

# 3M Novec™ 72DA

## Engineered Fluid

### Introduction

3M™ Novec™ 72DA Engineered Fluid is a blend of hydrofluoroether methyl nonafluorobutyl ether (C<sub>4</sub>F<sub>9</sub>OCH<sub>3</sub>), ethyl nonafluorobutyl ether (C<sub>4</sub>F<sub>9</sub>OC<sub>2</sub>H<sub>5</sub>), trans-1,2-dichloroethylene (t-DCE) and isopropanol. This mixture of solvents is a blend of azeotropes. The blend has been analyzed during evaporation and extended use in a vapor degreaser and found to have a consistent composition that is effective for medium- to heavy-duty degreasing and defluxing applications.

Novec 72DA fluid is ideal for a wide range of electronics and other precision cleaning applications. It is intended to replace CFCs, HCFCs, HFCs, nPB and chlorinated solvents. This Novec product has zero ozone depletion potential and other favorable environmental, health and safety properties (see Table 2).

The high solvency, low surface tension, nonflammability and stability of Novec 72DA fluid make it ideal for immersion and vapor degreasing applications. The isopropanol in Novec 72DA fluid provides enhanced removal of ionic contaminants.

### Typical Applications

Cleaning, rinsing and drying agent

- Cleaning of rosin solder flux residues, oils, greases and waxes

For information on other possible applications, contact your 3M representative or 3M authorized distributor.

### Material Description

Ingredients	Novec 72DA
Methyl Nonafluorobutyl Ether (C <sub>4</sub> F <sub>9</sub> OCH <sub>3</sub> )	10% by weight
Ethyl Nonafluorobutyl Ether (C <sub>4</sub> F <sub>9</sub> OC <sub>2</sub> H <sub>5</sub> )	20% by weight
Trans-1,2-dichloroethylene (t-DCE)	68% by weight
Isopropanol	2% by weight

**Typical Physical Properties**  
**- Table 1**

Data compiled from published information

Not for specification purposes

Properties	Novec 72DA	Freon® TE	Genesolv® 2004	AK-225 AES	4310-SMT
Formulation	Azeotrope <sup>1</sup>	Azeotrope 96% C <sub>2</sub> Cl <sub>3</sub> F <sub>3</sub> 4% Ethanol	Azeotrope 96% CCl <sub>2</sub> FCH <sub>3</sub> 4% Methanol	Azeotrope 95.5% C <sub>3</sub> Cl <sub>2</sub> HF <sub>5</sub> 4.5% Ethanol	Azeotrope <sup>2</sup>
Boiling Pt °C	44	45	29.4	52	37
Freeze Pt °C	-38 <sup>3</sup>	-42	na	-138	-10 <sup>3</sup>
Liquid Density <sup>4</sup>	1.27	1.50	1.22	1.49	1.37
Surface Tension <sup>5</sup>	18	17.7	18.5	16.8	15.5
Kauri-Butanol Value	58	40	76	41	na
Vapor Pressure <sup>6</sup>	360	362	527	414	471
Viscosity <sup>7</sup>	0.40	0.65	0.45	0.61	0.47
Heat of Vaporization <sup>8</sup>	60	43	62	41	53

<sup>1</sup> 10% 3M™ Novec™ 7100 Engineered Fluid (C<sub>4</sub>F<sub>9</sub>OCH<sub>3</sub>),  
 20% 3M™ Novec™ 7200 Engineered Fluid (C<sub>4</sub>F<sub>9</sub>C<sub>5</sub>H<sub>5</sub>), 68% trans-1,2-dichloroethylene,  
 2% isopropanol

<sup>2</sup> 52.9% HFC-4310mee (C<sub>5</sub>H<sub>2</sub>F<sub>10</sub>), 43% trans-1,2-dichloroethylene, 4% methanol, 0.1% stabilizer

<sup>3</sup> Critical solution temperature

<sup>4</sup> g/ml @ 25°C

<sup>5</sup> dynes/cm @ 25°C

<sup>6</sup> mmHg @ 25°C

<sup>7</sup> cps @ 25°C

<sup>8</sup> cal/g @ boiling point

na-Not Available

**Environmental and Safety Properties**  
**- Table 2**

Data compiled from published information

Not for specification purposes

Properties	Novec 72DA	Freon® TE	Genesolv® 2004	AK-225 AES	4310-SMT
Ozone Depletion Potential-ODP <sup>1</sup>	0.00	0.77	0.11	0.03	0.00
Global Warming Potential <sup>3</sup>	43	5800	670	400	758 <sup>2</sup>
Flash Point	None	None	None	None	None

<sup>1</sup> CFC-113 = 1.0

<sup>2</sup> IPCC Report, 2001

<sup>3</sup> GWP-100 year ITH, CO<sub>2</sub> = 1.0

"Freon" is a registered trademark of DuPont.

"Genesolv" is a registered trademark of Honeywell (formerly AlliedSignal Corp.)

**Regulatory Status**

The U.S. Environmental Protection Agency (EPA) has listed all components of 3M™ Novec™ 72DA Engineered Fluid as “acceptable,” without restrictions, under the EPA’s Significant New Alternatives Policy (SNAP) program.

**Regulations on Chlorine-Containing Solvents – Table 3**

Regulation	Trans-1,2-dichloroethylene	Trichloroethylene	Perchloroethylene	Methylene Chloride
VOC Designation	Yes	Yes	Exempt	Exempt
Reportable Qty. for Accidental Release	1000 lbs. (1430 lbs. in Novec 72DA)	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

**Regulations and Reporting**

Because of its favorable health and environmental properties, trans-1,2-dichloroethylene (t-DCE) is subject to less stringent regulations in the areas noted compared to the other chlorinated solvents in Table 3. The t-DCE content of Novec 72DA may be subject to VOC regulations. t-DCE is not considered a Hazardous Air Pollutant (HAP).

**Environmental Policy**

3M will continue to recognize and exercise its responsibility to prevent pollution at the source wherever and whenever possible; develop products that will have a minimal effect on the environment; conserve natural resources through the use of reclamation and other appropriate methods; assure that its facilities and products meet and sustain the regulations of all federal, state and local environmental agencies; assist, wherever possible, governmental agencies and other official organizations engaged in environmental activities.

**Safety and Handling**

Novec 72DA fluid is nonflammable and does not exhibit flammability characteristics under normal operating and storage conditions. This fluid is highly resistant to thermal breakdown and hydrolysis in storage and during use. Before using this product, please read the current Material Safety Data Sheet available through your 3M sales or technical service representative and the precautionary statement on the product package. Follow all applicable precautions and directions.

**Packaging and Availability**

Novec 72DA fluid may be ordered in the following container sizes:

- 1-gallon pail
- 55-gallon drum

## 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. through Safety-Kleen Corp. A pre-negotiated handling agreement between users and this 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.\*

Safety-Kleen Corp. has a network of 156 branch service centers in the U.S. This large fleet will provide timely, economical fluid disposal service.

For additional information on the 3M Used Fluid Return Program, contact Safety-Kleen at this toll-free line: 1.888.932.2731. Contact your local 3M representative for fluid return programs outside the U.S.

\* Must have a 30 or more gallon purchase to participate in the 3M paid program. Used product of 5-30 gallons can be returned through Safety-Kleen at the user's expense.

## Resources

3M™ Novec™ Engineered Fluids are supported by global sales, technical and customer service resources, with fully-staffed 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™ 72DA Engineered Fluid in the United States, call 3M Customer Service, **800 810 8513**.

For information on additional 3M fluids, coatings and other chemical products for the electronics industry, visit our web site at:

[www.3M.com/electronics](http://www.3M.com/electronics)

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Issued: 8/05

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5045(HB)  
98-0212-2607-5