Safety Data Sheet

Document group:	16-3042-5	**Version number:**	11.00
Issue Date:	28/11/2022	**Supersedes date:**	12/06/2022

This Safety Data Sheet has been prepared in accordance with the Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice (Safe Work Australia, December 2011)

SECTION 1: Identification

1.1. Product identifier
3M Novec 72DE Engineered Fluid

Product Identification Numbers
98-0212-2968-1 98-0212-3162-0

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.

For Industrial or Professional use only.

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 lubricant deposition solvents 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. 3M Electronics Materials Solutions Division (EMSD) will not knowingly sample, support, or sell its products for incorporation in medical and pharmaceutical products and applications in which the 3M product will be temporarily or permanently implanted into humans or animals. The customer is responsible for evaluating and determining that a 3M EMSD product is suitable and appropriate for its particular use and intended application. The conditions of evaluation, selection, and use of a 3M product can vary widely and affect the use and intended application of a 3M product. Because many of these conditions are uniquely within the user's knowledge and control, it is essential that the user evaluate and determine whether the 3M product is suitable and appropriate for a particular use and intended application, and complies with all local applicable laws, regulations, standards, and guidance.

1.3. Supplier’s details
Address: 3M Australia - Building A, 1 Rivett Road, North Ryde NSW 2113
Telephone: 136 136
E Mail: productinfo.au@mmm.com
Website: www.3m.com.au

1.4. Emergency telephone number
EMERGENCY: 1800 097 146 (Australia only)

SECTION 2: Hazard identification

This product is classified as a hazardous chemical according to the Model Work Health and Safety Regulations, 2011, in accordance with applicable State and Territory legislation.

Refer to Section 14 of this Safety Data Sheets for product Dangerous Goods Classification.

2.1. Classification of the substance or mixture
Serious Eye Damage/Irritation: Category 2.
Specific Target Organ Toxicity (single exposure): Category 3

2.2. Label elements
The label elements below were prepared in accordance with the Code of Practice on Preparation of Safety Data Sheets for Hazardous Chemicals (Safe Work Australia, December 2011). This information may be different from the actual product label.

Signal word
Warning

Symbols
Exclamation mark |

Pictograms

Hazard statements

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

Precautionary statements

Prevention:

P264	Wash thoroughly after handling.

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.
P337 + P313	IF eye irritation persists: Get medical advice/attention.

2.3. Other assigned/identified product hazards
In use, may form flammable/explosive vapour-air mixture.

2.4. Other hazards which do not result in classification
Harmful to aquatic life with long lasting effects.

SECTION 3: Composition/information on ingredients

This material is a mixture.

Ingredient	CAS Nbr	% by Weight
1,2-Trans-dichloroethylene	156-60-5	68 - 72

Ethyl nonafluoroisobutyl ether	163702-06-5	10 - 20
Ethyl nonafluorobutyl ether	163702-05-4	1 - 10
Methyl nonafluoroisobutyl ether	163702-08-7	5 - 10
Methyl nonafluorobutyl ether	163702-07-6	1 - 5

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
Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, 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

Central nervous system depression (headache, dizziness, drowsiness, incoordination, nausea, slurred speech, giddiness, and unconsciousness).

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

Substance	Condition
Carbon monoxide.	During combustion.
Carbon dioxide.	During combustion.
Hydrogen Chloride	During combustion.
Hydrogen Fluoride	During combustion.

5.3. Special protective actions for fire-fighters
Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, 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 authorised 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. 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	

ACGIH : American Conference of Governmental Industrial Hygienists
AIHA : American Industrial Hygiene Association
Australia OELs : Australia. Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment
CMRG : Chemical Manufacturer's Recommended Guidelines
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
CEIL: Ceiling
Sen: Sensitiser
Sk: Absorption through the skin may be a significant source of exposure.

8.2. Exposure controls

8.2.1. Engineering controls
For those situations where the material might be exposed to extreme overheating due to misuse or equipment failure, use with appropriate local exhaust ventilation sufficient to maintain levels of thermal decomposition products below their exposure guidelines. 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.

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.

Select and use eye protection in accordance with AS/NZS 1336. Eye protection should comply with the performance specifications of AS/NZS 1337.

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:
For those situations where the material might be exposed to extreme overheating due to misuse or equipment failure, use a positive pressure supplied-air respirator.
Half facepiece or full facepiece air-purifying respirator suitable for organic vapours
Organic vapour respirators may have short service life.

For questions about suitability for a specific application, consult with your respirator manufacturer.
Select and use respirators according to AS/NZS 1715. Respirators should comply with AS/NZS 1716 performance specifications. For information about respirators, call 3M on 1800 024 464.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Liquid.
Specific Physical Form:	Liquid.
Colour	Colorless
Odour	Slight Odour
Odour threshold	*No data available.*
pH	*Not applicable.*
Melting point/Freezing point	*Not applicable.*
Boiling point/Initial boiling point/Boiling range	43 ºC
Flash point	No flash point [*Details:*Tested according to ASTM method D 3278-96]
Evaporation rate	*No data available.*
Flammability (solid, gas)	Not applicable.

Flammable Limits(LEL)	7.3 % volume [*Details:*@ 25 C, Tested according to ASTM method E-681-98 (per Annex A1)]
Flammable Limits(UEL)	15 % volume [*Details:*@ 25 C, Tested according to ASTM method E-681-98 (per Annex A1)]
Vapour pressure	46,662.7 Pa [@ 25 ºC]
Vapor Density and/or Relative Vapor Density	*No data available.*
Density	1.28 g/ml
Relative density	1.28 [*Ref Std:*WATER=1]
Water solubility	Negligible
Solubility- non-water	*No data available.*
Partition coefficient: n-octanol/water	*No data available.*
Autoignition temperature	396 ºC
Decomposition temperature	*Not applicable.*
Viscosity/Kinematic Viscosity	0.45 mPa-s
Volatile organic compounds (VOC)	896 g/l [*Test Method:*South Cost Air Qual Mgmt Dist]
Percent volatile	100 %
VOC less H2O & exempt solvents	896 g/l [*Test Method:*calculated SCAQMD rule 443.1]
Molecular weight	*No data available.*

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. Conditions to avoid
Heat.
Sparks and/or flames.

10.4. Possibility of hazardous reactions
Hazardous polymerisation will not occur.

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

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
Moderate eye irritation: Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy 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	Ingestion		No data available; calculated ATE >5,000 mg/kg
Overall product	Inhalation-Vapour (4 hours)	Rat	LC50 > 19.7 mg/l
1,2-Trans-dichloroethylene	Dermal	Rabbit	LD50 > 5,000 mg/kg
1,2-Trans-dichloroethylene	Inhalation-Vapour (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-Vapour (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
Methyl nonafluoroisobutyl ether	Dermal		LD50 estimated to be > 5,000 mg/kg

Ethyl nonafluorobutyl ether	Inhalation-Vapour (4 hours)	Rat	LC50 > 989 mg/l
Ethyl nonafluorobutyl ether	Ingestion	Rat	LD50 > 2,000 mg/kg
Methyl nonafluoroisobutyl ether	Inhalation-Vapour (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-Vapour (4 hours)	Rat	LC50 > 1,000 mg/l
Methyl nonafluorobutyl ether	Ingestion	Rat	LD50 > 5,000 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

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

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

Respiratory Sensitisation

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

Germ Cell Mutagenicity

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

Carcinogenicity

For the component/components, either no data are currently available or 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

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
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	Inhalation	respiratory	Not classified	Rat	NOAEL 989	4 hours

nonafluorobutyl ether		irritation			mg/l	
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

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 nonafluorobut	Inhalation	liver | kidney and/or bladder |	Not classified	Rat	NOAEL 263.4 mg/l	4 weeks

yl ether		respiratory system | heart | endocrine system | gastrointestinal tract | bone marrow | hematopoietic system | immune 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	Inhalation	heart | skin |	Not classified	Rat	NOAEL 155	13 weeks

nonafluorobutyl ether		endocrine system | gastrointestinal tract | hematopoietic system | immune system | muscles | nervous system | eyes | kidney and/or bladder | respiratory system			mg/l	
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

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

Exposure Levels
Refer Section **8.1 Control Parameters** of this Safety Data Sheet.

Interactive Effects
Not determined.

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.

No product test data available.

Material	CAS Number	Organism	Type	Exposure	Test endpoint	Test result
1,2-Trans-dichloroethylene	156-60-5	Bluegill	Estimated	96 hours	LC50	135 mg/l
1,2-Trans-dichloroethylene	156-60-5	Green algae	Experimental	48 hours	EC50	36.36 mg/l
1,2-Trans-dichloroethylene	156-60-5	Water flea	Experimental	48 hours	LC50	220 mg/l

1,2-Trans-dichloroethylene	156-60-5	Anaerobic sludge	Experimental	96 hours	IC50	48 mg/l
Ethyl nonafluoroisobutyl ether	163702-06-5	Fathead minnow	Estimated	96 hours	No tox obs at lmt of water sol	>100 mg/l
Ethyl nonafluoroisobutyl ether	163702-06-5	Green algae	Estimated	72 hours	No tox obs at lmt of water sol	>100 mg/l
Ethyl nonafluoroisobutyl ether	163702-06-5	Water flea	Estimated	48 hours	No tox obs at lmt of water sol	>100 mg/l
Ethyl nonafluoroisobutyl ether	163702-06-5	Green algae	Estimated	72 hours	EC10	2.37 mg/l
Ethyl nonafluorobutyl ether	163702-05-4	Fathead minnow	Estimated	96 hours	No tox obs at lmt of water sol	>100 mg/l
Ethyl nonafluorobutyl ether	163702-05-4	Green algae	Estimated	72 hours	No tox obs at lmt of water sol	>100 mg/l
Ethyl nonafluorobutyl ether	163702-05-4	Water flea	Estimated	48 hours	No tox obs at lmt of water sol	>100 mg/l
Ethyl nonafluorobutyl ether	163702-05-4	Green algae	Estimated	72 hours	EC10	2.37 mg/l
Methyl nonafluoroisobutyl ether	163702-08-7	Fathead minnow	Endpoint not reached	96 hours	LC50	>100 mg/l
Methyl nonafluoroisobutyl ether	163702-08-7	Green algae	Estimated	72 hours	EC50	>100 mg/l
Methyl nonafluoroisobutyl ether	163702-08-7	Water flea	Estimated	48 hours	EC50	>100 mg/l
Methyl nonafluoroisobutyl ether	163702-08-7	Green algae	Estimated	72 hours	NOEC	100 mg/l
Methyl nonafluorobutyl ether	163702-07-6	Fathead minnow	Endpoint not reached	96 hours	LC50	>100 mg/l
Methyl nonafluorobutyl ether	163702-07-6	Green algae	Estimated	72 hours	EC50	>100 mg/l
Methyl nonafluorobutyl ether	163702-07-6	Water flea	Estimated	48 hours	EC50	>100 mg/l
Methyl nonafluorobutyl ether	163702-07-6	Green algae	Estimated	72 hours	NOEC	100 mg/l

12.2. Persistence and degradability

Material	CAS Number	Test type	Duration	Study Type	Test result	Protocol
1,2-Trans-dichloroethylene	156-60-5	Experimental Biodegradation	28 days	Percent degraded	8 %BOD/ThOD	OECD 301D - Closed bottle test
1,2-Trans-dichloroethylene	156-60-5	Experimental Photolysis		Photolytic half-life (in air)	13 days (t 1/2)	
Ethyl nonafluoroisobutyl ether	163702-06-5	Estimated Biodegradation	28 days	BOD	0 %BOD/ThOD	OECD 301D - Closed bottle test
Ethyl nonafluorobutyl	163702-05-4	Estimated Biodegradation	28 days	BOD	0 %BOD/ThOD	OECD 301D - Closed bottle test

ether						
Methyl nonafluoroisobutyl ether	163702-08-7	Estimated Biodegradation	28 days	BOD	22 %BOD/ThOD	OECD 301D - Closed bottle test
Methyl nonafluorobutyl ether	163702-07-6	Estimated Biodegradation	28 days	BOD	22 %BOD/ThOD	OECD 301D - Closed bottle test

12.3 : Bioaccumulative potential

Material	CAS Number	Test type	Duration	Study Type	Test result	Protocol
1,2-Trans-dichloroethylene	156-60-5	Experimental Bioconcentration		Log Kow	2.06	
Ethyl nonafluoroisobutyl ether	163702-06-5	Data not available or insufficient for classification	N/A	N/A	N/A	N/A
Ethyl nonafluorobutyl ether	163702-05-4	Data not available or insufficient for classification	N/A	N/A	N/A	N/A
Methyl nonafluoroisobutyl ether	163702-08-7	Estimated Bioconcentration		Log Kow	4.0	
Methyl nonafluorobutyl ether	163702-07-6	Estimated Bioconcentration		Log Kow	4.0	

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.

SECTION 14: Transport Information

Australian Dangerous Goods Code (ADG) - Road/Rail Transport
UN No.: Not applicable.
Proper shipping name: Not applicable.
Class/Division: Not applicable.
Sub Risk: Not applicable.
Packing Group: Not applicable.

Hazchem Code: Not applicable
IERG: Not applicable.

International Air Transport Association (IATA) - Air Transport
UN No.: Not applicable.
Proper shipping name: Not applicable.
Class/Division: Not applicable.
Sub Risk: Not applicable.

Packing Group: Not applicable.

International Maritime Dangerous Goods Code (IMDG)- Marine Transport
UN No.: Not applicable.
Proper shipping name: Not applicable.
Class/Division: Not applicable.
Sub Risk: Not applicable.
Packing Group: Not applicable.
Marine Pollutant: Not applicable.

SECTION 15: Regulatory information

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

Australian Inventory Status:
All components of this product are listed on or exempt from the Australian Inventory of Industrial Chemicals (AIIC). Conditions may apply prior to introduction for direct importers of this product, Please contact 3M Australia on 136 136 for further details.

Poison Schedule: This product is intended for Industrial or Professional Use only and therefore is not packaged and labelled in accordance with the requirements of the Standard for the Uniform Scheduling of Medicines and Poisons.

SECTION 16: Other information

Revision information:
Complete document review.

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 Safety 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.
Greenguard ® is a United States based program. The ‘Low VOC’ reference related to United States Federal and State regulations exemptions for some solvents.

3M Australia SDSs are available at www.3m.com.au