

3M™ Novec™ 7300DL Engineered Fluid

Introduction

3M™ Novec™ 7300DL Engineered Fluid is a higher purity version of 3M™ Novec™ 7300 Engineered Fluid. This clear, colorless, odorless fluid is ideal for a wide variety of applications requiring ultra-high purity and extensive quality control testing. Product specifications are tightly controlled for the following contaminants:

- ions
- metals
- particulate
- non-volatile residue

Novec 7300DL fluid, a segregated nonflammable hydrofluoroether, is thermally stable, non-ozone depleting, and has a very low global warming potential. It is recommended for use as a replacement for perfluoropolyethers (PFPEs), perfluorocarbons (PFCs), hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs).

The solubility and high purity of Novec 7300DL fluid make it an excellent product for use in lubricant deposition in the hard disk industry. Its higher boiling point gives Novec 7300DL fluid a lower evaporation rate and lower operating costs compared to lower boiling solvents in many applications. The low surface tension and low viscosity of Novec 7300DL fluid make it ideal for semiconductor wafer cleaning applications.

Typical Physical Properties

Properties	3M™ Novec™ 7300DL Engineered Fluid
Appearance	Clear, colorless
Molecular Weight	350
Boiling Point (°C) @ 760 mmHg	98.0
Liquid Density (g/ml)	1.66
Surface Tension (dynes/cm)	15
Solubility of Solvent in Water, ppb	586
Solubility of Water in Solvent, ppm	67
Vapor Pressure (mmHg)	44.9
Viscosity (cps)	1.18
Heat of Vaporization (cal/g @ boiling point)	24.3

Not for specification purposes. All values @ 25°C unless otherwise specified.

Environmental and Safety Properties

Properties	3M™ Novec™ 7300DL Engineered Fluid
Ozone Depletion Potential—ODP ¹	0
Global Warming Potential ²	200
Atmospheric Lifetime (years)	3.8
Flash Point	None
Flammability Range in Air	None

¹ CFC-11=1.0

² GWP—100 year ITH, CO₂ = 1.0

Materials Compatibility

Novec 7300DL fluid is compatible with most metals and hard polymers such as:

Metals	Plastics	Elastomers
Stainless Steel	Polycarbonate	EPDM
Nickel	PMMA	Natural Rubber
Copper	ABS	Polyurethane
Aluminum	Polypropylene	
Monel	Polyethylene	

Elastomeric materials should be limited to those compounds that contain the least amount of extractible plasticizer. 3M engineers can suggest appropriate compounds or assist with test procedures for your evaluation. For fluorinated plastics, such as PTFE, and fluorinated elastomers, contact your 3M engineer to assist you in your determination of compatibility in your application.

Solvent Properties

Novec 7300DL fluid is an excellent replacement for PFPEs, PFCs, HCFCs, and HFCs in many solvent applications. The solubility, fast evaporation rate and high purity of Novec 7300DL fluid make it an excellent product for use in lubricant deposition in the hard disk industry.

Solubility for various lubricants is shown below.

Data compiled from published information.

Not for specification purposes. All values @ 25°C unless otherwise specified.

Lubricant/Additive	Solubility in 3M™ Novec™ 7300DL Engineered Fluid
Fomblin® Z-dol™	Miscible
Fomblin® AM-2001	Miscible
Dow Chemical X-1P	2.3 % by wt.
Fomblin® Z-Tetraol	<1000 ppm
Separex ZT-33-00	>10 % by wt.
Separex ZT-40-00	2.4 % by wt
Separex ZT-56-00	>10 % by wt.

Safety and Handling

Be sure to read and follow the precautions and directions for use contained in the product label and Material Safety Data Sheet before using this product.

Novec 7300DL fluid is nonflammable and is highly resistant to thermal breakdown and hydrolysis in storage and during use. Recommended handling procedures are provided in the Material Safety Data Sheet.

A product Material Safety Data Sheet is available upon request from your local 3M representative, or online at www.3M.com/electronics.

Typical Purity Specifications

Purity Specifications
(properties controlled and monitored for 3M™ Novec™ 7300DL Fluid, which are not controlled and monitored for 3M™ Novec 7300™ Engineered Fluid)

Properties		Units	3M™ Novec™ 7300DL Engineered Fluid
Water*		ppm	<50.0
Purity*		%	>99.5
Residue*		ppm	<1.0
Particulate levels	>0.3 micron	#/ml	<30.0
	>0.5 micron		<16.0
	>1.0 micron		<5.0
	>5.0 micron		< 3.0**
Ion Concentration*	F ⁻	ppb	<10.0
	Cl ⁻		<10.0
	NO ₂ ⁻		<10.0
	Br ⁻		<10.0
	NO ₃ ⁻		<10.0
	PO ₄ ³⁻		<10.0
	SO ₄ ²⁻		<10.0
	HCOO ⁻		Monitor
	CH ₃ COO ⁻		Monitor
(C ₂ O ₄) ²⁻	Monitor		
Non-Volatile Analysis*	Hydrocarbons	ppb	< 200
	Silicones		None Detected
	Esters		< 30
Metals***	Ag, Al, Ba, Ca, Cd, Co, Cr Cu, Fe, K, Li, Mg, Mn, Na Ni, Pb, Sr, Ti, Zn	ppb	< 5 Each

* Certificate of Analysis specifications

** As filled; not listed on Certificate of Analysis or Certificate of Conformance

*** Certificate of Conformance specifications

Recycle and Disposal Options

Used Fluid Return Program

3M offers a program for free pickup and return of used 3M specialty fluids in the U.S. A pre-negotiated handling agreement between users and our authorized service provider offers users broad protection against future liability for used 3M product. The fluid return program is covered by independent third-party financial and environmental audits of treatment, storage and disposal facilities. Necessary documentation is provided. A minimum of 30 gallons of used 3M specialty fluid is required for participation in this free program.

For additional information on the 3M Used Fluid Return Program, contact your local 3M representative or call 3M Customer Service at 800.810.8513.

Resources

3M™ Novec™ Engineered Fluids are supported by global sales, technical and customer service resources, with technical service laboratories in the U.S., Europe, Japan, Latin America and Southeast Asia. Users benefit from 3M's broad technology base and continuing attention to product development, performance, safety and environmental issues. For additional technical information on 3M™ Novec™ 7300DL Engineered Fluid in the United States or for the name of a local authorized distributor, call 3M Electronics Markets Materials Division: **800 810 8513**.

The 3M™ Novec™ Brand Family

The Novec brand is the hallmark for a variety of patented 3M products. Although each has its own unique formula and performance properties, all Novec products are designed in common to address the need for safe, effective, sustainable solutions in industry-specific applications. These include precision and electronics cleaning, heat transfer, fire protection, lubricant deposition and several specialty chemical applications.

3M™ Novec™ Engineered Fluids • 3M™ Novec™ Aerosol Cleaners • 3M™ Novec™ 1230 Fire Protection Fluid • 3M™ Novec™ Electronic Coatings • 3M™ Novec™ Electronic Surfactants

United States	China	Europe	Japan	Korea	Singapore	Taiwan
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Electronics Markets Materials Division

3M Center, Building 224-3N-11
St. Paul, MN 55144-1000
www.3M.com/novec
1-800-810-8513

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