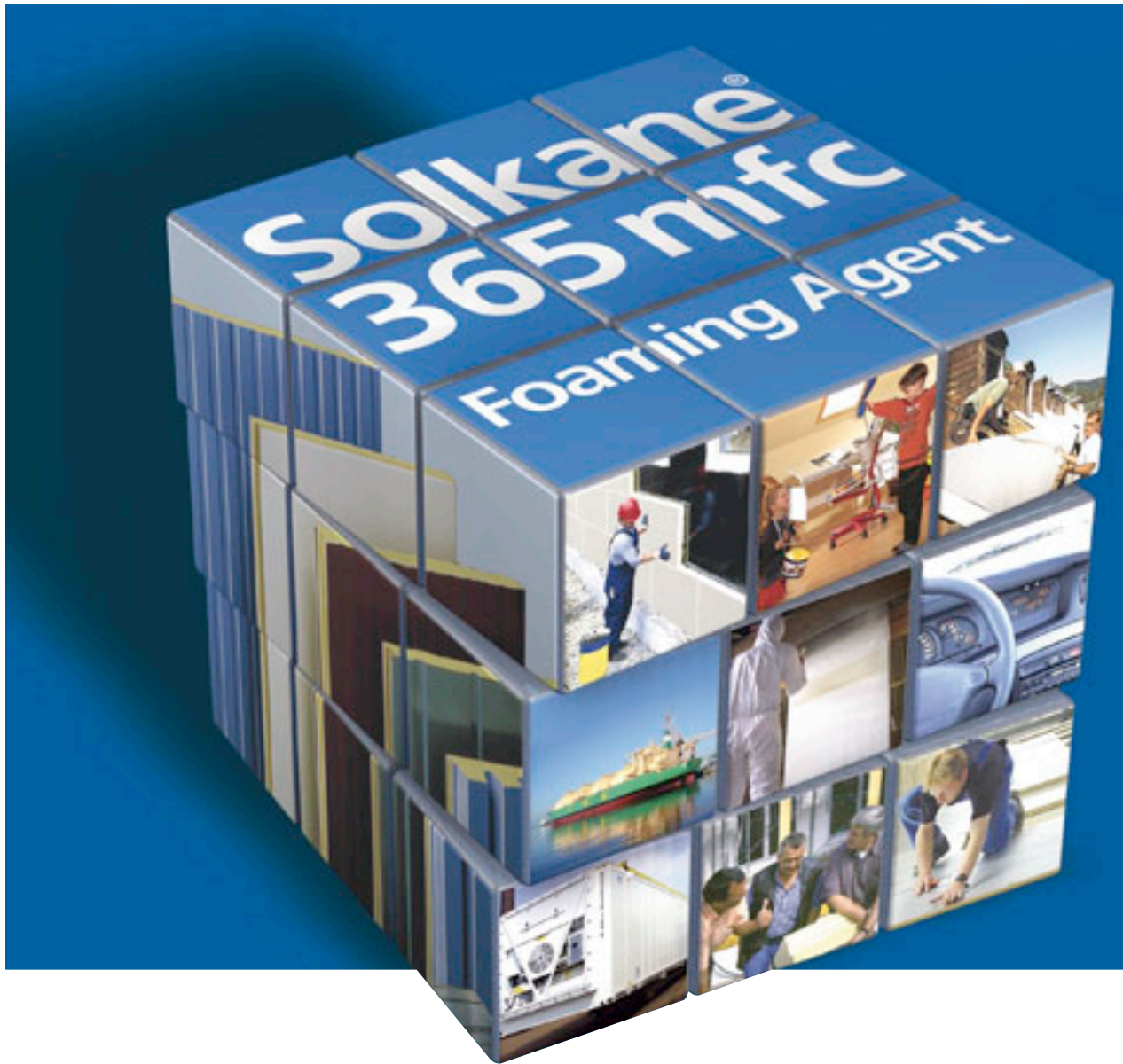


Solkane[®] 365mfc

Foaming Agent



Solvay
Fluor



Solkane 365mfc – A Multi-Faced Blowing Agent for Plastic Foams

Product description and handling

Solkane® 365mfc is a hydrofluorocarbon of the latest generation. It has no ozone depleting potential and with its boiling point of 40 °C it can be handled as a true liquid at room temperature. It is a colourless, compound with a faintly ethereal odour, used for a wide range of applications within PU foams, solvents or heat transfer fluids.

The chemical stability of Solkane® 365mfc is even better when compared to HFC 141b. Therefore no stabilizer is needed if Solkane® 365mfc is stored under appropriate conditions (for details please refer to our SDS).

Top team

Solkane® 365mfc is a perfect team player. It is miscible with a wide range of other organic foam blowing agents like other HFCs or even hydrocarbons. The choices are up to you and almost unlimited.

Blending of i.e. cyclopentane with Solkane® 365mfc strongly improves the lambda value while reducing the density of the resulting PU foam. That means, running Solkane® 365mfc in your system minimizes raw material costs while improving insulation performance. That is what we call a win win situation!



Strong protection

Solkane® 365mfc is your first choice when fire safety is demanded. Fire classifications and fire performance tests are of increased importance for modern PU products especially in the building industry. Combined with the Solvay's IXOL® range of reactive flame retardant polyols, Solkane® 365mfc blown PU foams reach the highest possible classifications for organic insulation materials.

Pole position

For high performance PUR at competitive prices its tough to beat Solkane® 365mfc. Solkane® 365mfc gives you the best lambda values of any ODP zero foaming agent. Ask for our latest eco-efficiency studies which impressively demonstrate how Solkane® 365mfc brings out the best in your PUR/PIR products – economically and ecologically!

Best choice

Solvay's own range of Solkane® 365/227 blends are approved solutions for a wide number of applications – utilising all of Solkane® 365mfc benefits in a non-flammable blend.

Ask for our expertise.



Stability and Storage

Compared to HFC 141b the thermal and chemical stability of Solkane® 365mfc is excellent. It should not be exposed to strong alkaline compounds or alkali metals. Under high temperatures or/and pressure hazardous reactions are possible with reactive metals e.g. Zinc, Aluminium and its alloys, Magnesium as well as with air. In pre-formulated PU-foam systems Solkane® 365mfc has been observed to be stable, so no stabiliser is needed.

Solkane® 365mfc should be stored in a cool and well ventilated area. The contact to heat sources, open flames or sparks should be avoided.

For additional information please refer to our SDS or ask our specialist.

Quality

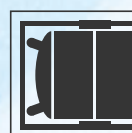
■ Purity of Solkane® 365mfc	99.5 % min.
■ Water	100 ppm max.
■ Acid	1 ppm max.
■ Non volatile residue	100 ppm max.

Packaging

Solkane® 365mfc is available in:



Non returnable drums (240 kg)



ISO-tank container (20 mt)



Roadtanker (20 mt)

Other quantities on request

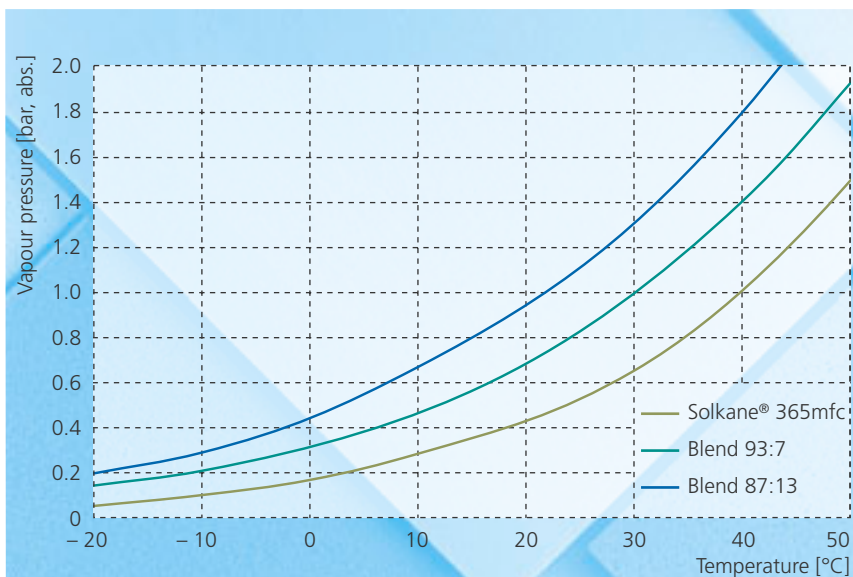
Physical Data

The following table shows the physical properties of Solkane® 365mfc based blowing agents provided by Solvay.

Chemical name	Blend of	
	1,1,1,3,3-Pentafluorobutane	1,1,1,3,3-Pentafluorobutane and 1,1,1,2,3,3,3-Heptafluoropropane
Formula	CF ₃ -CH ₂ -CF ₂ -CH ₃	CF ₃ -CH ₂ -CF ₂ -CH ₃ and CF ₃ -CHF-CF ₃
Ratio [mass-%]	100	93/7 87/13
Molecular weight average [g/mol]	148.09	149.6 150.9
Boiling point [°C at 1.013 bar]	40.2	30 24
Flammable	yes	no no
Vapour pressure at 20 °C [kPa]	47	70 93
Density of liquid at 20 °C [kg/dm ³]	1.27	1.28 1.29
Density of vapour at 20 °C (Air = 1)	5.7	6.4 6.5
Thermal conductivity of vapour at 25 °C [mW/m.K]	10.6	10.7 10.9
Viscosity of liquid at 20 °C [μPa.s]	452	447 432
Log P o/w (pure Solkane® 365mfc)	1.6	
Solubility in water at 23 °C [g/kg]	0.84	0.84

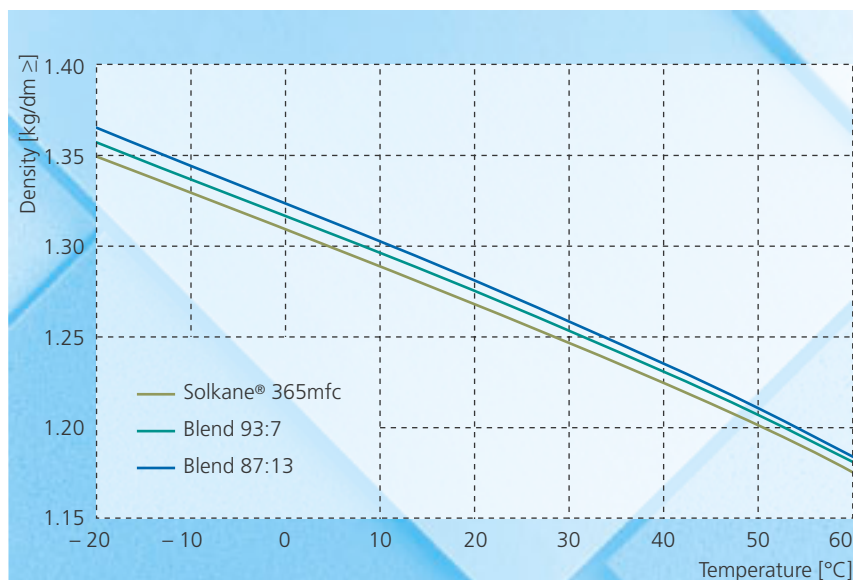
Vapour Pressure

Solkane® 365/227
versus Temperature



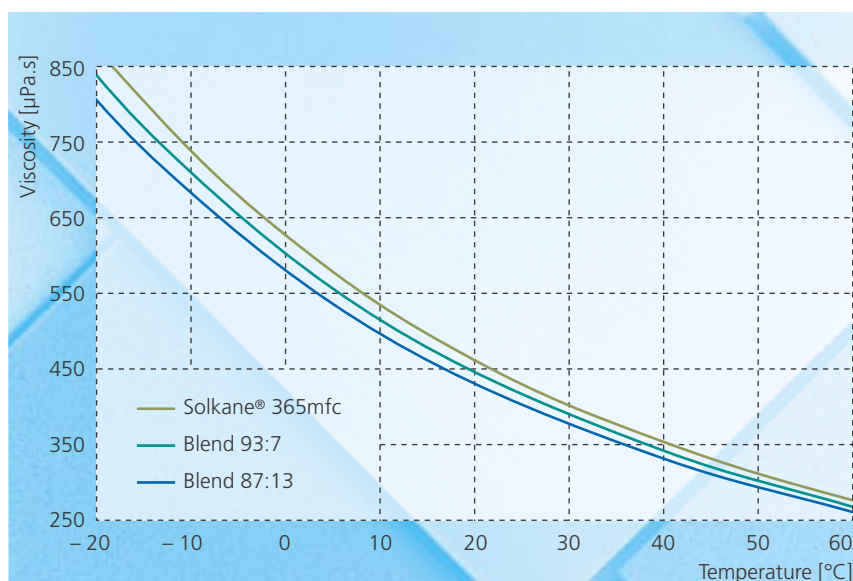
Liquid Density

Solkane® 365/227
versus Temperature



Viscosity

Solkane® 365/227
versus Temperature



Materials Compatibility for Solkane® 365mfc

Solkane® 365mfc is a material friendly compound. It is compatible with a wide range of sealing materials as shown in table below.

Thermoplastics	Percent change of weight
PVC	-0.02
PE-HD	0.4
PMMA	57
Polycarbonate	0.3
PP	0.2
Nylon 66	-0.3
PS	0.2
Elastomers	
Neoprene	1.0
Viton A	90.5
EPDM	1.6
Natural rubber	7.2
Nitril rubber	2.5
Silicone	16.1

Change in % by weight after 7 days immersion.

Solubility in Polyols

The polyol solubility* is lower than known from Solkane® 141b and is higher than hydrocarbons in most cases.

Polyol	Solkane® 141b	Solkane® 365mfc **	n-pentane	c-pentane
Caradol® 585	100	32	5	11
Castor Oil	100	18	47	100
Ethyleneglycol	4	3	1	1
IXOL® M125	37	5	2	5
Stepanpol® 3152	33	30	6	7
T CPP	100	100	10	100
Tercarol® A 350	100	100	36	100
Tercarol® RF 55	100	100	4	18
Voranol® RA 640	100	100	20	100

* Solubility in g per 100 g Polyol

** no changes expected for Solkane® 365/227 blends solubility behavior. Solkane® 365/227 blends are practically identical to pure Solkane® 365.

Flammability

Solkane® 365mfc/227ea blends offered by Solvay have no flash point (ISO 1516/1523) and are not subject to flammable liquid regulation. Being non azeotropic blends, the composition can change during handling. Below a concentration of 5 mass % of Solkane® 227ea the liquid becomes flammable.

Straight Solkane® 365mfc has a flash point below -27°C (DIN 51755, Teil 2) but is difficult to ignite. The minimum ignition energy is around 50 times higher than of n-pentane and is 10.4 MJ (25°C , 8 Vol % in air at 1 bar).

The explosion limits at standard conditions in dry air are:

- Lower explosion limit (LEL) 3.6 % by volume in air
- Upper explosion limit (UEL) 13.3 % by volume in air

For more information please read our brochure about flammability characteristics and handling.

Miscibility

As mentioned before Solkane® 365mfc is miscible with a wide range of organic compounds. It forms azeotropes even with some popular co-blowing agents.

Compound	Composition [pbw Solkane® 365mfc]	Boiling Point [°C]
Methanol	94	37.5
Ethanol	97.5	39.5
n-Pentane	58	27
Iso-Pentane	46	22.5
Cyclo-Pentane	72	32
1,2-trans-Dichloroethylene	70	36
Galden HT 55	65	36
Galden HT 70	66	37

Toxicity

Long term evaluation of Solkane® 365mfc has been finished and showed no toxicity concern, even less effect than HCFC 141b.

Based on these good results, the registration of the product has been done in Europe. Solkane® 365mfc is registered in ELINCS under the number 430-250-1.

The average exposure limit will probably be set to 500 or 1000ppm which is comparable to HCFC 141b (500 ppm). All results available up to date indicate the product to be safe for a broad range of industrial applications when the recommended standard hygiene practices and safety rules are observed.



*Solvay Fluor – Competence in
Fluorine Chemistry. Worldwide.*

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Warning:

All statements, information, and data given herein are believed to be accurate and reliable but are presented without guarantee, warranty or responsibility of any kind, express or implied. Statements or suggestions concerning possible use of our products are made without representation or warranty that any such use is free of patent infringement, and are not recommendations to infringe any patent. The user should not assume that all safety measures are indicated, or that other measures may not be required. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and protection of human welfare and the environment.

All statements or suggestions concerning the possible uses of HFCs and blends thereof are made without any representations and/or warranties whatsoever that any such use is free of legal constraints.

In particular, the use of Solkane® 365mfc and of blends containing Solkane® 365mfc might fall within the scope of European Patent 381 986 and its counterparts. Solvay has acquired certain rights from Bayer under these patents, according to which Bayer has agreed not to assert any of such patent rights against any purchaser of Solkane® 365mfc and blends containing Solkane® 365mfc from Solvay for use as foam blowing agent outside the USA and Canada.

The following must be noted regarding the USA and Canada: (1) Solkane® 365mfc cannot be used in the USA or Canada, by itself or in a blend, as a blowing agent to foam a plastic based on an isocyanate to form plastic foam compositions; (2) Solkane® 365mfc and blends containing Solkane® 365mfc must not be made, used, offered for sale, or sold in the USA or Canada, or imported into the USA or Canada, for such blowing uses; and (3) closed cell plastic foam compositions prepared by foaming a plastic material based on isocyanate in the presence of a propellant comprising Solkane® 365mfc and/or a blend containing Solkane® 365mfc, cannot be made, used, offered for sale, or sold, within the USA or Canada, or imported into the USA or Canada. To do so can result in a claim of patent infringement under U.S. patent no. 5,496,866 and Canadian patent no. 2,009,169. Solvay will not sell Solkane® 365mfc or blends containing Solkane® 365mfc to any purchaser intending to use the product accordingly.



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