**10.5. Incompatible materials**Strong oxidizing agents
Magnesium
Finely divided aluminium**10.6. Hazardous decomposition products**Halogenated compounds
Carbon oxides

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Hydrogen fluoride
Carbonyl halides
Gaseous hydrogen chloride (HCl).

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

study technically not feasible

Acute dermal toxicity:

study technically not feasible

Acute inhalation toxicity:

LC50

Species: Rat

Value: 120000 ppm

Exposure time: 4 h

Acute toxicity (other routes of administration):

No data available

(b) Skin corrosion/irritation:

Species: Rabbit

Result: No skin irritation

Exposure time: 4 h

Method: OECD Test Guideline 404

(c) Serious eye damage/eye irritation:

study technically not feasible

(d) Respiratory or skin sensitisation:

Result: Does not cause skin sensitisation.

Classification: Patch test on human volunteers did not demonstrate sensitisation properties.

(e) Germ cell mutagenicity:

Test Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay)

Metabolic activation: with and without metabolic activation

Result: negative

Test Method: Mutagenicity (Escherichia coli - reverse mutation assay)

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Metabolic activation: with and without metabolic activation
Result: negative
Method: OECD Test Guideline 471

Test Method: Chromosome aberration test in vitro
Cell type: Human lymphocytes
Result: negative
Method: OECD Test Guideline 473

Species: Rat
Cell type: Bone marrow
Method: Mutagenicity (micronucleus test)
Result: negative

Test Method: Unscheduled DNA synthesis
Species: Rat
Result: negative

Species: Mouse
Cell type: Bone marrow
Method: Mutagenicity (micronucleus test)
Result: negative

(f) Carcinogenicity:
Note: No data available

(g) Reproductive toxicity:
Test Type: Two-generation study
Method: OECD Test Guideline 416
Species: Rat
Route of Application: inhalation (gas)
General Toxicity - Parent: NOEL: 5.000 ppm
General Toxicity F1: NOEL: 5.000 ppm
Fertility: NOEL: 15.000 ppm
Early Embryonic Development: NOEL: 15.000 ppm
Method: OECD Test Guideline 414
Species: Rat
Route of Application: inhalation (gas)
General Toxicity Maternal: NOEL: 15.000 ppm
Developmental Toxicity: NOEL: 10.000 ppm
Method: OECD Test Guideline 414
Species: Rabbit
Route of Application: inhalation (gas)

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General Toxicity Maternal: NOAEC: 15.000 ppm
Developmental Toxicity: NOAEC: 15.000 ppm

(h) STOT-single exposure:

No data available

(i) STOT - repeated exposure:

Species: Rat
Application Route: Inhalation
Exposure time: 90 d
LOAEL: 4000
Method: OECD Test Guideline 413
Note: Subchronic toxicity

(j) Aspiration hazard:

No data available

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:*

LC50

Species: *Oncorhynchus mykiss* (rainbow trout)

Value: 38 mg/l

Exposure time: 96 h

Method: OECD Test Guideline 203

Toxicity to aquatic plants:

EC50

Growth inhibition

Species: *Pseudokirchneriella subcapitata* (green algae)

Value: > 215 mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201

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NOEC

Growth rate

Species: *Pseudokirchneriella subcapitata* (green algae)

Value: 115 mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201

Toxicity to aquatic invertebrates:

EC50

Immobilization

Species: *Daphnia magna* (Water flea)

Value: 82 mg/l

Exposure time: 48 h

Method: OECD Test Guideline 202

12.2. Persistence and degradability*Biodegradability:*

Biodegradation: 0 %

Exposure time: 28 d

Result: Not readily biodegradable.

Method: OECD 301 D

12.3. Bioaccumulative potential

Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

Not persistent, bioaccumulative, and toxic (PBT).

Not very persistent and very bioaccumulative (vPvB).

12.6. Endocrine disrupting properties

No data available

12.7. Other adverse effects

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No data available

SECTION 13: Disposal considerations**13.1. Waste treatment methods***Product:*

Offer surplus and non-recyclable solutions to a licensed disposal company. Refer to manufacturer/supplier for information on recovery/recycling.

Remarks:

The classification of the product may meet the criteria for a hazardous waste. Classification: 14.06.01

Further information:

Provisions relating to waste:

EC Directive 2006/12/EC; 2008/98/EEC

Regulation No. 1013/2006

The classification of the product may meet the criteria for a hazardous waste.

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-CHLORO-3,3,3-TRIFLUOROPROPENE)

IMDG:LIQUEFIED GAS, N.O.S.(TRANS-1-CHLORO-3,3,3-TRIFLUOROPROPENE)

IATA:Liquefied gas, n.o.s.(Trans-1-Chloro-3,3,3-trifluoropropene)

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

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No data available

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

Basis	Value	Remarks
Substances of very high concern (SVHC)		This product does not contain substances of very high concern according to Regulation (EC) No Article 57 above the respective regulatory 1907/2006 (REACH), concentration limit of ≥ 0.1 % (w/w).
Regulation (EC) No. 1907/2006, Annex XVII		Not listed

Global warming potential :

4,5

VOC:

Directive 2010/75/EU of 24 November 2010 on industrial and livestock rearing emissions (integrated pollution prevention and control), 100 %

VOC:

Directive 2004/42/EC, 100 %

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

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Korea. Existing Chemicals Inventory (KECI)

On the inventory, or in compliance with the inventory

Philippines. Inventory of Chemicals and Chemical Substances (PICCS)

On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances (IECSC)

On the inventory, or in compliance with the inventory

Thailand. Existing Chemicals Inventory from FDA (TECI List)

Not 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-Chloro-3,3,3-trifluoropropene : H412 Harmful to aquatic life with long lasting effects.
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 and toxic substance

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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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