

3M™ Novec™ Engineered Fluid 73DE

Technical data

October 2017

Section 1: Product description

3M™ Novec™ Engineering Fluid 73DE is designed primarily for heavy-duty vapour degreasing or immersion cleaning, featuring high solvency, low surface tension, non-flammability and fluid stability. 3M™ Novec™ Fluid 73DE 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. Vapour degreasing with 3M™ 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.

Section 2: Features

- Designed for use in vapour 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 vapour degreaser with stable bath composition during extended use
- Non-flammable and low in toxicity for an excellent safety profile
- 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

Section 3: Typical physical properties

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™ Engineered Fluid 73DE	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
Vapour 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 vapourization (cal/g @ boiling point)	54.2	53.3	34.6	56.4	58.8

Section 4: Applications

- Cleaning solvent for vapour 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

Section 5: 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™ Engineered Fluid 73DE	HCFC-141b	HCFC-225ca/cb	TCE	nPB
Ozone depletion potential (ODP)	0	0.1	0.03	0	0.026
Global warming potential (GWP) ¹	47	782	127/525	<1	<1
Flashpoint ²	None	None	None	None	None

¹ GWP 100-year integrated time horizon (ITH), IPCC 2013

² Closed cup flashpoint test method

Section 6: 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™ Engineered Fluid 73DE	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 ²	20	50	5	None ³	Exposure exceeds guideline by 100x

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

² Published exposure guideline (8 hour TWA, ppmv) divided by estimated exposure level of 10 ppmv for vapour degreasing

³ There is no safety margin at this exposure

Section 7: Regulations on chlorine-containing solvents

Because of its favourable 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™ Engineered Fluid 73DE 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 lb. or more of 3M™ Novec™ Fluid 73DE 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 lb.	100 lb.	100 lb.	1000 lb.
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

Section 8: Materials compatibility¹

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.

Plastics		Elastomers		Metals	
Compatible	Incompatible	Compatible	Incompatible	Compatible	Incompatible
Acetal		Perfluoroelastomers		Copper	
Epoxy				Brass	
Nylon	ABS	Butyl rubber	Silicone	Stainless steel	
PEEK				Magnesium	
Polyester	Polystyrene	Parofluor® Perfluoroelastomers		Titanium	
Polyethylene	Acrylic	Viton™ Fluoroelastomers		Aluminum	
Polypropylene	Polycarbonate	Polyurethane		Carbon steel	
PTFE				Cadmium	

¹ Not a complete list. 3M™ Novec™ Fluid 73DE 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.

Section 9: 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 ¹	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
Flashpoint	D56	Conforms
Acrylic stress crazing	F484	Does not conform ²
Stress corrosion of titanium alloys	F945 ³	Conforms

¹ Tested in accordance with the ASTM test method shown

² 3M™ Novec™ 73DE Fluid caused visible crazing of acrylic plastics

³ Not a part of AMS 1526B

Section 10: Safety and handling

Before using this product, please read the current safety data sheet (available at 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™ Engineered Fluid 73DE 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.

Section 11: Storage and shelf life

The shelf life of 3M™ Novec™ Engineered Fluid 73DE 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.

Section 12: 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 113.5 L (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.

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

Section 13: Other information

Safety data sheet	Consult safety data sheet before use.
Regulatory	To obtain best performance, use this product within 12 months of date of manufacture.
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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