



Safety Data Sheet

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This Safety Data Sheet has been prepared in accordance with the GHS guidelines & India Hazardous substances (Classification, Labeling & Packaging) Draft Rules 2011.

SECTION 1: Identification

1.1. Product identifier

3M™ Novec™ 72DA Engineered Fluid

Product Identification Numbers

98-0212-3095-2	98-0212-3096-0	98-0212-3097-8	98-0212-3163-8	98-0212-3440-0
HB-0042-2512-2	XZ-0046-0689-7			

1.2. Recommended use and restrictions on use

Recommended use

For Industrial Use Only. See Limitations on Use for supplemental information on intended applications including Medical Device applications., Cleaning and Coating Solvent

Restrictions on use

Novec™ Engineered Fluids are used in a wide variety of applications including but not limited to precision cleaning of medical devices and as a lubricant deposition solvent for medical devices. When the product is used for applications where the finished device is implanted into the human body, no residual Novec™ solvent may remain on the parts. It is highly recommended that the supporting test results and protocol be cited during FDA registration.

1.3. Supplier's details

Address:	3M India Limited, plot-48-51, Electronic city, Hosur road, Bangalore-560100
Telephone:	080-45543000, contact Product EHS team
E Mail:	productehs.in@mmm.com
Website:	http://solutions.3mindia.co.in

1.4. Emergency telephone number

080-45543000 (Contact hours: 8:00 AM to 5:00 PM)

SECTION 2: Hazard identification

Under MSIHC Rules, information is noted below on flammability, acute toxicity and explosivity relevant to this product. In line with international standards, information on other hazard classes and associated precautionary statements relevant to this product are included as well.

2.1. Classification of the substance or mixture

Serious Eye Damage/Irritation: Category 2A

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Specific Target Organ Toxicity (single exposure): Category 3.
Acute Aquatic Toxicity: Category 3.
Chronic Aquatic Toxicity: Category 3.

2.2. Label elements

Signal Word

WARNING!

Symbols

Exclamation mark |

Pictograms



HAZARD STATEMENTS:

H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.

H412 Harmful to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS

Prevention:

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

Response:

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Disposal:

P501 Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

2.3. Other hazards

In use, may form flammable/explosive vapour-air mixture.

SECTION 3: Composition/information on ingredients

This material is a mixture.

Ingredient	CAS Nbr	% by Wt
1,2-Trans-dichloroethylene	156-60-5	66 - 70
Ethyl nonafluoroisobutyl ether	163702-06-5	10 - 19
Ethyl nonafluorobutyl ether	163702-05-4	1 - 10
Methyl Nonafluoroisobutyl Ether	163702-08-7	5 - 10
Methyl Nonafluorobutyl Ether	163702-07-6	1 - 5
Propan-2-ol	67-63-0	1 - 3

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation

Remove person to fresh air. If you feel unwell, get medical attention.

Skin contact

Wash with soap and water. If you feel unwell, get medical attention.

Eye contact

Immediately flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. Get medical attention.

If swallowed

Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

See Section 11.1 Information on toxicological effects

4.3. Indication of any immediate medical attention and special treatment required

Not applicable

SECTION 5: Fire-fighting measures

5.1. Suitable Extinguishing media

Use a fire fighting agent suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture

Exposure to extreme heat can give rise to thermal decomposition. Material displays no closed-cup flash point but may form flammable/explosive vapor air mixture.

Hazardous Decomposition or By-Products

<u>Substance</u>	<u>Condition</u>
Carbon monoxide.	During combustion.
Carbon dioxide.	During combustion.
Hydrogen Chloride	During combustion.
Hydrogen Fluoride	During combustion.

5.3. Special protective actions for fire-fighters

When fire fighting conditions are severe and total thermal decomposition of the product is possible, wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, tunic and trousers (leggings), bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Keep away from sparks, flames, and extreme heat. Evacuate area. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions

Avoid release to the environment. For larger spills, cover drains and build dykes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up

Eliminate all potential ignition sources when cleaning up spill. Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and Safety Data Sheet. Seal the container. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Contents may be under pressure, open carefully. Avoid inhalation of thermal decomposition products. Avoid skin contact with hot material. For industrial/occupational use only. Not for consumer sale or use. Store work clothes separately from other clothing, food and tobacco products. Avoid breathing dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment. Avoid contact with oxidising agents (eg. chlorine, chromic acid etc.) No smoking: Smoking while using this product can result in contamination of the tobacco and/or smoke and lead to the formation of hazardous decomposition products. Keep away from sparks, flames, and extreme heat.

7.2. Conditions for safe storage including any incompatibilities

Store in a well-ventilated place. Keep container tightly closed. Store away from heat. Store at temperatures not exceeding 38C/100F. Store away from strong bases. Store away from oxidising agents.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	CAS Nbr	Agency	Limit type	Additional comments
1,2-Trans-dichloroethylene	156-60-5	ACGIH	TWA:200 ppm	
Ethyl nonafluorobutyl ether	163702-05-4	Manufacturer determined	TWA(as total isomers):200 ppm(2160 mg/m3)	
Ethyl nonafluoroisobutyl ether	163702-06-5	Manufacturer determined	TWA(as total isomers):200 ppm(2160 mg/m3)	
Methyl Nonafluorobutyl Ether	163702-07-6	AIHA	TWA:750 ppm	
Methyl Nonafluoroisobutyl Ether	163702-08-7	AIHA	TWA:750 ppm	
Propan-2-ol	67-63-0	ACGIH	TWA:200 ppm;STEL:400 ppm	A4: Not class. as human carcin

ACGIH : American Conference of Governmental Industrial Hygienists

AIHA : American Industrial Hygiene Association

CMRG : Chemical Manufacturer's Recommended Guidelines

TWA: Time-Weighted-Average

STEL: Short Term Exposure Limit

CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls

Provide appropriate local exhaust when product is heated. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapours/spray. If ventilation is not adequate, use respiratory protection equipment. Provide ventilation adequate to maintain vapor concentration below lower explosive concentration. EUH018_SUPP Provide ventilation adequate to maintain vapor

concentration below lower explosive concentration.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:

Indirect vented goggles.

Skin/hand protection

Chemical protective gloves are not required under normal use conditions. However, when the product is subjected to extreme heat, HF may be formed. For those cases, neoprene gloves and apron are recommended.

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:

During heating:

Use a positive pressure supplied-air respirator if there is a potential for over exposure from an uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.

Half facepiece or full facepiece air-purifying respirator suitable for organic vapours

Organic vapor respirators may have short service life.

For questions about suitability for a specific application, consult with your respirator manufacturer.

Thermal hazards

Wear heat insulating gloves when handling hot material to prevent thermal burns.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Liquid.
Specific Physical Form:	Liquid.
Color	Colorless
Odor	Slight Odor
Odour threshold	<i>No data available.</i>
pH	<i>Not applicable.</i>
Melting point/Freezing point: NA	<i>Not applicable.</i>
Boiling point/Initial boiling point/Boiling range	45 °C
Flash point	No flash point [<i>Details:</i> Tested according to ASTM Method D-3278-96 e-1]
Evaporation rate	<i>No data available.</i>
Flammability (solid, gas)	Not applicable.
Flammable Limits(LEL)	5.9 % volume [<i>Details:</i> Tested according to ASTM Method E681-98 (per Annex A1)]
Flammable Limits(UEL)	14.5 % volume [<i>Details:</i> Tested according to ASTM Method E681-98 (per Annex A1)]
Vapour pressure	47,995.9 Pa [@ 25 °C]
Vapor Density and/or Relative Vapor Density	2.26 [@ 25 °C] [<i>Ref Std:</i> AIR=1]

Density	1.27 g/ml
Relative density	1.27 [Ref Std: WATER=1]
Water solubility	Slight (less than 10%)
Solubility- non-water	No data available.
Partition coefficient: n-octanol/water	No data available.
Autoignition temperature	408 °C
Decomposition temperature	Not applicable.
Viscosity/Kinematic Viscosity	0.4 mPa-s
Volatile organic compounds (VOC)	889 g/l [Test Method: South Cost Air Qual Mgmt Dist]
Percent volatile	100 %
VOC less H2O & exempt solvents	889 g/l [Test Method: South Cost Air Qual Mgmt Dist]
Molecular weight	No data available.

Nanoparticles

This material does not contain nanoparticles.

SECTION 10: Stability and reactivity**10.1 Reactivity**

This material may be reactive with certain agents under certain conditions - see the remaining headings in this section

10.2 Chemical stability

Stable.

10.3 Possibility of hazardous reactions

Hazardous polymerisation will not occur.

10.4 Conditions to avoid

Heat.

Sparks and/or flames.

10.5 Incompatible materials

Strong bases.

Strong oxidising agents.

10.6 Hazardous decomposition products**Substance****Condition**

Carbon monoxide.	At elevated temperatures. - extreme conditions of heat
Carbon dioxide.	At elevated temperatures. - extreme conditions of heat
Hydrogen Chloride	At elevated temperatures. - extreme conditions of heat
Hydrogen Fluoride	At elevated temperatures. - extreme conditions of heat
Perfluoroisobutylene (PFIB).	At elevated temperatures. - extreme conditions of heat
Toxic vapour, gas, particulate.	At elevated temperatures. - extreme conditions of heat

Refer to section 5.2 for hazardous decomposition products during combustion.

If the product is exposed to extreme conditions of heat from misuse or equipment failure, toxic decomposition products that include hydrogen fluoride and perfluoroisobutylene can occur.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labelling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1 Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation

Respiratory tract irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause additional health effects (see below).

Skin contact

Contact with the skin during product use is not expected to result in significant irritation.

Eye contact

Severe eye irritation: Signs/symptoms may include significant redness, swelling, pain, tearing, cloudy appearance of the cornea, and impaired vision.

Ingestion

Gastrointestinal irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhoea. May cause additional health effects (see below).

Additional Health Effects:

Single exposure may cause target organ effects:

Central nervous system (CNS) depression: Signs/symptoms may include headache, dizziness, drowsiness, incoordination, nausea, slowed reaction time, slurred speech, giddiness, and unconsciousness.

Toxicological Data

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Dermal		No data available; calculated ATE >5,000 mg/kg
Overall product	Inhalation-Vapor(4 hr)		No data available; calculated ATE >50 mg/l
Overall product	Ingestion		No data available; calculated ATE >5,000 mg/kg
1,2-Trans-dichloroethylene	Dermal	Rabbit	LD50 > 5,000 mg/kg
1,2-Trans-dichloroethylene	Inhalation-Vapor (4 hours)	Rat	LC50 95.6 mg/l
1,2-Trans-dichloroethylene	Ingestion	Rat	LD50 7,902 mg/kg
Ethyl nonafluoroisobutyl ether	Dermal		LD50 estimated to be 2,000 - 5,000 mg/kg
Ethyl nonafluoroisobutyl ether	Inhalation-Vapor (4 hours)	Rat	LC50 > 989 mg/l
Ethyl nonafluoroisobutyl ether	Ingestion	Rat	LD50 > 2,000 mg/kg
Ethyl nonafluorobutyl ether	Dermal		LD50 estimated to be 2,000 - 5,000 mg/kg
Ethyl nonafluorobutyl ether	Inhalation-	Rat	LC50 > 989 mg/l

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	Vapor (4 hours)		
Ethyl nonafluorobutyl ether	Ingestion	Rat	LD50 > 2,000 mg/kg
Methyl Nonafluoroisobutyl Ether	Dermal		LD50 estimated to be > 5,000 mg/kg
Methyl Nonafluoroisobutyl Ether	Inhalation-Vapor (4 hours)	Rat	LC50 > 1,000 mg/l
Methyl Nonafluoroisobutyl Ether	Ingestion	Rat	LD50 > 5,000 mg/kg
Methyl Nonafluorobutyl Ether	Dermal		LD50 estimated to be > 5,000 mg/kg
Methyl Nonafluorobutyl Ether	Inhalation-Vapor (4 hours)	Rat	LC50 > 1,000 mg/l
Methyl Nonafluorobutyl Ether	Ingestion	Rat	LD50 > 5,000 mg/kg
Propan-2-ol	Dermal	Rabbit	LD50 12,870 mg/kg
Propan-2-ol	Inhalation-Vapor (4 hours)	Rat	LC50 72.6 mg/l
Propan-2-ol	Ingestion	Rat	LD50 4,710 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
1,2-Trans-dichloroethylene	Rabbit	Minimal irritation
Ethyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Ethyl nonafluorobutyl ether	Rabbit	No significant irritation
Methyl Nonafluoroisobutyl Ether	Rabbit	No significant irritation
Methyl Nonafluorobutyl Ether	Rabbit	No significant irritation
Propan-2-ol	Multiple animal species	No significant irritation

Serious Eye Damage/Irritation

Name	Species	Value
1,2-Trans-dichloroethylene	Rabbit	Moderate irritant
Ethyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Ethyl nonafluorobutyl ether	Rabbit	No significant irritation
Methyl Nonafluoroisobutyl Ether	Rabbit	No significant irritation
Methyl Nonafluorobutyl Ether	Rabbit	No significant irritation
Propan-2-ol	Rabbit	Severe irritant

Sensitization:**Skin Sensitisation**

Name	Species	Value
Ethyl nonafluoroisobutyl ether	Guinea pig	Not classified
Ethyl nonafluorobutyl ether	Guinea pig	Not classified
Methyl Nonafluoroisobutyl Ether	Guinea pig	Not classified
Methyl Nonafluorobutyl Ether	Guinea pig	Not classified
Propan-2-ol	Guinea pig	Not classified

Respiratory Sensitisation

For the component/components, either no data are currently available or the data are not sufficient for classification.

Germ Cell Mutagenicity

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Name	Route	Value
1,2-Trans-dichloroethylene	In Vitro	Not mutagenic
1,2-Trans-dichloroethylene	In vivo	Not mutagenic
Ethyl nonafluoroisobutyl ether	In Vitro	Not mutagenic
Ethyl nonafluoroisobutyl ether	In vivo	Not mutagenic
Ethyl nonafluorobutyl ether	In Vitro	Not mutagenic
Ethyl nonafluorobutyl ether	In vivo	Not mutagenic
Methyl Nonafluoroisobutyl Ether	In Vitro	Not mutagenic
Methyl Nonafluoroisobutyl Ether	In vivo	Not mutagenic
Methyl Nonafluorobutyl Ether	In Vitro	Not mutagenic
Methyl Nonafluorobutyl Ether	In vivo	Not mutagenic
Propan-2-ol	In Vitro	Not mutagenic
Propan-2-ol	In vivo	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
Propan-2-ol	Inhalation	Rat	Some positive data exist, but the data are not sufficient for classification

Reproductive Toxicity
Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test result	Exposure Duration
1,2-Trans-dichloroethylene	Inhalation	Not classified for development	Rat	NOAEL 24 mg/l	during organogenesis
Ethyl nonafluoroisobutyl ether	Inhalation	Not classified for development	Rat	NOAEL 260 mg/l	during gestation
Ethyl nonafluorobutyl ether	Inhalation	Not classified for development	Rat	NOAEL 260 mg/l	during gestation
Methyl Nonafluoroisobutyl Ether	Inhalation	Not classified for female reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl Nonafluoroisobutyl Ether	Inhalation	Not classified for male reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl Nonafluoroisobutyl Ether	Inhalation	Not classified for development	Rat	NOAEL 307 mg/l	during gestation
Methyl Nonafluorobutyl Ether	Inhalation	Not classified for female reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl Nonafluorobutyl Ether	Inhalation	Not classified for male reproduction	Rat	NOAEL 129 mg/l	1 generation
Methyl Nonafluorobutyl Ether	Inhalation	Not classified for development	Rat	NOAEL 307 mg/l	during gestation
Propan-2-ol	Ingestion	Not classified for development	Rat	NOAEL 400 mg/kg/day	during organogenesis
Propan-2-ol	Inhalation	Not classified for development	Rat	LOAEL 9 mg/l	during gestation

Target Organ(s)
Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test result	Exposure Duration
1,2-Trans-dichloroethylene	Inhalation	central nervous system depression	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	occupational exposure
1,2-Trans-dichloroethylene	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		NOAEL Not available	
1,2-Trans-dichloroethylene	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Rat	LOAEL 4,500 mg/kg	not applicable
Ethyl nonafluoroisobutyl ether	Inhalation	cardiac sensitization	Some positive data exist, but the data are not sufficient for classification	Dog	NOAEL 204 mg/l	17 minutes

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Ethyl nonafluoroisobutyl ether	Inhalation	respiratory irritation	Not classified	Rat	NOAEL 989 mg/l	4 hours
Ethyl nonafluorobutyl ether	Inhalation	cardiac sensitization	Some positive data exist, but the data are not sufficient for classification	Dog	NOAEL 204 mg/l	17 minutes
Ethyl nonafluorobutyl ether	Inhalation	respiratory irritation	Not classified	Rat	NOAEL 989 mg/l	4 hours
Methyl Nonafluoroisobutyl Ether	Inhalation	nervous system	Not classified	Dog	LOAEL 913 mg/l	10 minutes
Methyl Nonafluoroisobutyl Ether	Inhalation	cardiac sensitization	Not classified	Dog	NOAEL 913 mg/l	10 minutes
Methyl Nonafluorobutyl Ether	Inhalation	nervous system	Not classified	Dog	LOAEL 913 mg/l	10 minutes
Methyl Nonafluorobutyl Ether	Inhalation	cardiac sensitization	Not classified	Dog	NOAEL 913 mg/l	10 minutes
Propan-2-ol	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Propan-2-ol	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	
Propan-2-ol	Inhalation	auditory system	Not classified	Guinea pig	NOAEL 13.4 mg/l	24 hours
Propan-2-ol	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	poisoning and/or abuse

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test result	Exposure Duration
1,2-Trans-dichloroethylene	Inhalation	endocrine system liver kidney and/or bladder respiratory system	Not classified	Rat	NOAEL 16 mg/l	90 days
1,2-Trans-dichloroethylene	Ingestion	kidney and/or bladder	Not classified	Rat	NOAEL 2,000 mg/kg/day	14 weeks
1,2-Trans-dichloroethylene	Ingestion	blood liver	Not classified	Rat	NOAEL 125 mg/kg/day	14 weeks
1,2-Trans-dichloroethylene	Ingestion	heart immune system respiratory system	Not classified	Rat	NOAEL 2,000 mg/kg/day	14 weeks
Ethyl nonafluoroisobutyl ether	Inhalation	liver kidney and/or bladder respiratory system heart endocrine system gastrointestinal tract bone marrow hematopoietic system immune system nervous system	Not classified	Rat	NOAEL 263.4 mg/l	4 weeks
Ethyl nonafluoroisobutyl ether	Ingestion	blood liver kidney and/or bladder heart endocrine system bone marrow hematopoietic system immune system nervous system respiratory system	Not classified	Rat	NOAEL 1,000 mg/kg/day	28 days
Ethyl nonafluorobutyl ether	Inhalation	liver kidney and/or bladder respiratory system heart endocrine system gastrointestinal tract bone marrow hematopoietic system immune	Not classified	Rat	NOAEL 263.4 mg/l	4 weeks

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		system nervous system				
Ethyl nonafluorobutyl ether	Ingestion	blood liver kidney and/or bladder heart endocrine system bone marrow hematopoietic system immune system nervous system respiratory system	Not classified	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl Nonafluoroisobutyl Ether	Inhalation	liver	Not classified	Rat	NOAEL 155 mg/l	13 weeks
Methyl Nonafluoroisobutyl Ether	Inhalation	bone, teeth, nails, and/or hair	Not classified	Rat	NOAEL 129 mg/l	11 weeks
Methyl Nonafluoroisobutyl Ether	Inhalation	heart skin endocrine system gastrointestinal tract hematopoietic system immune system muscles nervous system eyes kidney and/or bladder respiratory system	Not classified	Rat	NOAEL 155 mg/l	13 weeks
Methyl Nonafluoroisobutyl Ether	Ingestion	endocrine system liver heart hematopoietic system immune system nervous system eyes kidney and/or bladder respiratory system	Not classified	Rat	NOAEL 1,000 mg/kg/day	28 days
Methyl Nonafluorobutyl Ether	Inhalation	liver	Not classified	Rat	NOAEL 155 mg/l	13 weeks
Methyl Nonafluorobutyl Ether	Inhalation	bone, teeth, nails, and/or hair	Not classified	Rat	NOAEL 129 mg/l	11 weeks
Methyl Nonafluorobutyl Ether	Inhalation	heart skin endocrine system gastrointestinal tract hematopoietic system immune system muscles nervous system eyes kidney and/or bladder respiratory system	Not classified	Rat	NOAEL 155 mg/l	13 weeks
Methyl Nonafluorobutyl Ether	Ingestion	endocrine system liver heart hematopoietic system immune system nervous system eyes kidney and/or bladder respiratory system	Not classified	Rat	NOAEL 1,000 mg/kg/day	28 days
Propan-2-ol	Inhalation	kidney and/or bladder	Not classified	Rat	NOAEL 12.3 mg/l	24 months
Propan-2-ol	Inhalation	nervous system	Not classified	Rat	NOAEL 12 mg/l	13 weeks
Propan-2-ol	Ingestion	kidney and/or bladder	Not classified	Rat	NOAEL 400 mg/kg/day	12 weeks

Aspiration Hazard

For the component/components, either no data are currently available or the data are not sufficient for classification.

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Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. Additional information leading to material classification in Section 2 is available upon request. In addition, environmental fate and effects data on ingredients may not be reflected in this section because an ingredient is present below the threshold for labelling, an ingredient is not expected to be available for exposure, or the data is considered not relevant to the material as a whole.

12.1. Toxicity**Acute aquatic hazard:**

GHS Acute 3: Harmful to aquatic life.

Chronic aquatic hazard:

GHS Chronic 3: Harmful to aquatic life with long lasting effects.

Material	Organism	Type	Exposure	Test endpoint	Test result
3M™ Novec™ 72DA Engineered Fluid	Water flea	Calculated-Additive Toxicity	48 hours	EC50	>300 mg/l
3M™ Novec™ 72DA Engineered Fluid	Bluegill	Calculated-Additive Toxicity	96 hours	LC50	>190 mg/l

Material	CAS Nbr	Organism	Type	Exposure	Test endpoint	Test result
Ethyl nonafluoroisobutyl ether	163702-06-5	Green algae	Estimated	72 hours	Effect Concentration 10%	2.37 mg/l
Ethyl nonafluorobutyl ether	163702-05-4	Green algae	Estimated	72 hours	Effect Concentration 10%	2.37 mg/l
Methyl Nonafluoroisobutyl Ether	163702-08-7	Green Algae	Estimated	72 hours	NOEC	100 mg/l
Methyl Nonafluorobutyl Ether	163702-07-6	Green Algae	Estimated	72 hours	NOEC	100 mg/l
Propan-2-ol	67-63-0	Green algae	Experimental	72 hours	NOEC	1,000 mg/l
Propan-2-ol	67-63-0	Water flea	Experimental	21 days	NOEC	100 mg/l

12.2. Persistence and degradability

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
1,2-Trans-dichloroethylene	156-60-5	Experimental Photolysis		Photolytic half-life (in air)	13 days (t 1/2)	Other methods
1,2-Trans-dichloroethylene	156-60-5	Experimental Biodegradation	28 days	BOD	8 % weight	OECD 301D - Closed bottle test
Ethyl nonafluoroisob	163702-06-5	Estimated Biodegradation	28 days	BOD	0 % BOD/ThBOD	OECD 301D - Closed bottle test

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ethyl ether						
Ethyl nonafluorobutyl ether	163702-05-4	Estimated Biodegradation	28 days	BOD	0 % BOD/ThBOD	OECD 301D - Closed bottle test
Methyl Nonafluoroisobutyl Ether	163702-08-7	Estimated Biodegradation	28 days	BOD	22 % BOD/ThBOD	OECD 301D - Closed bottle test
Methyl Nonafluorobutyl Ether	163702-07-6	Estimated Biodegradation	28 days	BOD	22 % BOD/ThBOD	OECD 301D - Closed bottle test
Propan-2-ol	67-63-0	Experimental Biodegradation	14 days	BOD	86 % BOD/ThBOD	OECD 301C - MITI test (I)

12.3 : Bioaccumulative potential

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
1,2-Trans-dichloroethylene	156-60-5	Experimental Bioconcentration		Log Kow	2.09	Other methods
Methyl Nonafluoroisobutyl Ether	163702-08-7	Estimated Bioconcentration		Log Kow	4.0	Other methods
Methyl Nonafluorobutyl Ether	163702-07-6	Estimated Bioconcentration		Log Kow	4.0	Other methods
Propan-2-ol	67-63-0	Experimental Bioconcentration		Log Kow	0.05	Other methods

12.4. Mobility in soil

Please contact manufacturer for more details

12.5 Other Adverse effects

No information available.

SECTION 13: Disposal considerations**13.1. Disposal methods**

Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. Combustion products will include halogen acid (HCl/HF/HBr). Facility must be capable of handling halogenated materials. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

SECTION 14: Transport Information

Not hazardous for transportation.

Air Transport (IATA) Regulations

3M™ Novec™ 72DA Engineered Fluid

UN No Not applicable
Proper Shipping Name Not applicable
Hazard Class/Division Not applicable
Subsidiary Risk Not applicable
Packing Group: Not applicable

Marine Transport (IMDG)

UN No Not applicable
Proper Shipping Name Not applicable
Hazard Class/Division Not applicable
Subsidiary Risk Not applicable
Packing Group: Not applicable
Environmental Hazards: Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Global inventory status

Contact 3M for more information. One or more of the components of this product have been notified to ELINCS (European List of Notified or New Chemical Substances). Certain restrictions apply. Contact the selling division for additional information. The components of this material are in compliance with the provisions of the Korea Chemical Control Act. Certain restrictions may apply. Contact the selling division for additional information. The components of this material are in compliance with the provisions of Japan Chemical Substance Control Law. Certain restrictions may apply. Contact the selling division for additional information. The components of this product are in compliance with the new substance notification requirements of CEPA. This product complies with Measures on Environmental Management of New Chemical Substances. All ingredients are listed on or exempt from on China IECSC inventory. The components of this product are in compliance with the chemical notification requirements of TSCA. All required components of this product are listed on the active portion of the TSCA Inventory.

Applicable Environmental, Health and Safety Regulations

The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989
Hazardous Waste(Management , Handling & Transboundary) Rules, 2008
Hazardous Chemicals (Classification, Packaging and Labelling Draft Rules), 2011

The following ingredients are listed as hazardous on Part II of Schedule I of the India Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) rules

Propan-2-ol

The following ingredients are classified as hazardous based on the criteria listed under Part I of Schedule I of the India Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) rules:

The product is classified as Non-Hazardous.

SECTION 16: Other information

NFPA Hazard Classification

Health: 3 **Flammability:** 1 **Instability:** 0 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

Revision information:

Section 14: Packing group (IMO) information was added.
Company Telephone information was modified.

Section 1: Emergency telephone information was modified.
Section 1: Product name information was modified.
Section 2: Hazard - Other information was modified.
Label: GHS Classification information was modified.
Label: GHS Environmental Hazard Statements information was added.
Label: GHS Precautionary - Disposal information was added.
Section 2: Ingredient table information was modified.
Section 5: Fire - Extinguishing media information information was modified.
Section 5: Fire - Special hazards information information was modified.
Section 5: Hazardous combustion products table information was modified.
Section 6: Accidental release clean-up information information was modified.
Section 6: Accidental release personal information information was modified.
Section 7: Conditions safe storage information was modified.
Section 7: Precautions safe handling information information was modified.
Section 8: Appropriate Engineering controls information information was modified.
Section 8: Occupational exposure limit table information was modified.
Section 8: Personal Protection - Respiratory Information information was modified.
Section 8: Personal Protection - Skin/body information information was deleted.
Section 8: Personal Protection - Skin/hand information information was modified.
Section 8: Respiratory protection - recommended respirators information information was modified.
Section 8: Skin protection - protective clothing information information was deleted.
Section 8: Skin protection - recommended gloves information information was deleted.
Section 8: Skin protection - recommended gloves text information was deleted.
Section 09: Color information was added.
Section 09: Nanoparticle information was added.
Section 09: Odor information was added.
Sections 3 and 9: Odour, colour, grade information information was deleted.
Section 09: Percent Volatile information was added.
Section 9: Property description for optional properties information was added.
Section 9: Property description for optional properties information was deleted.
Section 09: Vapor Density Value information was added.
Section 9: Vapour density value information was deleted.
Section 9: Viscosity information information was deleted.
Section 09: Viscosity information was added.
Section 09: VOC Less H₂O & Exempt Solvents information was added.
Section 09: Volatile Organic Compounds information was added.
Section 10: Conditions to avoid physical property information was modified.
Section 10: Hazardous decomposition or by-products table information was modified.
Section 11: Acute Toxicity table information was modified.
Section 11: Germ Cell Mutagenicity Table information was modified.
Section 11: Health Effects - Ingestion information information was modified.
Section 11: Health Effects - Inhalation information information was modified.
Section 11: Reproductive Toxicity Table information was modified.
Section 11: Serious Eye Damage/Irritation Table information was modified.
Section 11: Skin Corrosion/Irritation Table information was modified.
Section 11: Skin Sensitization Table information was modified.
Section 11: Target Organs - Repeated Table information was modified.
Section 11: Target Organs - Single Table information was modified.
Section 12: Acute aquatic hazard information information was modified.
Section 12: Chronic aquatic hazard information information was modified.
Section 12: Component ecotoxicity information information was modified.
Section 12: Material ecotoxicity information information was modified.
Section 12: Persistence and Degradability information information was modified.
Section 12: Bioaccumulative potential information information was modified.
Section 13: 13.1. Waste disposal note information was modified.
Section 13: Standard Phrase Category Waste GHS information was modified.

Section 14: Environmental hazards information was added.

Section 14: IMO Subsidiary Risk information was added.

Section 14: IMO transport hazard classes information was added.

Section 14: Proper Shipping Name (IMO) information was added.

Section 14: UN Number (IMO) information was added.

Section 15: Applicable Environmental, Health and Safety Regulations information was modified.

Section 15: MSIHC Part I of Schedule I ingredients information was modified.

Section 15: Regulations - Inventories information was modified.

Section 16: UK disclaimer information was deleted.

DISCLAIMER: The information on this Safety Data Sheet is based on our experience and is correct to the best of our knowledge at the date of publication, but we do not accept any liability for any loss, damage or injury resulting from its use (except as required by law). The information may not be valid for any use not referred to in this Data Sheet or use of the product in combination with other materials. For these reasons, it is important that customers carry out their own test to satisfy themselves as to the suitability of the product for their own intended applications.

3M India SDSs are available at <http://solutions.3mindia.co.in>