

## 安全資料表

1. 產品與用途								
1.1 物料名稱		: R1233zd Refrigerant						
1.2 用途		: 雪種						
2. 危害成份								
中								
		有害	有毒	腐蝕性	易燃	刺激性	爆炸性	助燃
		( )	( )	( )	( )	( )	( )	( )
2.2 潛在危害		吸入：大量吸入可能會引致缺氧，不協調、血壓上升、呼吸困難						
		皮膚接觸：液態濺射可能引致凍傷。						
		眼睛接觸：刺激性，液態濺射或霧化噴射可能會引致凍傷。						
3. 火警和爆炸資料								
3.1 燃燒物成份比例		: 無資料	3.2 沸點(°C): 19 度		3.3 溶解度 : 無資料			
3.4 閃點(°C)		: 無資料	3.5 比重 : 無資料		3.6 氣味 : 無資料			
3.7 滅火設備		: 灑水或二氧化碳,化學乾粉之滅火劑，視乎現場燃燒物選擇						
4. 急救處理								
4.1 眼睛接觸		: 取下隱形眼鏡，立即用大量水沖洗至少 5 分鐘，立即致電醫生，立刻求醫。						
4.2 皮膚接觸		: 接觸皮膚，立刻以大量水清洗，立即脫掉受污染的衣服和鞋子。如發現水疱或凍傷情況，再次使用前先清洗衣物，立即致電醫生						
4.3 吸入		: 移至新鮮空氣處，可能需要人工呼吸和/或吸氧，立即致電醫生求醫。						
4.4 食入		: 移開傷者，保持溫暖，如發現有呼吸困難，就須施行人工呼吸及立刻安排接見醫生。						
5. 個人防護裝備								
☑ 防凍手套		☑ 防化學品護眼罩			☑ 口罩			

## 6. 處理及使用應知事項

### 6.1 儲存注意事項:

- 存放於乾爽清涼的地方
- 保持足夠通風，避免太陽直接照射
- 遠離熱源
- 儲存溫度：不可高於45°C

### 6.2 意外洩漏處理的方法:

- 在清除洩漏雪種時，穿上個人防護裝備。將洩漏源頭分隔並確保通風正常。
- 大量洩漏：要確保地點通風，可用沙、泥及適當物品吸乾。

## 7. 其他資料

- 雪種氣體是重過空氣，如不良通風環境下，雪種會沉底，這時應提供適當之通風或呼吸裝備

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**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  
REACH 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  
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	: Honeywell Specialty Chemicals Seelze GmbH Wunstorfer Straße 40 30926 Seelze Germany	Honeywell International, Inc. 115 Tabor Road Morris Plains, NJ 07950-2546 USA
Telephone	: (49) 5137-999 0	
For further information, please contact:	: PMTEU Product Stewardship: SafetyDataSheet@Honeywell.com	

**1.4. Emergency telephone number**

Emergency telephone number : +1-703-527-3887 (ChemTrec-Transport)  
+1-303-389-1414 (Medical)

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Country based Poison : see chapter 15.1  
Control Center

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**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  
P410 + P403

Avoid release to the environment.  
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.  
Results of PBT and vPvB assessment, see chapter 12.5.

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**SECTION 3: Composition/information on ingredients**

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**3.1. Substance**

Chemical name	CAS-No. Index-No. REACH Registration Number EC-No.	Classification 1272/2008	Concentration	Remarks
trans-1-Chloro-3,3,3-trifluoropropene	102687-65-0 01-2119855084-38 700-486-0	Aquatic Chronic 3; H412 Press. Gas Liquefied gas; H280	100 %	

**3.2. Mixture**

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.

*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**

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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.

**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 (CO<sub>2</sub>)

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

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**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.

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**SECTION 6: Accidental release measures**

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

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.

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**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:*

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:*

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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:*

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.

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/m3	Inhalation	
trans-1-Chloro-3,3,3-trifluoropropene	Consumers / Long-term systemic effects		379 mg/m3	Inhalation	
trans-1-Chloro-3,3,3-	Consumers /		109mg/kg	Ingestion	



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trifluoropropene	Long-term systemic effects		bw/d		
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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**

Physical state	:	gaseous
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 Method: OECD Test Guideline 103
Flammability	:	The product is not flammable. Method: Flammability (gases)
Upper explosion limit	:	None

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Lower explosion limit	: None
Flash point	: Method: ISO 2719 Not applicable
Auto-ignition temperature	: 380 °C at 986,8 - 1.035,9 hPa Method: DIN 51794
Decomposition temperature	: 250 °C
Viscosity, kinematic	: No data available
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
Vapour pressure	: 1.516 hPa at 30 °C
Vapour pressure	: 1.065 hPa at 20 °C
Density	: 1,27 g/cm3
Relative vapour density	: (Air = 1.0) not determined

**9.2 Other Information**

Oxidizing properties	: The substance or mixture is not classified as oxidizing.
Evaporation rate	: No data available
Viscosity, dynamic	: No data available

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**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 avoid**

Pressurized 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  
Hydrogen fluoride  
Carbonyl halides  
Gaseous hydrogen chloride (HCl).

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**SECTION 11: Toxicological information**

**11.1. Information on toxicological effects**

*Acute oral toxicity:*  
study technically not feasible

*Acute dermal toxicity:*  
study technically not feasible

*Acute inhalation toxicity:*  
LC50

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

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Species: Rat  
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:*

study technically not feasible

### *Respiratory or skin sensitisation:*

Result: Does not cause skin sensitisation.  
Classification: Patch test on human volunteers did not demonstrate sensitisation properties.

### *Repeated dose toxicity:*

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

### *Carcinogenicity:*

Note: No data available

### *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)  
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

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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:*

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

### *Aspiration hazard:*

No data available

## 11.2. Information on other hazards

Endocrine disrupting properties  
No data available

### *Other information:*

Excessive exposure may cause central nervous system effects including drowsiness and dizziness.  
Cardiac Sensitization (dog): No effects for exposures up to 100000 ppm.

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**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

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

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**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**

This substance is not considered to be very persistent and very bioaccumulating (vPvB).

This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

**12.6. Endocrine disrupting properties**

No data available

**12.7. Other adverse effects**

No data available

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**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

For personal protection see section 8.

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**SECTION 14: Transport information**

**14.1 UN 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)



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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**

**14.5 Environmental hazards**

ADR/RID: no

Marine pollutant: no

**14.6 Special precautions for user**

No data available

**14.7 Maritime transport in bulk according to IMO instruments**

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 $\geq 0.1$ % (w/w).

**VOC:**

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

**VOC:**

Directive 2004/42/EC, 100 %

**Poison Control Center**

Country	Phone Number
Austria	+4314064343
Belgium	070 245245
Bulgaria	(+35929154233

Country	Phone Number
Liechtenstein	+41 442515151
Lithuania	+370532362052
Luxembourg	070245245; (+352)80002-5500

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Croatia	(+3851)23-48-342
Cyprus	+357 2240 5611
Czech Republic	+420224919293; +420224915402
Denmark	82121212
Estonia	16662; (+372)6269390
Finland	9471977
France	+33(0)145425959
Greece	+30 210 779 3777
Hungary	(+36-80)201-199
Iceland	5432222
Ireland	+353(1)8092166
Italy	0382 24444
Germany	Berlin : 030/19240
	Bonn : 0228/19240
	Erfurt : 0361/730730
	Freiburg : 0761/19240
	Göttingen : 0551/19240
	Homburg : 06841/19240
	Mainz : 06131/19240
	Munich : 089/19240
Latvia	+37167042473

Malta	+356 2395 2000
Netherlands	030-2748888
Norway	22591300
Poland	+48 42 25 38 400
Portugal	808250250
Romania	+40 21 318 3606
Slovakia (NTIC)	+421 2 54 774 166
Slovenia	+386 1 400 6051
Spain	+34915620420
Sweden	112 (begär Giftinformation); +46104566786
Switzerland	145
United Kingdom	(+44) 844 892 0111

**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

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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)

Not in compliance with the inventory

China. Inventory of Existing Chemical Substances (IECSC)

On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand

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

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

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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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