

NOVEC™ 7200



FEATURES

Used for all industries, **NOVEC™ 7200** is a fluid specially developed to **clean, degrease, rinse and dry all kind of materials.**

NOVEC™ 7200, ethoxy-nonafluorobutane (C₄F₉OC₂H₅) is a proprietary clear, colourless and odourless liquid designed to replace the existing solvents having an ODP and to be used for the cleaning operations with ultrasonics. It is the raw material for a large number of formulations. Its high boiling point and its very low surface tension, provide to the **NOVEC™ 7200** some properties for the light degreasing into the vapour phase. It can be used **neat or also with an azeotropic blend or with the co-solvent process.**



This High-Tech fluid has no ODP and its thermal and chemical stability and its very low toxicity provide the best industrial compromise for the safety in use and the environment.

Other NOVEC™ hydrofluoroethers, azeotropes and blends

	Formulation	Boiling temperature	Application
NOVEC™ 7100	Methoxy-nonafluorobutane	61°C	Light cleaning, heat transfer, formulations
NOVEC™ 72DE	Ethoxy-nonafluorobutane + Trans-1, 2-dichlorethylene	43°C	Very performing degreasing
NOVEC™ 71DE	7100 with Trans-1, 2-dichlorethylene	41°C	Degreasing + wax removal
NOVEC™ 71IDA	7100 with Trans-1, 2-dichlorethylene and ethanol	40°C	Degreasing + flux removal
NOVEC™ 71IPA	7100 with isopropylic alcohol	55°C	Light cleaning, rinsing of co-solvent
PROMOSOLV DS2	7100 + drying additive	60°C	Spot free drying, after detergent cleaning

SPECIFICATIONS

Characteristics	Units	Values	Methods
Appearance	-	Transparent, colourless	Visual
Purity	%	99,0	-
Non volatile residues	ppm weight	≤ 1.0	-

CHARACTERISTICS

Properties	Units	7200	CFC-113	HCFC-141b	Trichlor-ethylene	Methylene Chloride
Boiling point	°C	76	56	32	87	39.8
Freezing point	°C	- 138	- 35	- 103	- 86	- 96.7
Flash point		none	none	none	none	none
Density	g/cm ³	1.43	1.56	1.23	1.46	1.32
Surface tension	mN/m	13.6	17.3	19.3	22	25.5
Heat transfer						
Vapour pressure	kPa	14.5	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	1.21	0.92	1.26	0.93	1.3

PACKAGING TYPE

Packaging types of 5 kg, 15 kg and drums of 272 kg available.

STORAGE & SHELF LIFE

The hydrofluroether **NOVEC™ 7200** 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: 24 months under these conditions.

PROCESS PARAMETERS

Material compatibility

As with the most fluorinated liquids, the **NOVEC™** are absorbed by the plastics and the fluorinated elastomers in case of a prolonged exposure.

Metals	Plastics	Elastomers
Aluminium	Acrylic (PMMA)	Butyl rubber*
Copper	Polyethylene	Natural rubber
Carbon steel	Polypropylene	Nitril rubber
Stainless steel 302	Polycarbonate	EPDM
Brass	Polyester	
Molybdenum	Epoxy	
Tantalum	PET	
Tungsten	ABS	
Alloy Cu/Be C172		
Alloy Mg AZ31B		

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

Copper oxidation can be noticed while testing

The compatibility tests of **NOVEC™ 7200** 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 indicate a possible use in the cleaning unit containing numerous components.

Applications

NOVEC™ 7200, is the raw material for azeotropic blends or not. This product is only to remove particulates, very light oils and some light silicones. It is recommended to use it with an azeotropic formulation or with a co-solvent. This product is also used as spot free drying with retrofitted or new drying units.

It is a replacement agent for CFCs, HCFCs and HFCs

Vapour pressure : density and viscosity

Temperature /°C	Vapour pressure /kPa	Density	Viscosity Dyn./mPas
- 40	0.4	1.57	1.57
- 30	0.8	1.55	1.22
- 20	1.5	1.53	0.97
- 10	2.6	1.50	0.79
0	4.5	1.48	0.66
10	7.3	1.46	0.56
20	11.6	1.44	0.48
30	17.8	1.41	0.41
40	26.6	1.39	0.36
50	38.8	1.37	0.32
60	55.3	1.34	0.29
70	77.2	1.32	0.26

HSE

Properties	Units	7200	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 warming pot.	GWP	55	5000	630	< 10	< 100
Atmospheric lifetime	years	0.9	85	9.4	8	0.5
Toxicity						
Exposure average 8h	ppm	200	500	500	25	50
VOC		YES	YES	YES	YES	YES

R phrases : R 18 : In use, may form flammable/explosive vapour-air mixture.
R 53 : May cause long-term adverse effects in the aquatic environment.

S phrases : S 23 : Do not breathe vapour.
S 51 : Use only in well-ventilated areas.
S 61 : Avoid release to the environment. Refer to special instructions/safety data sheet.

Toxicological results of NOVEC™ 7200

Eyes Irritation	Not irritant
Skin sensitisation	Not a skin sensitizer
Developmental toxicity	No abnormal effects observed
Inhalation (28 day study)	200 ppm "exposure guideline™"
Mutagenicity	Not a mutagen
Cardiac sensitisation	No signs of sensitisation at exposures up to 20 000 ppm
Ecotoxicity	Total

Toxicity profile

The toxicological testing completed to date on **NOVEC™ 7200** fluid shows the material to be low in overall toxicity. It is practically non-irritating to the eyes, minimally irritating to the skin and is not mutagen, developmental toxin or cardiac sensitizer. This material is rated "practically non-toxic" through inhalation. Twenty-eight day inhalation studies have helped establish recommended exposure guidelines of 200 ppm for eight-hour average exposure per day.

Please read carefully the safety data sheet of the product **NOVEC™ 7200** before use. 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.

The information contained in this product sheet is given for indicative purposes and in no way incurs the liability of INVENTEC. All users are liable, with respect to Administrative Authorities (regulation of facilities classified for the protection of the environment) for the compliance of their installation.

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