



**Solstice® L40X (R-455A)**

000000018891

Version 6.4

Revision Date 10.02.2022


Supersedes 5

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

Flammable gases Category 1B  
H221 Flammable gas.  
Gases under pressure Liquefied gas  
H280 Contains gas under pressure; may explode if heated.

**2.2. Label elements**

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

Hazard pictograms	:		
Signal word	:	Danger	
Hazard statements	:	H221 H280	Flammable gas. Contains gas under pressure; may explode if heated.
Precautionary statements	:	P210 P260 P280 P284 P308 + P313 P410 + P403	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking. Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. Wear protective gloves/ eye protection/ face protection. In case of inadequate ventilation wear respiratory protection. IF exposed or concerned: Get medical advice/ attention. Protect from sunlight. Store in a well- ventilated place.
Special labelling of certain products:	:	Contains fluorinated greenhouse gases.	

**2.3. Other hazards**

Warning! Container under pressure.

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

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**3.1. Substance**

Not applicable

**3.2. Mixture**

Chemical name	CAS-No. Index-No. REACH Registration Number EC-No.	Classification 1272/2008	Concentration	Remarks
2,3,3,3-Tetrafluoroprop-1-ene	754-12-1 468-710-7	Press. Gas Liquefied gas; H280 Flam. Gas 1B; H221	75,5 %	
Difluoromethane	75-10-5 200-839-4	Flam. Gas 1B; H221 Press. Gas ; H280	21,5 %	
Carbon dioxide	124-38-9 204-696-9	Press. Gas Liquefied gas; H280	3 %	

Remaining components of this product are non-hazardous and/or are present at concentrations below reportable limits.

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:*

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician.

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*Skin contact:*

After contact with skin, wash immediately with plenty of water. Rapid evaporation of the liquid may cause frostbite. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. Call a physician. Wash contaminated clothing before re-use.

*Eye contact:*

Protect unharmed eye. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

*Ingestion:*

Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. If conscious, drink plenty of water. 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 frost-bitten areas as 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:*

In case of fire, allow gas to burn if flow cannot be shut off immediately.  
Apply water from a safe distance to cool container and protect surrounding area.  
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

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

Flammable gas.  
Contents under pressure.  
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.  
Vapours may travel to areas away from work site before igniting/flashing back to vapor source.  
Fire or intense heat may cause violent rupture of packages.  
Cool closed containers exposed to fire with water spray.  
Do not allow run-off from fire fighting to enter drains or water courses.  
Fire may cause evolution of:  
Hydrogen fluoride  
Carbonyl halides  
Halogenated compounds  
Carbon oxides

**5.3. Advice for firefighters**

In the event of fire and/or explosion do not breathe fumes.  
Wear self-contained breathing apparatus and protective suit.  
No unprotected exposed skin areas.  
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**

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Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Wear self-contained breathing apparatus and protective suit. Eliminate all ignition sources if safe to do so. Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area. Vapors may travel to areas away from work site before igniting/flashing back to vapor source. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Ensure that the oxygen content is  $\geq 19.5\%$ .

**6.2. Environmental precautions**

Prevent further leakage or spillage if safe to do so. The product evaporates readily. Discharge into the environment must be avoided.

**6.3. Methods and materials for containment and cleaning up**

Use explosion-proof equipment.  
No sparking tools should be used.  
Ventilate the area.  
Allow to evaporate.

**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:*

Handle with care. Wear personal protective equipment. Do not breathe vapour. Avoid contact with skin, eyes and clothing. Use only in well-ventilated areas. Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Use authorized cylinders only. Do not remove screw cap until immediately ready for use. Always replace cap after use.

*Advice on protection against fire and explosion:*

Container hazardous when empty. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Keep product and empty container away from heat and sources of ignition. Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Take measures to prevent the build up of electrostatic charge. Electrical equipment should be protected to the appropriate standard. Use explosion-proof equipment. No sparking tools should be used. No smoking.

*Hygiene measures:*

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Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. When using do not eat, drink or smoke. Remove and wash contaminated clothing before re-use. Keep working clothes separately. Do not breathe vapour. Avoid contact with skin, eyes and clothing.

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

*Requirements for storage areas and containers:*

Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Storage rooms must be properly ventilated. Ensure adequate ventilation, especially in confined areas. Store away from incompatible substances. Store in original container.

**7.3. Specific end use(s)**

no additional data available

**SECTION 8: Exposure controls/personal protection**

**8.1. Control parameters**

*Occupational exposure limits:*

Components	Basis / Value type	Value / Form of exposure	Exceeding Factor	Remarks
2,3,3,3-Tetrafluoroprop-1-ene	WEEL TWA	500 ppm		
2,3,3,3-Tetrafluoroprop-1-ene	HONEYWELL TWA	500 ppm		
Difluoromethane	HONEYWELL TWA	2.200 mg/m3 1.000 ppm		We are not aware of any national exposure limit.
Carbon dioxide	EH40 WEL TWA	9.150 mg/m3 5.000 ppm		
Carbon dioxide	EH40 WEL STEL	27.400 mg/m3 15.000 ppm		

TWA - Time weighted average  
STEL - Short term exposure limit

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**DNEL/ PNEC-Values**

Component	End-use/impact	Exposure duration	Value	Exposure routes	Remarks
2,3,3,3-Tetrafluoroprop-1-ene	Workers / Long-term systemic effects		950 mg/m3	Inhalation	
2,3,3,3-Tetrafluoroprop-1-ene	Consumers / Long-term systemic effects		113,1 mg/m3	Inhalation	
2,3,3,3-Tetrafluoroprop-1-ene	Workers / Acute systemic effects		186400 mg/m3	Inhalation	
2,3,3,3-Tetrafluoroprop-1-ene	Consumers / Acute systemic effects		186400 mg/m3	Inhalation	
Difluoromethane	Workers / Long-term systemic effects		7035 mg/m3	Inhalation	
Difluoromethane	Consumers / Long-term systemic effects		750 mg/m3	Inhalation	
Carbon dioxide					No data available

Component	Environmental compartment / Value	Remarks
2,3,3,3-Tetrafluoroprop-1-ene	Fresh water: 0,1 mg/l	
2,3,3,3-Tetrafluoroprop-1-ene	Marine water: 0,01 mg/l	
2,3,3,3-Tetrafluoroprop-1-ene	Fresh water sediment: 1,51 mg/kg	
2,3,3,3-Tetrafluoroprop-1-ene	Marine sediment: 0,151 mg/kg	
2,3,3,3-Tetrafluoroprop-1-ene	Soil: 1,49 mg/kg	
Difluoromethane	Fresh water: 0,142 mg/l	Assessment factor: 1000



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Difluoromethane	Fresh water sediment: 0,534 mg/kg dw	
Carbon dioxide	:	No data available

**8.2. Exposure controls**

**Occupational exposure controls**

The Personal Protective Equipment must be in accordance with EN standards:respirator EN 136, 140, 149; safety glasses EN 166; protective suit: EN 340, 463, 468, 943-1, 943-2; gloves EN 374, 511; safety shoes EN-ISO 20345.

Do not breathe vapour.

**Engineering measures**

Use with local exhaust ventilation.

**Personal protective equipment**

*Respiratory protection:*

In case of insufficient ventilation wear suitable respiratory equipment.

Self-contained breathing apparatus (EN 133)

*Hand protection:*

Protective gloves against cold  
(EN 511)

*Eye protection:*

Safety goggles

*Skin and body protection:*

Avoid skin contact with leaking liquid (danger of frostbite).

Wear suitable protective equipment.

**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

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Colour	:	clear
Odour	:	slight
Melting point/range	:	No data available
Boiling point/boiling range	:	-52,1 °C
Flammability	:	Flammable gas with a fundamental burning velocity of less than 10 cm/s
Upper explosion limit	:	12,9 %(V) 23 °C Upper flammability limit
Lower explosion limit	:	11,8 %(V) 23 °C Lower flammability limit
Flash point	:	Not applicable
Auto-ignition temperature	:	473 - 477 °C
pH	:	Not applicable
Viscosity, kinematic	:	No data available
Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Vapour pressure	:	1.235 kPa at 21,1 °C
Vapour pressure	:	2.638 kPa at 54,4 °C
Vapour pressure	:	1.042 kPa at 25 °C
Density	:	No data available

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Relative vapour density : No data available

**9.2 Other Information**

Hot Surface Ignition Temperature (HSIT): > 800 °C (method: ASTM D8211-18)  
Evaporation rate : No data available

Viscosity, dynamic : No data available

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**SECTION 10: Stability and reactivity**

**10.1. Reactivity**

Stable under normal conditions.

**10.2. Chemical stability**

No decomposition if used as directed.

**10.3. Possibility of hazardous reactions**

Hazardous polymerisation does not occur.

**10.4. Conditions to avoid**

Keep away from heat and sources of ignition.  
Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.  
Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.  
Some risk may be expected of corrosive and toxic decomposition products.

**10.5. Incompatible materials**

Strong oxidizing agents  
Finely divided aluminium  
Finely divided magnesium  
Zinc

**10.6. Hazardous decomposition products**

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

**Honeywell**

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Hydrogen fluoride  
Carbonyl halides  
Carbon monoxide  
Carbon dioxide (CO<sub>2</sub>)

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

*Acute oral toxicity:*

Not applicable

*Acute dermal toxicity:*

No data available

*Acute inhalation toxicity:*

LC50

Species: Rat

Value: > 520000 ppm

Exposure time: 4 h

Test substance: Difluoromethane (HFC-32)

LC50

Species: Rat

Value: > 400000 ppm

Exposure time: 4 h

Test substance: 2,3,3,3-Tetrafluoroprop-1-ene

*Skin irritation:*

No data available

*Eye irritation:*

No data available

*Respiratory or skin sensitisation:*

Cardiac sensitization

Species: dogs

Result: No effects observed for exposures up to 12% (120,189 ppm).

Test substance: 2,3,3,3-Tetrafluoroprop-1-ene

*Aspiration hazard:*

No data available

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**11.2. Information on other hazards**

Endocrine disrupting properties  
No data available

*Other information:*

May cause cardiac arrhythmia.

Difluoromethane. (HFC-32): Cardiac sensitisation threshold (dog): 350000 ppm.

**SECTION 12: Ecological information**

**12.1. Toxicity**

*Toxicity to fish:*

LC50

Species: Cyprinus carpio (Carp)

Value: > 197 mg/l

Exposure time: 96 h

Test substance: 2,3,3,3-Tetrafluoroprop-1-ene

*Toxicity to aquatic plants:*

EC50

Species: Scenedesmus capricornutum (fresh water algae)

Value: > 100 mg/l

Test substance: 2,3,3,3-Tetrafluoroprop-1-ene

*Toxicity to aquatic invertebrates:*

EC50

Species: Daphnia magna (Water flea)

Value: > 83 mg/l

Exposure time: 48 h

Test substance: 2,3,3,3-Tetrafluoroprop-1-ene

**12.2. Persistence and degradability**

*Biodegradability:*

Result: Not readily biodegradable.

Test substance: 2,3,3,3-Tetrafluoroprop-1-ene

**12.3. Bioaccumulative potential**

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No data available

**12.4. Mobility in soil**

No data available

**12.5. Results of PBT and vPvB assessment**

No data available

**12.6. Endocrine disrupting properties**

No data available

**12.7. Other adverse effects**

Accumulation in aquatic organisms is unlikely.

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**SECTION 13: Disposal considerations**

**13.1. Waste treatment methods**

*Product:*

Dispose according to legal requirements.

*Packaging:*

Legal requirements are to be considered in regard of reuse or disposal of used packaging materials

*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:3161

IMDG:3161

IATA:3161

**14.2 UN proper shipping name**

ADR/RID:LIQUEFIED GAS, FLAMMABLE, N.O.S.( R-1234yf, DIFLUOROMETHANE)

IMDG:LIQUEFIED GAS, FLAMMABLE, N.O.S.( R-1234yf,DIFLUOROMETHANE)

IATA:Liquefied gas, flammable, n.o.s.( R-1234yf, Difluoromethane)

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**14.3 Transport hazard class(es)**

ADR/RID: 2.1

IMDG: 2.1

IATA: 2.1

**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**

**Poison Control Center**

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

Country	Phone Number
Liechtenstein	+41 442515151
Lithuania	+370532362052
Luxembourg	070245245; (+352)80002-5500
Malta	+356 2395 2000
Netherlands	030-2748888
Norway	22591300
Poland	+48 42 25 38 400
Portugal	800250250
Romania	+40 21 318 3606
Slovakia (NTIC)	+421 2 54 774 166
Slovenia	+386 1 400 6051
Spain	+34915620420
Sweden	112 (begär Giftninformation); +46104566786
Switzerland	145

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Italy	0382 24444	United Kingdom	(+44) 844 892 0111
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		

**Other inventory information**

US. Toxic Substances Control Act  
On TSCA Inventory

Australia. Industrial Chemicals Act (AIC), as amended  
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. 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

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand  
On the inventory, or in compliance with the inventory



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**15.2 Chemical safety assessment**

A Chemical Safety Assessment has not been carried out.

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**SECTION 16: Other information**

**Text of H-statements referred to under heading 3**

2,3,3,3-Tetrafluoroprop-1-ene	:	H280	Contains gas under pressure; may explode if heated.
		H221	Flammable gas.
Difluoromethane	:	H221	Flammable gas.
		H280	Contains gas under pressure; may explode if heated.
Carbon dioxide	:	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 und 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 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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