

VERSATILL® HTF-24

DESCRIPTION

Versatill® HTF-24 is a fluorinated solvents mixture with a normal boiling point (NBP) of 23.7°C is especially designed as heat transfer fluid for low temperature heat removal on direct contact using two phase (liquid - vapor) application. It is a nonflammable solvent that has excellent material compatibility, low surface tension, low Global Warming Potential and Zero ODP.

APPLICATIONS

- Semiconductor Ion implanters Dry etchers CVD/PVD tools
- Electronic Automated Test Equipment (ATE)
- Electronic Cooling Supercomputers
- Sensitive electronics High voltage transformers
- Direct contact cooling
- Heat pipes
- Heat transfer fluid
- High temperature heat pumps

ADVANTAGES

- Non-flammable
- Non-corrosive
- Low global warming potential (GWP)
- Zero ozone depletion potential (ODP)
- Low surface tension, low viscosity, high liquid density
- Excellent thermal, dielectric, chemical, and hydrolytic stability
- Superior drying property
- Excellent permeability
- Thermodynamic fluid.
- Recyclable

TECHNICAL DATA SHEET

PHYSICAL PROPERTIES

Physical Properties of Versatill® HTF-24	
Boiling point (NBP)	23.7°C
Critical Temp.	179°C
Critical Pressure	32.5 Bar
Liquid Density (Kg/M ³ , 25°C)	1,281
Vapor Density (Kg/M ³ , 25°C)	3.969
Viscosity (cST, 25°C)	0.44
Surface Tension (dyne/cm/ 25°C)	16.4
Latent Heat of Vaporization (KJ/kg, 25°C)	186.2
Specific Heat Capacity, Liquid (KJ/kg K, 25°C)	1.340

THERMODYNAMIC PROPERTIES

Temp. °C	p ^l bar	p ^{ll} bar	D ^l kg/dm ³	D ^{ll} kg/m ³	v ^l dm ³ /kg	v ^{ll} dm ³ /kg	h ^l kJ/kg	h ^{ll} kJ/kg	r kJ/kg	s ^l kJ/(kgK)	s ^{ll} kJ/(kgK)
0	0.408	0.207	1.335	1.39	0.749	719.17	200.00	394.55	194.55	1.000	1.726
5	0.500	0.264	1.326	1.75	0.754	572.47	205.92	398.99	193.07	1.024	1.729
10	0.609	0.333	1.315	2.17	0.760	460.06	212.43	403.46	191.03	1.047	1.732
15	0.735	0.416	1.305	2.68	0.766	373.02	218.99	407.95	188.96	1.071	1.736
20	0.882	0.516	1.294	3.28	0.773	304.98	225.61	412.46	186.85	1.094	1.740
25	1.051	0.634	1.283	3.98	0.779	251.31	232.31	418.58	186.27	1.116	1.744
30	1.245	0.773	1.272	4.79	0.786	208.60	239.07	421.52	182.45	1.139	1.749
35	1.467	0.935	1.260	5.74	0.794	174.33	245.91	426.06	180.15	1.161	1.753
40	1.718	1.122	1.248	6.82	0.801	146.63	252.82	430.62	177.80	1.183	1.758
45	2.001	1.339	1.236	8.06	0.809	124.07	259.79	435.17	175.38	1.205	1.764
50	2.320	1.587	1.223	9.47	0.817	105.56	266.84	439.73	172.89	1.226	1.769

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COMPATIBILITY

Versatill® HTF-24 has a wide range of compatibility with many type of materials. It is generally compatible with all non fluorinated plastics and elastomers.

Thermoplastics	Compatibility
	+
PVC (Polyvinylchloride)	
High-density polyethylene	+
PMMA (Polymethyl methacrylate)	-
Polycarbonate	+
Polypropylene	+
Nylon 66	+
Polystyrene	+
PETG Polyethylene terephthalate	+
PTFE	+
Elastomers	
Neoprene	+
Viton® A	-
EPDM rubber	+
Natural rubber	-
Nitrile rubber	+
Silicone	o

Table : + compatible / o border line / - not compatible

SAFETY, ENVIRONMENTAL AND HEALTH

Environmental Properties

Properties	Versatill® HTF-24
Ozone Depletion Potential (ODP) ¹	None
Global Warming Potential (GWP) ²	850
Atmospheric Lifetime (years)	7.5
Flash point	None

¹ CFC-11= 1.0

² CO2 =1.0, 100yr ITH

TECHNICAL DATA SHEET

Health Profile

Properties	Versatill® HTF-24
Acute Lethal Concentration (ppm)	>50,000
8 hr Exposure Guideline (ppm)	300
Skin Irritation	Negligible
Mutagenicity	Negative
Ecotoxicity	Very low (EC50>118mg/L 72Hrs, algae)
Acute Oral Toxicity	LD50 > 2000 mg/kg
28-day Inhalation	NOAEL=2000 ppm

Please refer to the current product Safety Data Sheet and the precautionary statement on the product package prior to use. Follow all applicable precautions and directions.

The Solvents Company
9 Cornell Street.
Kingston, NY 12401
631-595-9300
sales@solventsco.com

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