

# 3M™ Novec™ 73DE Engineered Fluid

## Product Description

3M™ Novec™ 73DE Engineered Fluid is designed primarily for heavy-duty vapor degreasing or immersion cleaning, featuring high solvency, low surface tension, non-flammability and fluid stability. Novec 73DE fluid is a high performing, cost-effective replacement for n-propyl bromide (nPB or 1-bromopropane), trichloroethylene (TCE), ozone-depleting hydrochlorofluorocarbons (HCFCs) like HCFC-225 (Asahiklin AK-225) and HCFC-141b and high global warming potential (GWP) hydrofluorocarbons (HFCs) for a wide range of cleaning applications. Vapor degreasing with Novec 73DE fluid can also help save you time and money over aqueous cleaning by offering faster cycle times, lower energy usage and improved cleaning of parts with complex geometries.

## Features

- Designed for use in vapor degreasers and immersion cleaning
- Excellent performance with high solvency and low surface tension
- Effective in cleaning heavy greases, oils, waxes, silicones and non-polar flux residues
- Easy to maintain and use in a vapor degreaser with stable bath composition during extended use
- Non-flammable and low in toxicity for an excellent safety profile
- Environmentally sustainable with low global warming potential (GWP) and zero ozone depletion potential (ODP)
- Cost-effective replacement for nPB, TCE, ozone-depleting HCFCs and high GWP HFCs
- Faster cycle times, lower energy usage and improved cleaning of parts compared to aqueous cleaning
- Effective for lubricant deposition applications where increased solvency is desired

## Typical Physical Properties and Performance Characteristics

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the product's Certificate of Analysis (COA) that is shipped with the product or available by request from your 3M Technical Service Representative.

Properties	3M™ Novec™ 73DE Engineered Fluid	HCFC-141b	HCFC-225ca/cb	TCE	nPB
Boiling Point (°C (°F))	48 (118)	32 (90)	54 (129)	87 (189)	71 (160)
Liquid Density (g/mL)	1.28	1.23	1.55	1.44	1.35
Surface Tension (dynes/cm)	19.9	19.3	16.2	32.3	25.9
Kauri-Butanol Value	83	56	31	129	125
Vapor Pressure (mmHg @ 20°C (68°F))	263	569	290	74	150
Viscosity (cP)	0.38	0.43	0.59	0.54	0.49
Heat of Vaporization (cal/g @ boiling point)	54.2	53.3	34.6	56.4	58.8

## 3M™ Novec™ 73DE Engineered Fluid

### Applications

- Cleaning solvent for vapor degreasing, immersion cleaning and spray cleaning
- Solvent cleaner for heavy greases, oils, waxes, silicones and non-polar flux residues
- Lubricant deposition applications where increased solvency is desired

### Environmental Properties

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Data compiled from published information

Properties	3M™ Novec™ 73DE Engineered Fluid	HCFC-141b	HCFC-225ca/cb	TCE	nPB
Ozone Depletion Potential (ODP)	0	0.1	0.03	0	0.026
Global Warming Potential (GWP) <sup>1</sup>	47	782	127/525	<1	<1
Flash Point <sup>2</sup>	None	None	None	None	None

<sup>1</sup> GWP 100-year integrated time horizon (ITH), IPCC 2013

<sup>2</sup> Closed cup flash point test method

### Comparison of Safety Profiles

Margin of safety is calculated by exposure guideline divided by exposure. The larger the safety margin, the safer the product is in its intended use.

**Note:** Data compiled from published information. Not for specification purposes.

Properties	3M™ Novec™ 73DE Engineered Fluid	HCFC-141b	HCFC-225ca/cb	TCE	nPB
Exposure Guideline (ppmv)	100 / 200	500	50	10	0.1
Estimated Exposure (ppmv)	10	10	10	10	10
Margin of Safety <sup>2</sup>	20	50	5	None <sup>3</sup>	Exposure exceeds guideline by 100x

<sup>1</sup> 3M™ Novec™ 73DE Engineered Fluid is comprised of two components. The values shown are for each component: 3M™ Novec™ 7300 Engineered Fluid / trans-1, 2-dichloroethylene

<sup>2</sup> Published exposure guideline (8 hour TWA, ppmv) divided by estimated exposure level of 10 ppmv for vapor degreasing

<sup>3</sup> There is no safety margin at this exposure

### Regulations on Chlorine-Containing Solvents

Because of its favorable health and environmental properties, trans-1, 2-dichloroethylene (t-DCE) is subject to less stringent regulations compared to the other chlorinated solvents. U.S. regulations affecting 3M™ Novec™ 73DE Engineered Fluid include volatile organic compound (VOC) emissions of t-DCE and reporting requirements if t-DCE is emitted into water or if a spill of 1176 lbs. or more of Novec 73DE fluid occurs. t-DCE is not considered a Hazardous Air Pollutant (HAP).

**Note:** Data compiled from published information. Not for specification purposes.

U.S. Regulation	t-DCE	TCE	PERC	Methylene Chloride
VOC Designation	Yes	Yes	Yes	No
Reportable Quantity for Accidental Release	1000 lbs.	100 lbs.	100 lbs.	1000 lbs.
Regulated if Emitted into Water	Yes	Yes	Yes	Yes
Hazardous Air Pollutant	No	Yes	Yes	Yes
Annual Reporting (EPCRA 313) (SARA)	No	Yes	Yes	Yes
OSHA List of Toxins / Carcinogens	No	Yes	Yes	Yes

## 3M™ Novec™ 73DE Engineered Fluid

### Materials Compatibility<sup>1</sup>

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Data compiled from published information.

3M™ Novec™ 73DE Engineered Fluid					
Plastics		Elastomers		Metals	
Compatible	Incompatible	Compatible	Incompatible	Compatible	Incompatible
Acetal		DuPont™ Kalrez™ Perfluoroelastomers		Copper	
Epoxy				Brass	
Nylon	ABS	Butyl Rubber	Silicone	Stainless Steel	
PEEK				Magnesium	
Polyester	Polystyrene	Parfluor™ Perfluoroelastomers		Titanium	
Polyethylene	Acrylic	Viton™ Fluoroelastomers	Fluorosilicone	Aluminum	
Polypropylene	Polycarbonate	Polyurethane		Carbon Steel	
PTFE				Cadmium	

<sup>1</sup> Not a complete list. Novec 73DE fluid is a high solvency cleaning fluid. It is compatible with most metals and solvent-resistant plastics. Parts containing solvent-sensitive plastics and elastomeric materials should be evaluated prior to cleaning. Consult a 3M Technical Representative for specific material compatibility in your process.

### Aerospace Materials Compatibility

3M™ Novec™ 73DE Engineered Fluid has been tested for Aircraft Exterior Surface Cleaner Compatibility (AMS 1526B).

**Note:** The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Test Description	ASTM Test Method <sup>1</sup>	3M™ Novec™ 73DE Engineered Fluid Results
Sandwich Corrosion	F1110	Conforms
Effect on Painted Surfaces	F502	Conforms
Hydrogen Embrittlement	F519	Conforms
Effect on Unpainted Surfaces	F485	Conforms
Total Immersion Corrosion	F483	Conforms
Low-Embrittling Cadmium Plate	F1111	Conforms
Flash Point	D56	Conforms
Acrylic Stress Cracking	F484	Does not conform <sup>2</sup>
Stress Corrosion of Titanium Alloys	F945 <sup>3</sup>	Conforms

<sup>1</sup> Tested in accordance with the ASTM test method shown

<sup>2</sup> Novec 73DE fluid caused visible crazing of acrylic plastics

<sup>3</sup> Not a part of AMS 1526B

### Safety and Handling

Before using this product, please read the current Safety Data Sheet (available at [3M.com/Novec](http://3M.com/Novec) or through your 3M sales or technical service representative) and the precautionary statement on the product package. Follow all applicable precautions and directions. 3M™ Novec™ 73DE Engineered Fluid is non-flammable and does not exhibit flammability characteristics under normal operating and storage conditions. The fluid is resistant to thermal breakdown and hydrolysis during storage and use. Contents may be under pressure if shipped at elevated temperatures. Open container slowly to vent pressure.

## 3M™ Novec™ 73DE Engineered Fluid

### Storage and Shelf Life

The shelf life of 3M™ Novec™ 73DE Engineered Fluid is 24 months from the date of manufacture when stored in the original, unopened packaging materials and stored at 21°C (70°F) and 50% relative humidity.

Maintain storage temperature below 38°C (100°F) to prevent excess pressure on the container by the product. Protect from freezing. If stored below -10°C (14°F), mix before use.

### Used Fluid Program

3M offers a program for free pickup and disposal of used 3M specialty fluids in the U.S. A handling agreement between users and our authorized service provider offers users broad protection against future liability for used 3M product. The used fluid 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 Program, contact your local 3M representative or call 3M Customer Service at 800.810.8513.

#### The 3M™ Novec™ Brand Family

The Novec brand is the hallmark for a variety of proprietary 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, protective coatings, immersion cooling, advanced insulation media replacement solutions and several specialty chemical applications.

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

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**Safety Data Sheet:** Consult Safety Data Sheet before use.

**Regulatory:** For regulatory information about this product, contact your 3M representative.

**Technical Information:** The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

**Product Use:** Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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