

PROMOSOLV™ DS2



PERFORMANCES

The PROMOSOLV™ DS2 drying product was **specifically developed for optics, to eliminate water without leaving marks** and reduce energy consumption whilst being environmentally-friendly.

The PROMOSOLV™ DS2 drying product is made up of the hydrofluoroether PROMOSOLV™ IBuA and a drying additive, with no ODP (ozone-depleting potential), it is non-flammable and has very low toxicity.

SPECIFICATIONS

Characteristics	Units	Values	Methods
Aspect	-	colourless	visual
Density at 20°C	kg/cm ³	1,48	-
Purity	%	99,8	-
Non volatile residues	ppm	≤ 2,0	-
Additive content	ppm weight	4000 ± 400	MO 0535
Methoxynonafluorobutyl ethers	% weight	98,75	-
Isobutylic alcohol	% weight	1,25	-

CHARACTERISTICS

Property @	Units	Promosolv™ DS2	CFC-113	HCFC-141b	Trichlor-ethylene	Methylene Chloride
Boiling point	°C	58	48	32	87	39.8
Freezing point	°C	- 135	- 35	- 103	- 86	- 96.7
Flash point	6	none	none	none	none	none
Density	g/cm ³	1.48	1.56	1.23	1.46	1.32

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Surface tension	mN/m	13.6	17.3	19.3	22	25.5
Inflammable limits % volume	lower upper	- -	- -	5.6 17.7	- -	15.5 66.4
Solubility of solvent in water	ppm	< 15	110	2700	1100	19000
Additive concentration	ppm	600-4000	600-3000	600-3500	500-3000	500-4000
Heat transfer						
Vapour pressure	kPa	28	44.1	75.9	10	73.6
Dynamic viscosity	mPa.s	0.61	0.68	0.43	0.62	0.425
Latent heat of vaporization	kJ/kg@bp	125	146	223	265	391
Specific heat	kJ/kg.K	1.17	0.92	1.26	0.93	1.3

PACKAGING TYPE

Packaging types of 40 kg and drums of 280 kg available.

STORAGE & SHELF LIFE

PROMOSOLV™ DS2 is not flammable in the standard conditions of use or storage. This fluid is highly stable to thermal and chemical reaction when used or stored in normal conditions. Some more procedures are detailed into the safety data sheet available on request. This product does not sustain combustion according to the norm : ASTM D4206-86 (< 1 second).

To ensure the best product performance it is recommended to store the products in closed packaging types. Shelf life : 18 months under these conditions.

CONDITIONS OF USE

Material compatibility

As with the most fluorinated liquids, **PROMOSOLV™ DS** are absorbed by the plastics and the fluorinated elastomers in case of a prolonged exposure. A simple test along the process is recommended with all materials

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Metals	Plastics	Elastomers
Aluminium	Acrylic	Butyl rubber*
Copper	Polyethylene	Natural rubber
Carbon steel	Polypropylene	Nitril rubber
Stainless steel	Polycarbonate	EPDM
Brass	Polyester	
Molybdenum	Epoxy	
Tantalum	PET	
Tungsten	ABS	
German silver	PMMA	
Alloy Cu/Be C172	C-PVC	
Alloy Mg AZ32B		

Tested compatibility for an exposure of 1 hour at boiling temperature.

*Butyl rubber is preferable for a prolonged exposure > 1 month.

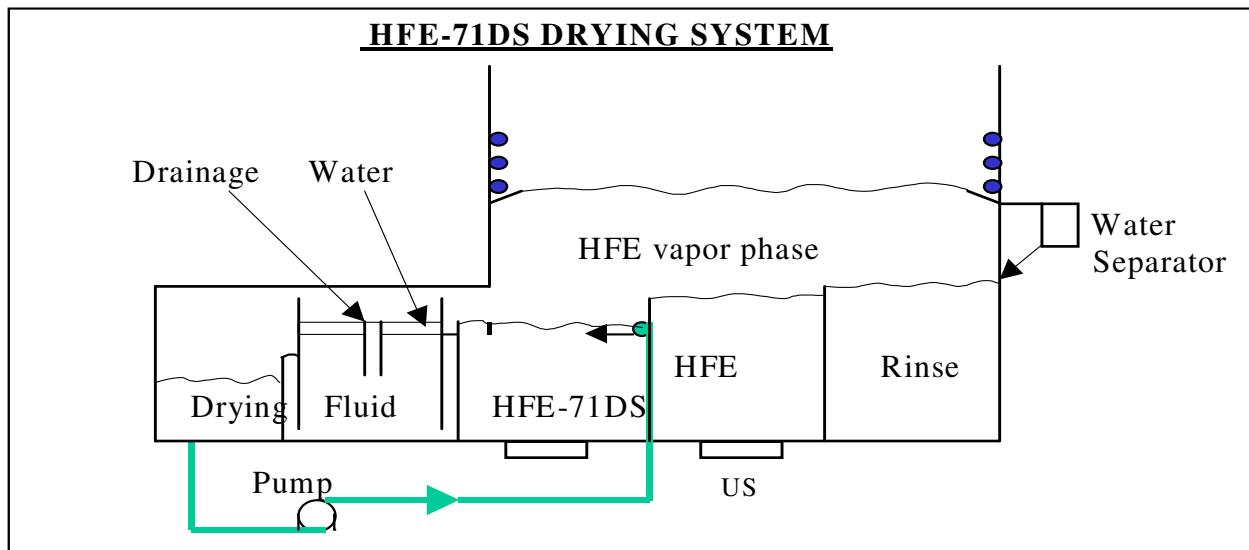
Exceptions : swelling of PTFE and silicon rubber

The compatibility tests of **PROMOSOLV™ DS2** show a good compatibility with a large range of metals, plastics and elastomers, similar to the performance of perfluorinated liquids.

A good compatibility with plastics particularly sensible as the polycarbonate and the PMMA indicates a possible use in the cleaning unit containing numerous components.

PROMOSOLV™ DS2 and the spot free drying process

The spot free drying process with **PROMOSOLV™ DS2** works according to the principle of the water displacement. When wet parts are immersed into the **PROMOSOLV™ DS2** fluid which has a heavier density and much lower surface tension, water is removed off the parts by gravity to the surface of the fluid. This process needs a two to three sump drying unit. This type of drying allows heavy production for all type of materials.



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The water introduced into the **PROMOSOLV™ DS2**, which contains a very carefully selected additive, is displaced by gravity towards the surface of the sump on which a flushing ramp pushes it over a weir, into a gravity water separator. This decanted water is rejected from the dryer through the water drain while the **PROMOSOLV™ DS2** fluid is re-circulated to the first drying sump with a pump. Dried parts are then rinsed into the second and third sums of PROMOSOLV™ IBuA. The final rinse is made in the vapour phase, and then the spot free parts can be very gently removed from the drying unit.

Applications PROMOSOLV™ DS2

PROMOSOLV™ DS2 drying agent has been specially developed for the spot free drying application for plastic, metal, optic, synthetic, ceramic parts and assemblies.

- Watch industry
- Jewel industry
- Optical
- Medical
- General and precision mechanic
- Aircraft industry
- Military
- Others

This drying process with **PROMOSOLV™ DS2** drying agent replaces the CFCs, HCFCs or the Chlorinated drying systems, provides entire satisfaction for heavy duties applications and complies with regulations.

PROMOSOLV™ DS2 is specially designed for the high tech industries like optics, medical, jewellery which need further surface treatments, PVD, CVD etc...

Advantages

PROMOSOLV™ DS2 drying agent provides many advantages compared to conventional drying systems :

- Removal of small and large quantities of water.
- Spot free drying versus hot air.
- Parts are not damaged like it can happen for the centrifugation.
- No dust contaminates parts as for absorbing material.
- Removal of water with a pH included between 5 and 9.
- Drying of tap water and DI water.
- Low energy consumption.
- Reduces of cycle time by elimination of air drying step.
- Solubility of HFE-DS2 drying agent in water is very low and thus respects the environment.

Typical drying process

Recommendations to dry with **PROMOSOLV™ DS2** drying agent :

1. Introduce the parts to dry in a basket with the lowest water retention as possible and deep the basket in the drying sump with the **PROMOSOLV™ DS2** drying agent. The drying time depends on the profile of the parts, the cycle time can vary between 30secondes and 3minutes. Vertical agitation can help to dislodge any trapped water between parts.
2. Remove the basket from the first sump and wait that the excess of drying agent drains back. Transfer the basket into the second rinse of PROMOSOLV™ IBuA for the first rinsing operation. The cycle time can vary between 30 seconds and 3 minutes. Vertical agitations or ultrasonics can help to better rinse.

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3. Transfer the basket to the third rinse and proceed as point 2 and then use the PROMOSOLV™ IBuA vapour phase for 1 minute until the temperature of the parts is equal to the temperature of the vapour.
3. Move the basket from the vapour phase to the cold zone for 1 minute to dry the parts and so that no HFE is carried out of the dryer.

Equipment

The experience has shown that retrofitted or new equipment is the best choice to use **PROMOSOLV™ DS2** and PROMOSOLV™ IBuA agent to provide high quality and a very economical solution.

HSE

Property @	Units	Promosolv™ DS2	CFC-113	HCFC-141b	Trichlor-ethylene	Methylene Chloride
Environmental data						
Ozone depletion pot.	ODP	0.00	0.80	0.10	< 0.005	< 0.005
Global warning pot.	GWP	500	5000	630	< 10	< 100
Atmospheric lifetime	years	4.1	85	9.4	8	0.5
Toxicity						
Exposure average : 8h	ppm	750	500	500	25	50
VOC		OUI	OUI	OUI	OUI	OUI

INVENTEC Material Safety Data sheets can be found at www.quickfds.com.

All safety measures should be taken. In all kind of handling or exposition to the product, the individual protection recommended by the safety data sheet should be taken. The typical figures used here above can be changed without notice.

This data is based on information that the manufacturer believe to be reliable and offered in good faith. In no event will INVENTEC be responsible for special, incidental and consequential damages. The user is responsible to the Administrative Authorities (regulations for the protection of the Environment) for the conformity of his installation.