

# Solvokane™ E 1.5

Technical Information



Solvay  
Fluor





## Introduction

Solvokane™ E1.5, an azeotropic, non-flammable mixture of Solkane® 365mfc (1,1,1,3,3-pentafluorobutane) and t-DCE (1,2-dichloroethylene), with a small portion of Ethanol added. Solvokane™ E 1.5 has increased solvency capabilities especially for contaminants common in the electronics industry such as solder fluxes. It was developed and patented by Solvay Fluor GmbH to meet present and future demands of the precision cleaning within the electronics industries.

The phase-out of conventional solutions (e.g., CFCs and HCFCs) has required alternative products.

Solvokane™ E 1.5 offers product characteristics which are very close to HCFC 141b and CFC 113, with a Kauri Butanol (Kb) Index of 21.7. The solvency power versus common contaminants is stronger than the Kb value would suggest.

EPA/SNAP approved, Solvokane™ E 1.5 is a new generation, environmentally-compatible solvent. A volatile, colorless liquid without ozone depletion potential (ODP=0), it has a relatively low global warming potential (GWP), as well as other properties which make it a superior replacement for CFCs and HCFCs.

## Features and Benefits

- Fast drying with no-residue
- Low temperature with a boiling point 36°C
- Non-flammable azeotrope

- Excellent toxicity characteristics
- Drop in replacement for high cost HFC/HFE solvents
- Cleaning similar to R 141b and R 113
- Can be used as a starting point or component for more complex/customized solvent formulations

## Typical Applications

Solvokane™ E 1.5 was designed to serve numerous applications and it is applicable as formulated. It can, however, be used as a starting point or component for more complex or customized solvent formulations which can be adjusted for the needs of the industry.

- Precision Cleaning
- Defluxing Electronics
- Cleaning of Optical Parts and Assemblies
- Degreasing
- Fluid Carrier

## Environmental Aspects

SNAP approved, Solvokane™ E 1.5 is a new generation, environmentally-compatible solvent. A volatile, colorless liquid without ozone depletion potential (ODP=0), it has a relatively low global warming potential (GWP) of 556, as well as other properties which make it a superior replacement for CFCs and HCFCs.

## Physical Properties – Solvokane™ E 1.5

<b>Molecular weight MG</b>	[kg/kmol]	131.4
<b>Density</b>	[kg/dm <sup>3</sup> ] at 25°C	1.22
<b>Boiling point</b>	[°C/1013 mbar]	35.8
<b>Freezing point</b>	[°C]	-42.6
<b>Flashpoint</b>		no
<b>Heat of vaporisation ΔH</b>	[kJ/kg] at 25°C	228
<b>Specific heatcapacity C<sub>pl</sub></b>	[kJ/kgK] at 25°C	1.355
<b>Solubility of water</b>	[%] at 20°C	0.095
<b>Solubility in water</b>	[%] at 20°C	S365mfc = 0.095 t-DCE = 0.239
<b>Surface tension</b>	[mN/m] at 20°C	17.9
<b>Viscosity liquid</b>	[mPa*s] at 25°C	0.46
<b>Refractive index</b>	[20°C]	1.325
<b>Autoignition temperature</b>	[DIN EN 14522]	> 600°C (T1)
<b>Kauri Butanol index</b>		21.7
<b>Vapor pressure</b>		
0°C	[K Pa]	22.6
25°C	[K Pa]	70.1
50°C	[K Pa]	168.9
<b>EX-limits</b>		
LFL (Vol%) 20		3.8
UFL (Vol%) 70		13.7

## Safety/Flammability

Solvokane™ E 1.5 shows no flash point according to DIN 13736 and ASTM D93. Despite the absence of flash-point, vapor from Solvokane™ E 1.5, when diluted in air, can form explosive mixtures when an energy source is present. Lower and upper limits are noted in the table below. A number of conventional solvents such as HCFC 141b, Trichlorethylene (TCE) or Methylene chloride (MC) show identical flammability. But as seen in the chart below, the explosive range of Solvokane™ between lower and upper explosive limits is much narrower, further reducing the risk so handling with Solvokane™ is safer.

Prior to use, testing should be performed under conditions expected during normal operations. Standard precautions should be applied in form of good ventilation, grounding of equipment filling/refilling and pumping and avoiding contact with open fire or electrical sparks. For more information, please refer to the Solvay Solkane® Information Service: [www.solvay-fluor.com](http://www.solvay-fluor.com)

	Solvokane™	HCFC 141b	TCE	MC
Flashpoint	None	None	None	None
Lower explosive limit (LEL, Vol%)	5.4	5.6	8.0	13.0
Upper explosive limit (UEL, Vol%)	9.4	17.7	10.5	22.0
Explosive range (Vol%)	4.0	12.1	2.5	9.0

For complete toxicity information, refer to the Solvokane™ E 1.5 MSDS.

## Disposal/Recovery Considerations

Consideration should be given to potential issues with flammability. Users should test for flammability in their particular application and test the spent Solvokane™ E 1.5 to ensure proper classification for waste disposal. Please read the MSDS prior to disposal/recovery and contact your local Solvay representative for more information if needed.

## Product Description/Packaging/ Sampling

The following table shows the typical composition of the azeotropic Solvokane™ E 1.5 mixture, which leads to the non-flammable properties. The stabilizer is an especially volatile substance, which is highly effective but will not affect cleaning properties or lead to residues.

Ingredients	Concentration
Solkane® 365mfc (C <sub>4</sub> H <sub>5</sub> F <sub>5</sub> )	≥ 50 % wt.
t-DCE (C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub> )	≤ 50 % wt.
Purity	≥ 99.7 % wt
Acidity	≤ 1 ppm
Water	≤ 100 ppm
Residue	≤ 10 ppm

### Solvokane™ E 1.5 standard packaging

- 235 kg net metal returnable drums
- 22 kg net metal returnable drums

### Also possible in sampling dimensions or on special request:

- 12 kg net metal returnable drums
- 6 kg net metal returnable drums
- 1 kg net metal returnable drums