

# PERMESSO DI RICERCA DI RISORSE GEOTERMICHE FINALIZZATO ALLA SPERIMENTAZIONE DI UN IMPIANTO PILOTA DENOMINATO "LUCIGNANO"

COMUNE DI RADICONDOLI – PROVINCIA DI SIENA

PROPONENTE:

Lucignano Pilot Project S.r.l.



## PROGETTO DEFINITIVO

NUMERO ELABORATO:

**LCG-RP01-A10-V00**

TITOLO:

**SCHEMA DEL FLUIDO DI LAVORO**

DATA:

Aprile 2017

PROGETTISTI:

**RENEWEM S.r.l**

Via Norvegia n° 68 - 56021 Cascina (PI) - ITALIA

UFFICI:

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REVISIONE

DATA		NOTE	
REV.1			
REV.2			
REV.3			



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

**Honeywell**

## Solstice® ZD, Solstice® 1233zd (E)

Version 1.3

Revision Date 16.06.2014

### 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

#### 1.1. Product identifier

Product name : Solstice® ZD, Solstice® 1233zd (E)  
Type of product : Substance  
Remarks : SDS according to Art. 31 of Regulation (EC) 1907/2006.  
Chemical Name : trans-1-Chloro-3,3,3-trifluoropropene  
EC-No. : 700-486-0  
Registration number : 01-2119855084-38

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

Use of the Substance/Mixture : Refrigerant  
Power cycle fluid  
Heat transfer fluid

Uses advised against : none

#### 1.3. Details of the supplier of the safety data sheet

Company : Honeywell Fluorine Products Europe B.V.  
Laarderhoogtweg 18  
1101 EA Amsterdam  
Netherlands  
Telephone : (31) 020 5656911  
Telefax : (31) 020 5656600  
For further information,  
please contact: : PMTEU Product Stewardship:  
SafetyDataSheet@Honeywell.com  
Honeywell International, Inc.  
101 Columbia Road  
Morristown, NJ 07962-1057  
USA

#### 1.4. Emergency telephone number

Emergency telephone number : (32) 16 391 209 (Mon-Fri, 9.00-17.00h)  
+1-703-527-3887 (ChemTrec)  
+1-303-389-1414 (Medical)

### 2. HAZARDS IDENTIFICATION

#### 2.1. Classification of the substance or mixture

##### REGULATION (EC) No 1272/2008

Chronic aquatic toxicity 3  
H412 Harmful to aquatic life with long lasting effects.  
Gases under pressure Press. Gas

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H280 Contains gas under pressure; may explode if heated.

### DIRECTIVES 67/548/EEC or 1999/45/EC

R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

### 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	:	P281	Use personal protective equipment as required.
		P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
		P273	Avoid release to the environment.
		P308 + P313	IF exposed or concerned: Get medical advice/ attention.
		P410 + P403	Protect from sunlight. Store in a well-ventilated place.

### DIRECTIVES 67/548/EEC or 1999/45/EC

R-phrases(s)	:	R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S-phrases(s)	:	S61	Avoid release to the environment. Refer to special instructions/ Safety data sheets.

### 2.3. Other hazards

#### Potential health effects

Skin	:	Animal testing did not show any hazardous effects.
Eyes	:	No adverse health effects are expected.

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- Ingestion : Unlikely route of exposure.
- Inhalation : High vapour concentrations can cause headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness. May cause cardiac arrhythmia.
- Chronic Exposure : not applicable
- Further information : Do not breathe vapours or spray mist.

### Potential environmental effects

Do not flush into surface water or sanitary sewer system.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Type of product : Substance

### Chemical characterization

Chemical Name : trans-1-Chloro-3,3,3-trifluoropropene

CAS-No. : 102687-65-0

EC-No. : 700-486-0

Registration number : 01-2119855084-38

Occupational Exposure Limit(s), if available, are listed in Section 8.  
For the full text of the R-phrases/ H-statements mentioned in this Section, see Section 16.

## 4. FIRST AID MEASURES

### 4.1 Description of first aid measures

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

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### 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. :

## 5. FIREFIGHTING MEASURES

### 5.1. Extinguishing media

Suitable extinguishing media : Water spray  
Dry powder  
Foam  
Carbon dioxide (CO<sub>2</sub>)

Extinguishing media which shall not be used for safety reasons : High volume water jet

### 5.2. Special hazards arising from the substance or mixture

Possibility of generating hazardous reactions during a fire due to the presence of F and Cl groups.  
Heating will cause pressure rise with risk of bursting  
Cool closed containers exposed to fire with water spray.  
This product is not flammable at ambient temperatures and atmospheric pressure.

### 5.3. Advice for firefighters

Wear full protective clothing and self-contained breathing apparatus.  
Further information : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

## 6. ACCIDENTAL RELEASE MEASURES

### 6.1. Personal precautions, protective equipment and emergency procedures

Immediately contact emergency personnel. Wear personal protective equipment. Unprotected persons must be kept away. Ensure adequate ventilation. In case of insufficient ventilation wear suitable respiratory equipment.

### 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).

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### 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.

## 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 : Can form a combustible mixture with air at pressures above atmospheric pressure. Keep product and empty container away from heat and sources of ignition.
- Hygiene measures : Remove and wash contaminated clothing before re-use. Wash hands before breaks and at the end of workday.

### 7.2. Conditions for safe storage, including any incompatibilities

- Requirements for storage areas and containers : 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.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

#### Occupational exposure limits:

Components	Basis	Value type	Control parameters	Exceeding Factor	Form of exposure	Remarks
trans-1-Chloro-3,3,3-trifluoropropene	WEEL	TWA	800 ppm			We are not aware of any national exposure limit.

TWA - time weighted average

#### DNEL/ PNEC-Values

No DNEL-data available.

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No PNEC data available.

### 8.2. Exposure controls

#### Occupational exposure controls

Do not breathe vapours or spray mist.  
Avoid contact with skin, eyes and clothing.

#### Environmental exposure controls

Handle in accordance with local environmental regulations and good industrial practices.

#### Engineering measures

Use with local exhaust ventilation.  
Perform filling operations only at stations with exhaust ventilation facilities.

#### Personal protective equipment

Respiratory protection : Remarks: In the case of vapour formation use a respirator with an approved filter.

Hand protection : Glove material: Viton (R)  
Vitoject® 890  
Gloves must be inspected prior to use.  
Replace when worn.  
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



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### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1. Information on basic physical and chemical properties

Form	:	liquid, clear
Colour	:	colourless
Odour	:	slight
molecular weight	:	130,5 g/mol
Melting point/range	:	< -90 °C Method: OECD Test Guideline 102
Boiling point/boiling range	:	19 °C
Flash point	:	Method: ISO 2719 not applicable
Flammability (solid, gas)	:	The product is not flammable. Method: Flammability (gases)
Ignition temperature	:	380 °C at 986,8 - 1.035,9 hPa Method: DIN 51794
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Lower explosion limit	:	None
Upper explosion limit	:	None
Vapour pressure	:	1.516 hPa at 30 °C
Vapour pressure	:	1.065 hPa at 20 °C
Density	:	1,27 g/cm <sup>3</sup>
Water solubility	:	1,90 g/l at 20 °C Method: OECD Test Guideline 105
Partition coefficient: n-octanol/water	:	log Pow 2,2 at: 25 °C

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Relative vapour density : (Air = 1.0)  
not determined

### 10. STABILITY AND REACTIVITY

#### 10.1. Reactivity

no data available

#### 10.2. Chemical stability

no data available

#### 10.3. Possibility of hazardous reactions

no data available

#### 10.4. Conditions to avoid

Heating will cause pressure rise with risk of bursting  
Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.  
Keep away from direct sunlight.

#### 10.5. Incompatible materials

Strong oxidizing agents  
Magnesium  
Finely divided aluminium

#### 10.6. Hazardous decomposition products

In case of fire hazardous decomposition products may be produced such as:  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)  
Carbonyl halides  
Gaseous hydrogen chloride (HCl).  
Gaseous hydrogen fluoride (HF).

### 11. TOXICOLOGICAL INFORMATION

#### 11.1. Information on toxicological effects

Acute oral toxicity : not applicable

Acute dermal toxicity : not applicable

Acute inhalation toxicity : LC50  
Species: rat

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	Value: 120000 ppm Exposure time: 4 h
Skin irritation	: Species: rabbit Result: No skin irritation Exposure time: 4 h Method: OECD Test Guideline 404
Eye irritation	: not applicable
Sensitisation	: Result: Does not cause skin sensitisation. Classification: Patch test on human volunteers did not demonstrate sensitisation properties.
Sensitisation	: Cardiac sensitization Species: dogs Cardiac sensitisation threshold (dog): 25000 ppm.
Repeated dose toxicity	: Species: rat Application Route: Inhalation Exposure time: 90 d LOAEL : 4000 ppm Method: OECD Test Guideline 413 Note: Subchronic toxicity
Genotoxicity in vitro	: Test Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay) Result: negative
Genotoxicity in vivo	: 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
Reproductive Toxicity/Fertility	: Species: rabbit Note: No-observed-effect level - 15,000 ppm
	: Species: rat

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Note: No-observed-effect level - 10,000 ppm

Teratogenicity and developmental toxicity : Species: rabbit  
Note: No-observed-effect level - 15,000 ppm

: Species: rat  
Note: No-observed-effect level - 10,000 ppm

Further information : Not mutagenic in Ames Test.

## 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: 106,7 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201

Toxicity to aquatic plants : 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.

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Method: OECD 301 D

### 12.3. Bioaccumulative potential

no data available

### 12.4. Mobility in soil

no data available

### 12.5. Results of PBT and vPvB assessment

no data available

### 12.6. Other adverse effects

no data available

## 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.

Waste key for the unused product : Classification: 14.06.01

Further information : Provisions relating to waste:  
EC Directive 2006/12/EC; 2008/98/EEC  
Regulation No. 1013/2006

For personal protection see section 8.

## 14. TRANSPORT INFORMATION

### ADR/RID

UN Number : 3163  
Description of the goods : LIQUEFIED GAS, N.O.S.  
(TRANS-1-CHLORO-3,3,3-TRIFLUOROPROPENE)  
Class : 2  
Classification Code : 2A  
Hazard Identification Number : 20  
ADR/RID-Labels : 2.2

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Environmentally hazardous : no

### IATA

UN Number : 3163  
Description of the goods : Liquefied gas, n.o.s.  
(Trans-1-Chloro-3,3,3-trifluoropropene)  
Class : 2.2  
Hazard Labels : 2.2

### IMDG

UN Number : 3163  
Description of the goods : LIQUEFIED GAS, N.O.S.  
(TRANS-1-CHLORO-3,3,3-TRIFLUOROPROPENE)  
Class : 2.2  
Hazard Labels : 2.2  
EmS Number : F-C, S-V  
Marine pollutant : no

## 15. REGULATORY INFORMATION

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

#### Other inventory information

US. Toxic Substances Control Act : On TSCA Inventory  
Australia. Industrial Chemical (Notification and Assessment) Act : On the inventory, or in compliance with the inventory  
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) : All components of this product are on the Canadian DSL.  
Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory  
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  
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand : Not in compliance with the inventory

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### 15.2 Chemical safety assessment

Chemical safety assessment : A Chemical Safety Assessment has been carried out.

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## 16. OTHER INFORMATION

### Further information

All directives and regulations refer to amended versions.  
Vertical lines in the left hand margin indicate an amendment from the previous version.

Abbreviations:

EC European Community

CAS Chemical Abstracts Service

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.

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