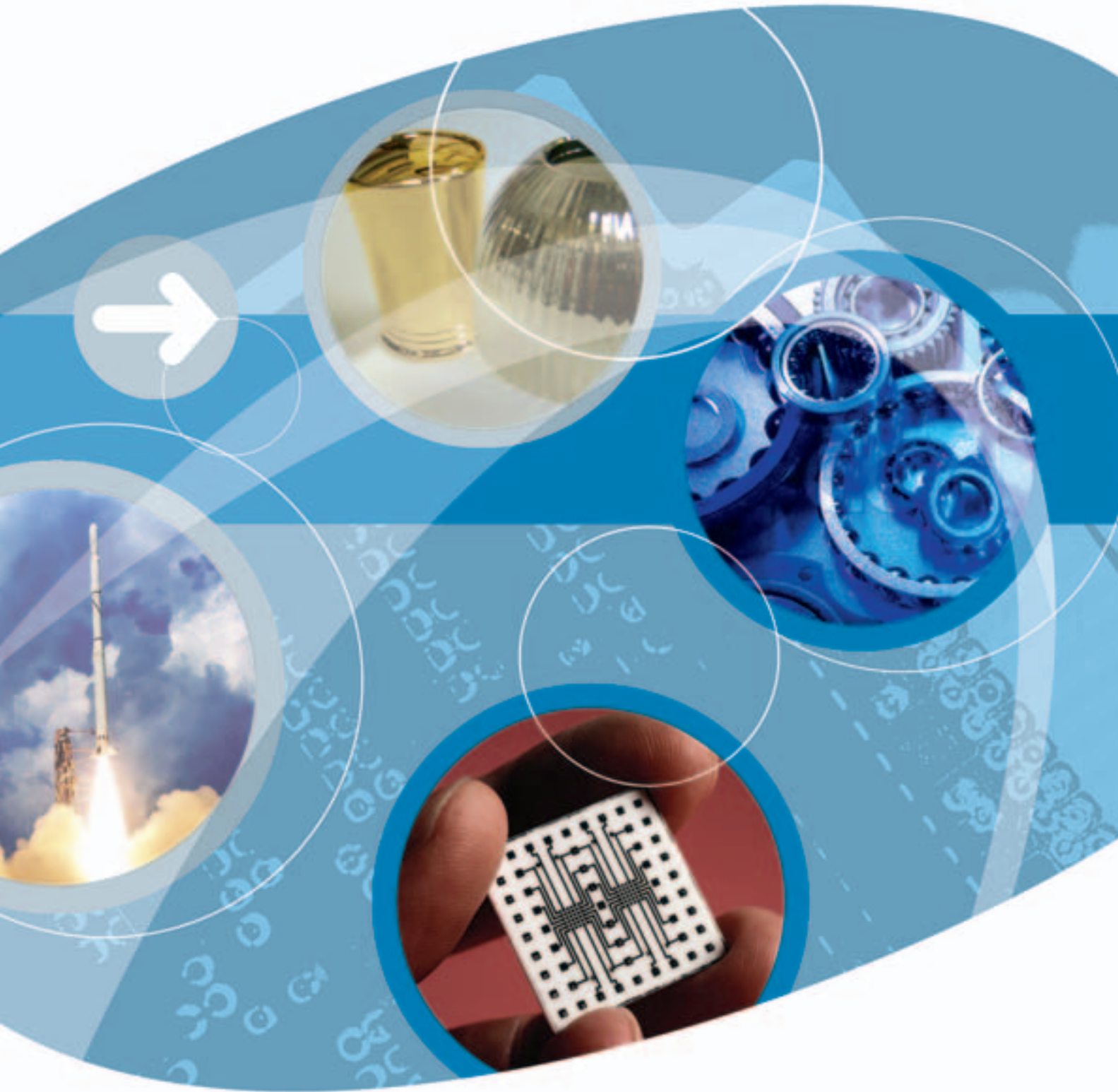


Forane[®]
SOLVENTS

Forane[®] 141b and Forane[®] 365 - Precision cleaning



Arkema is a supplier of fluorinated materials to the global solvent market. Most recently, Arkema has been supplying Forane® 141b and Forane® 365 for use in the solvent market in various applications including precision cleaning, electronics cleaning, and carrier applications where permitted.

Forane® 141b

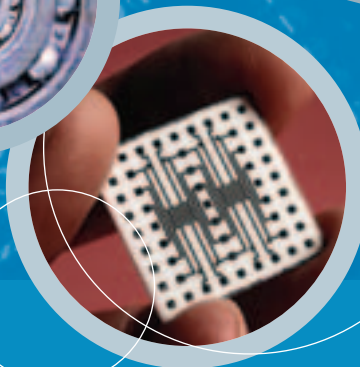
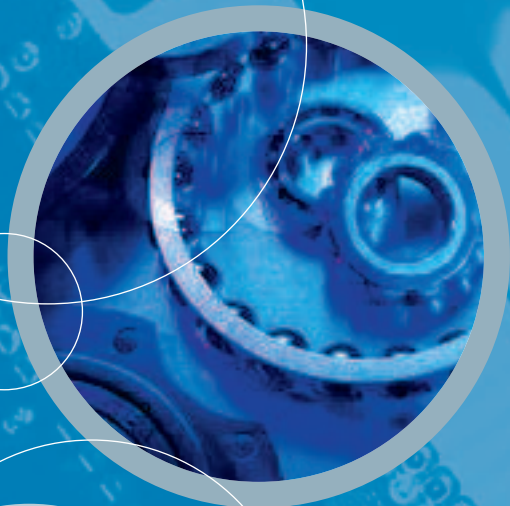
The Grade Range

The Forane® 141b grade range comprises three products which are all formulated from the same base.

→ **Forane® 141b DGX** is an HCFC 141b with a stabilizing agent making it suitable for heated equipment. Both the liquid and vapor phases are stabilized. It is particularly suited to cleaning, degreasing and rinsing applications.

→ **Forane® 141b SV** is formulated to eliminate water from components of many types and materials including those made from metal, plastics and glass.

→ **Forane® MGX** has been designed specifically for defluxing electronic components.



Properties and Commercial Specification

	Forane® 141b DGX	Forane® 141b SV	Forane® 141b MGX
COMPOSITION	1,1-di-chloro 1-fluoroethane plus stabilizing agents.	Forane® 141b DGX containing 500 ppm of a hydrophilic additive.	Azeotropic blend of 141b DGX and methanol.
APPLICATION	Degreasing and Rinsing.	Dewatering.	Removal of flux after soldering operations.
BOILING POINT	32°C	32°C	32°C
VAPOR PRESSURE*	0.810 bar	0.81 bar	0.845 bar
DENSITY (LIQUID)*	1.24	1.24	1.24
FLASH POINT	None	None	None
COMMERCIAL SPECIFICATION	141b ≥ 99.5% by weight with at least 300 ppm of stabilizers.	141b DGX ≥ 99.5% by weight with a hydrophilic additive at 500 +/-50 ppm.	95.6% by weight of 141b DGX 4% by weight of methanol. 0.4% by weight of an inhibitor.

* 25° C

Forane® 365

The Grade Range

Forane® 365 HX is the base material for this new range of non-flammable, non-ozone depleting grades that can be used throughout Europe instead of HCFC 141b. This stable azeotropic blend of two HFCs (365mfc and 4310mee) offers the advantages of a non-flammable HFC but at a more economical price than other competitive products on the market. Forane® 365 HX is a less aggressive solvent than 141b, so it is even more compatible with the materials it normally encounters; however, in the most difficult cases, this lower solvent power means that it may have to be used in conjunction with other pre-cleaners.

→ **Forane® 365 HX** is used for particle removal, or as a rinsing and drying solvent after a cosolvent* for degreasing or defluxing applications.

→ **Forane® 365 SV** includes the same SV additive as Forane® 141b SV for direct replacement in dewatering applications for sensitive materials like special metals, plastics, glass.

Finally, only for experienced formulators, the flammable **Forane® 365mfc** is available to make specific blends for other applications. The manufacture and sale of these blends has been entrusted to a company specializing in the formulation and distribution of solvents.

* Arkema recommends the "Garosolve®" range from *Gaches Chimie Spécialités* of Toulouse, France. Garosolve® solvents are based on formulations patented by Arkema, and are made from raw materials supplied by Arkema.

Combined with Garosolve® products for the most difficult cases, the new Forane® grades offer a solution to most requirements of the precision cleaning of delicate materials. These include drying, removal of dust and other particulates, removal of oil, grease and polish, defluxing of standard fluxes and even brazing pastes.

	Forane® 365mfc	Forane® 365 HX	Forane® 365 SV
COMPOSITION	1,1,1,1,3,3-pentafluorobutane used as the base material.	Blend of HFC 365mfc and HFC 4310mee.	Forane® 365HX containing 500 ppm of a hydrophilic additive.
APPLICATION	Base product for use in blends.	Base product for use in blends. Particle removal. Drying / Rinsing	Dewatering
BOILING POINT	40°C	42°C	42°C
VAPOR PRESSURE*	0.53 bar	0.53 bar	0.53 bar
DENSITY (LIQUID)*	1.334	1.28	1.28
FLASH POINT	-24°C	None	none
COMMERCIAL SPECIFICATION	HFC 365mfc ≥ 99.7% by weight.	HFC 365 ≥ 75% by weight HFC 4310mee ≤ 25% by weight.	HFC 365mfc ≥ 75% by weight, HFC 4310mee ≤ 25% by weight with a hydrophilic additive, SV at 500 ppm +/- 50 ppm.



Quality and customer service

A global chemical player, Arkema consists of 3 coherent and balanced business segments: Vinyl Products, Industrial Chemicals, and Performance Products. Present in over 40 countries with 18,600 employees, Arkema achieves sales of 5.2 billion euros (in 2004). With its 6 research centers in France, the United States and Japan, and internationally recognized brands, Arkema holds leadership positions in its principal markets.

Arkema is committed to providing high quality products and services to its customers, in particular through its Fluorochemicals Division, which includes its FORANE® product range. Our production plants in Europe have the ISO 9001 and 14001 accreditations.

CONTACTS

Arkema will assist its customers through:

- ➔ A worldwide sales network with local agencies and branch offices liaising with the Fluorochemicals central division - **ARKEMA Fluorochemicals**, 4-8, cours Michelet 92800 Puteaux - France
Fax: +33 (0) 1 49 00 53 12
- ➔ A technical support, research and product development team (ISO 9001 v 2000). This department is based at the Pierre-Bénite Research Center, and provides assistance on the Forane® 141b and 365 ranges through information, advice, analytical services and trials, as required. Customers are welcome to attend trials by arrangement. **ARKEMA - CRRA - OFA Department**
Rue Henri Moissan, BP 63 - 69493 Pierre-Bénite Cedex (France)
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See MSDS for Health & Safety Considerations

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