



SAFETY DATA SHEET

Solvokane®

Revision Date 23.10.2015

**Results of PBT and vPvB assessment**

- This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT).
- This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB).

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

**3.1 Substance**

- Not applicable, this product is a mixture.

**3.2 Mixture**

- Formula C2H2Cl2 ; C4H5F5
- Chemical nature Azeotrope

**Information on Components and Impurities**

Chemical Name	Identification number	Classification Regulation (EC) No 1272/2008	Concentration [%]
trans-dichloroethylene	Index-No. : 602-026-00-3  CAS-No. : 156-60-5  EINECS-No. : 205-860-2	Flammable liquids, Category 2 ; H225 Acute toxicity, Category 4 ; H332 Chronic aquatic toxicity, Category 3 ; H412	>= 30 - < 40
<p>Minimum classification: For certain hazard classes, including acute toxicity and STOT repeated exposure, the classification according to the criteria in Directive 67/548/EEC does not correspond directly to the classification in a hazard class and category under this Regulation. In these cases the classification in this Annex shall be considered as a minimum classification. This classification shall be applied if none of the following conditions are fulfilled: 1) the manufacturer or importer has access to data or other information as specified in Part 1 of Annex I that lead to classification in a more severe category compared to the minimum classification. Classification in the more severe category must then be applied; 2) the minimum classification can be further refined based on the translation table in Annex VII when the physical state of the substance used in the acute inhalation toxicity test is known to the manufacturer or importer. The classification as obtained from Annex VII shall then substitute the minimum classification indicated in this Annex if it differs from it., The reference * can also be found in the column 'Specific concentration Limits and M-factors' where it indicates that the entry concerned has specific concentration limits under Directive 67/548/EEC (Table 3.2) for acute toxicity. These concentration limits cannot be 'translated' into concentration limits under this Regulation, especially when a minimum classification is given. However, when the reference * is shown, the classification for acute toxicity for this entry may be of special concern.</p>			
<b>Other substances with occupational exposure limits</b>			
1,1,1,3,3-pentafluorobutane	Index-No. : 602-102-00-6  CAS-No. : 406-58-6  ELINCS No. : 430-250-1	Flammable liquids, Category 2 ; H225	>= 70 - < 80

For the full text of the H-Statements mentioned in this Section, see Section 16.

P00000019104

Version : 2.00 / GB ( EN )

k k k "gYf j JW!W Ja JY"Z ..... gci fW



SAFETY DATA SHEET

Solvokane®

Revision Date 23.10.2015

**SECTION 4: First aid measures**

**4.1 Description of first aid measures**

**In case of inhalation**

- Remove to fresh air.
- Oxygen or artificial respiration if needed.
- If symptoms persist, call a physician.

**In case of skin contact**

- Wash off with soap and water.
- If symptoms persist, call a physician.

**In case of eye contact**

- Rinse thoroughly with plenty of water, also under the eyelids.
- If eye irritation persists, consult a specialist.

**In case of ingestion**

- Clean mouth with water and drink afterwards plenty of water.
- If symptoms persist, call a physician.

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

**In case of inhalation**

**Symptoms**

- narcosis
- At high concentrations:
- Asphyxia

**In case of skin contact**

**Effects**

- Prolonged skin contact may defat the skin and produce dermatitis.

**In case of eye contact**

**Effects**

- slight irritation

**In case of ingestion**

**Effects**

- Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

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

**Notes to physician**

- When symptoms persist or in all cases of doubt seek medical advice.

**SECTION 5: Firefighting measures**

**5.1 Extinguishing media**

**Suitable extinguishing media**

- powder
- Foam
- Aqueous film forming foam (AFFF).
- Carbon dioxide (CO<sub>2</sub>)

**Unsuitable extinguishing media**

- Water may be ineffective.

P00000019104

Version : 2.00 / GB ( EN )

www.service-chimie.fr

source



SAFETY DATA SHEET

Solvokane®

Revision Date 23.10.2015

## 5.2 Special hazards arising from the substance or mixture

- The product is not flammable.
- Vapours are heavier than air and may spread along floors.
- Risk of ignition.
- Vapours may form explosive mixtures with air.
- Hazardous decomposition products formed under fire conditions.

## 5.3 Advice for firefighters

### Special protective equipment for firefighters

- Wear self-contained breathing apparatus and protective suit.
- Full protective flameproof clothing
- Wear chemical resistant oversuit
- Special protective actions for fire-fighters
- In case of fire, use water spray.
- Keep product and empty container away from heat and sources of ignition.

## SECTION 6: Accidental release measures

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

#### Advice for non-emergency personnel

- Prevent further leakage or spillage if safe to do so.
- Keep away from incompatible products

#### Advice for emergency responders

- Evacuate personnel to safe areas.
- Keep people away from and upwind of spill/leak.
- Remove all sources of ignition.
- Wear self-contained breathing apparatus and protective suit.
- Cover the spreading liquid with foam in order to slow down the evaporation.
- Ventilate the area.

### 6.2 Environmental precautions

- Should not be released into the environment.
- If the product contaminates rivers and lakes or drains inform respective authorities.

### 6.3 Methods and materials for containment and cleaning up

- Dam up.
- Soak up with inert absorbent material.
- Prevent product from entering sewage system.
- Keep in properly labelled containers.
- Keep in suitable, closed containers for disposal.

### 6.4 Reference to other sections

- Refer to protective measures listed in sections 7 and 8.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

- Use only in well-ventilated areas.
- Keep away from heat and sources of ignition.
- Heating can release vapours which can be ignited.
- To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded.
- When transferring from one container to another apply earthing measures and use conductive hose material.

P00000019104  
Version : 2.00 / GB ( EN )

www.service-chimie.fr

source



SAFETY DATA SHEET

**Solvokane®**

Revision Date 23.10.2015

- Do not use sparking tools.
- Keep away from incompatible products

**Hygiene measures**

- Eye wash bottles or eye wash stations in compliance with applicable standards.
- When using do not eat, drink or smoke.
- Wash hands before breaks and at the end of workday.
- Handle in accordance with good industrial hygiene and safety practice.
- Gloves, overalls and boots have to be double layered (protection against cold temperature).

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

**Technical measures/Storage conditions**

- Store in original container.
- Keep container closed.
- Keep in a cool, well-ventilated place.
- Keep in a bunded area.
- Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- Ensure all equipment is electrically grounded before beginning transfer operations.
- Take measures to prevent the build up of electrostatic charge.
- Keep away from:
- Incompatible products

**Packaging material**

**Suitable material**

- glass
- Stainless steel
- Coated steels.

**Unsuitable material**

- in cardboard box
- Wooden box

**7.3 Specific end use(s)**

- Contact your supplier for additional information

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

**8.1 Control parameters**

**Components with workplace occupational exposure limits**

Components	Value type	Value	Basis
1,1,1,3,3-pentafluorobutane	TWA	1,000 ppm	Solvay Acceptable Exposure Limit
trans-dichloroethylene	TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)

P00000019104

Version : 2.00 / GB ( EN )

www.service-chimie.fr

source



SAFETY DATA SHEET

Solvokane®

Revision Date 23.10.2015

**Derived No Effect Level (DNEL) / Derived minimal effect level (DMEL)**

Product name	Population	Route of exposure	Potential health effects	Exposure time	Value	Remarks
1,1,1,3,3-pentafluorobutane	Workers	Dermal	Systemic effects	Long term	9940 mg/kg bw/day	
	Workers	Inhalation	Systemic effects	Long term	4053 mg/m3	
	General population	Dermal	Systemic effects	Long term	2982 mg/kg bw/day	
	General population	Inhalation	Systemic effects	Long term	605 mg/m3	
	General population	Oral	Systemic effects	Long term	3 mg/kg bw/day	

**Predicted No Effect Concentration ( PNEC )**

Product name	Compartment	Value	Remarks
1,1,1,3,3-pentafluorobutane	Fresh water	1.2 mg/l	
	Marine water	0.12 mg/l	
	Marine sediment	0.737 mg/kg	
	Fresh water sediment	7.37 mg/kg	
	Soil	0.823 mg/kg	
	Sewage treatment plant	5.95 mg/l	
	Intermittent use/release	1.14 mg/l	

**8.2 Exposure controls**

**Control measures**

**Engineering measures**

- Provide appropriate exhaust ventilation at machinery.
- Apply technical measures to comply with the occupational exposure limits.

**Individual protection measures**

**Respiratory protection**

- In case of insufficient ventilation, wear suitable respiratory equipment.
- When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
- Respirator with a vapour filter (EN 141)
- Recommended Filter type: AX

**Hand protection**

- Wear suitable gloves.
- Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).

**Suitable material**

- Neoprene

**Eye protection**

- Chemical resistant goggles must be worn.

**Skin and body protection**

- Flame-resistant clothing
- If splashes are likely to occur, wear:
- Apron

P00000019104

Version : 2.00 / GB ( EN )

www.service-chimie.fr

source



SAFETY DATA SHEET

Solvokane®

Revision Date 23.10.2015

- Boots
- Neoprene

**Hygiene measures**

- Eye wash bottles or eye wash stations in compliance with applicable standards.
- When using do not eat, drink or smoke.
- Wash hands before breaks and at the end of workday.
- Handle in accordance with good industrial hygiene and safety practice.
- Gloves, overalls and boots have to be double layered (protection against cold temperature).

**Environmental exposure controls**

- Dispose of rinse water in accordance with local and national regulations.

**SECTION 9: Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**

<b>Appearance</b>	<b>Physical state:</b> liquid
	<b>Colour:</b> colourless
<b>Odour</b>	ether-like
<b>Odour Threshold</b>	no data available
<b>pH</b>	6.0 ( 1.7 g/l) SOLKANE ® 365 mfc
<b>Freezing point</b>	-43 °C
<b>Boiling point/boiling range</b>	36 °C
<b>Flash point</b>	closed cup does not flash
<b>Evaporation rate (Butylacetate = 1)</b>	no data available
<b>Flammability (solid, gas)</b>	Not applicable
<b>Flammability (liquids)</b>	The product is not flammable.
<b>Flammability/Explosive limit</b>	<b>Lower flammability/explosion limit:</b> Type: Lower explosion limit 5.40 %(V) <b>Upper flammability/explosion limit:</b> Type: Upper explosion limit 9.40 %(V) <b>Explosiveness:</b> Not explosive  In use may form flammable/explosive vapour-air mixture.
<b>Auto-ignition temperature</b>	580 °C SOLKANE ® 365 mfc
<b>Vapour pressure</b>	540 hPa ( 20 °C)
<b>Vapour density</b>	> 1 Method: Calculation method
<b>Density</b>	<b>Bulk density:</b> Not applicable <b>Relative density:</b> 1.27 SOLKANE ® 365 mfc

P00000019104  
Version : 2.00 / GB ( EN )  
[www.service-chimie.fr](http://www.service-chimie.fr)

source



SAFETY DATA SHEET

**Solvokane®**

Revision Date 23.10.2015

<b><u>Solubility</u></b>	<u>Water solubility :</u> 3.34 g/l <u>Solubility in other solvents:</u> miscible with most organic solvents :
<b><u>Partition coefficient: n-octanol/water</u></b>	log Pow: 1.61 SOLKANE @ 365 mfc
<b><u>Thermal decomposition</u></b>	no data available
<b><u>Viscosity</u></b>	<u>Viscosity, dynamic :</u> 0.4 mPa.s ( 25 °C)
<b><u>Explosive properties</u></b>	no data available
<b><u>Oxidizing properties</u></b>	Not considered as oxidizing
<b>9.2 Other information</b>	
<b><u>Henry's Constant</u></b>	ca. 3800 Pa.m <sup>3</sup> /mol (20 °C) Method: Calculation method considerable volatility, Air, SOLKANE @ 365 mfc
<b><u>Surface tension</u></b>	73.8 mN/m ( 20 °C) SOLKANE @ 365 mfc

**SECTION 10: Stability and reactivity**

**10.1 Reactivity**

- Risk of violent reaction.
- Risk of explosion.

**10.2 Chemical stability**

- Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions**

- Strong oxidizers, alkali metals and alkaline earth metals may cause fires or explosions.
- Hazardous polymerisation does not occur.

**10.4 Conditions to avoid**

- Heat, flames and sparks.
- Do not freeze.

**10.5 Incompatible materials**

- Light and/or alkaline metals
- Powdered metals
- Alkaline earth metals

**10.6 Hazardous decomposition products**

- Gaseous hydrogen fluoride (HF).
- Carbon monoxide
- Fluorophosgene
- Phosgene
- Gaseous hydrogen chloride (HCl).

P00000019104  
Version : 2.00 / GB ( EN )  
www.service-chimie.fr

source





SAFETY DATA SHEET

Solvokane®

Revision Date 23.10.2015

**SECTION 11: Toxicological information**

**11.1 Information on toxicological effects**

**Acute toxicity**

<b>Acute oral toxicity</b>	LD50 : > 2,000 mg/kg - Rat Test substance: SOLKANE ® 365 mfc
<b>Acute inhalation toxicity</b>	LC50 - 4 h > 0.605 g/l - Rat Test substance: SOLKANE ® 365 mfc
<b>Acute dermal toxicity</b>	no data available
<b>Acute toxicity (other routes of administration)</b>	no data available

**Skin corrosion/irritation**

1,1,1,3,3-pentafluorobutane	Rabbit No skin irritation
-----------------------------	------------------------------

**Serious eye damage/eye irritation**

Rabbit No eye irritation Test substance: SOLKANE ® 365 mfc
--

**Respiratory or skin sensitisation**

1,1,1,3,3-pentafluorobutane	Guinea pig Did not cause sensitization on laboratory animals.
-----------------------------	--

**Mutagenicity**

**Genotoxicity in vitro**

1,1,1,3,3-pentafluorobutane	In vitro tests did not show mutagenic effects
-----------------------------	---

**Genotoxicity in vivo**

1,1,1,3,3-pentafluorobutane	In vivo tests did not show mutagenic effects
-----------------------------	--

**Carcinogenicity**

no data available

**Toxicity for reproduction and development**

**Toxicity to reproduction/Fertility**

NOAEC parent: 29,971 ppm(m)  
Test substance: SOLKANE ® 365 mfc  
Effects on fertility  
NOAEC parent: 29,971 ppm(m)  
Test substance: SOLKANE ® 365 mfc  
Developmental Toxicity

**Developmental Toxicity/Teratogenicity**

no data available

**STOT**

**STOT - single exposure**

no data available

**STOT - repeated exposure**

trans-dichloroethylene

The substance or mixture is not classified as specific target organ toxicant, repeated exposure according to GHS criteria.

1,1,1,3,3-pentafluorobutane

The substance or mixture is not classified as specific target organ toxicant, repeated exposure according to GHS criteria.  
Inhalation Repeated exposure - Rat  
NOAEL: 30000 ppm  
Test substance: SOLKANE ® 365 mfc

**Aspiration toxicity**

no data available

P00000019104

Version : 2.00 / GB ( EN )

www.service-chimie.fr

source



SAFETY DATA SHEET

**Solvokane®**

Revision Date 23.10.2015

**SECTION 12: Ecological information**

**12.1 Toxicity**

**Aquatic Compartment**

**Acute toxicity to fish**

1,1,1,3,3-pentafluorobutane

LC50 - 96 h : > 200 mg/l - Brachydanio rerio (zebrafish)

LC50 - 96 h : 450 mg/l - Fishes, Salmo gairdneri  
semi-static test

Fresh water

LC50 - 96 h : > 100 mg/l - Oncorhynchus mykiss (rainbow trout)  
semi-static test

Fresh water

**Acute toxicity to daphnia and other aquatic invertebrates.**

1,1,1,3,3-pentafluorobutane

EC50 - 48 h : 980 mg/l - Daphnia magna (Water flea)  
Fresh water

**Toxicity to aquatic plants**

NOEC - 72 h : 13.2 mg/l - Algae : Pseudokirchneriella subcapitata (Selenastrum  
capricornutum)  
Test substance: SOLKANE ® 365 mfc

EC50 - 72 h : > 114 mg/l - Algae : Pseudokirchneriella subcapitata (Selenastrum  
capricornutum)  
Test substance: SOLKANE ® 365 mfc

**Chronic toxicity to fish**

1,1,1,3,3-pentafluorobutane

NOEC: ca. 38.2 mg/l - 30 Days - Pimephales promelas (fathead minnow)  
Method: Calculation method

**Terrestrial Compartment**

**Toxicity to terrestrial plants**

NOEC: >= 6 mg/l  
End point: Growth  
Test substance: SOLKANE ® 365 mfc

**12.2 Persistence and degradability**

**Abiotic degradation**

**Stability in water**

1,1,1,3,3-pentafluorobutane

Hydrolysis  
not significant, Medium, Water, Soil  
Photolysis

not significant, Medium, Water

**Photodegradation**

Half-life indirect photolysis: ca. 7 y  
Test substance: SOLKANE ® 365 mfc  
Medium  
Air

**Biodegradation**

P00000019104

Version : 2.00 / GB ( EN )

[www.service-chimie.fr](http://www.service-chimie.fr)

source



SAFETY DATA SHEET

**Solvokane®**

Revision Date 23.10.2015

**Biodegradability** aerobic  
Method: Closed Bottle test  
14 % - 28 Days  
Not readily biodegradable.  
Test substance: SOLKANE ® 365 mfc

**12.3 Bioaccumulative potential**

**Bioconcentration factor (BCF)** Test substance: SOLKANE ® 365 mfc  
Does not bioaccumulate.

**12.4 Mobility in soil**

**Adsorption potential (Koc)** Adsorption  
Soil/sediments  
Log Koc: ca. 1.8  
not significant  
Calculation method  
SOLKANE ® 365 mfc

**12.5 Results of PBT and vPvB assessment**

This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT).

This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB).

**12.6 Other adverse effects**

**Ozone-Depletion Potential** Ozone-Depletion Potential: 0  
Additional Information: no effect on stratospheric ozone  
Ozone depletion potential; ODP; (R-11 = 1)  
SOLKANE ® 365 mfc

Ozone-Depletion Potential: 890  
Reference value for carbon dioxide: GWP = 1  
GWP (ITH 100 y)  
Source IPCC (International Panel on Climate Change)  
SOLKANE ® 365 mfc

**SECTION 13: Disposal considerations**

**13.1 Waste treatment methods**

**Product Disposal**

- In accordance with local and national regulations.
- Refer to manufacturer/supplier for information on recovery/recycling.
- Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities.
- The incinerator must be equipped with a system for the neutralisation or recovery of HF.

**Advice on cleaning and disposal of packaging**

- Where possible recycling is preferred to disposal or incineration.

P00000019104  
Version : 2.00 / GB ( EN )

[www.service-chimie.fr](http://www.service-chimie.fr)

source



SAFETY DATA SHEET

Solvokane®

Revision Date 23.10.2015

**SECTION 14: Transport information**

**ADR**

not regulated

**RID**

not regulated

**IMDG**

not regulated

**IATA**

not regulated

**ADN/ADNR**

not regulated

Note: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transport regulations for hazardous materials, it would be advisable to check their validity with your sales office.

**SECTION 15: Regulatory information**

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

**Other regulations**

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), as amended
- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, as amended
- Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work, as amended

**Notification status**

Inventory Information	Status
United States TSCA Inventory	- Listed on Inventory
Mexico INSQ (INSQ)	- One or more components not listed on inventory
Canadian Domestic Substances List (DSL)	- Listed on Inventory
New Zealand. Inventory of Chemical Substances	- In compliance with the inventory
Australia Inventory of Chemical Substances (AICS)	- Listed on Inventory
Japan. CSCL - Inventory of Existing and New Chemical Substances	- Listed on Inventory
Korea. Korean Existing Chemicals Inventory (KECI)	- Listed on Inventory
China. Inventory of Existing Chemical Substances in China (IECSC)	- Listed on Inventory
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	- One or more components not listed on inventory
EU. European Registration, Evaluation, Authorisation and Restriction of Chemical (REACH)	- If product is purchased from Solvay in Europe it is in compliance with REACH, if not please contact the supplier.

P00000019104

Version : 2.00 / GB ( EN )

www.service-chimie.fr

source



SAFETY DATA SHEET

Solvokane®

Revision Date 23.10.2015

**15.2 Chemical Safety Assessment**

- A Chemical Safety Assessment has been carried out for this substance.
- 1,1,1,3,3-pentafluorobutane

**SECTION 16: Other information**

**Full text of H-Statements referred to under sections 2 and 3.**

- H225 Highly flammable liquid and vapour.
- H332 Harmful if inhaled.
- H412 Harmful to aquatic life with long lasting effects.

**Key or legend to abbreviations and acronyms used in the safety data sheet**

- SAEL Solvay Acceptable Exposure Limit
- TWA 8-hour, time-weighted average

**Further information**

- This sheet was updated (refer to the date at the top of this page). Subheadings and text which have been modified since the previous version are indicated with two vertical bars.
- Distribute new edition to clients

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. Such information is only given as a guidance to help the user handle, use, process, store, transport, dispose and release the product in satisfactory safety conditions and is not to be considered as a warranty or quality specification. It should be used in conjunction with technical sheets but do not replace them. Thus, the information only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in any other manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.