



## Safety Data Sheet

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This Safety Data Sheet has been prepared in accordance with the SS586 Specification for Hazard Communication for Hazardous Chemicals and Dangerous Goods.

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### SECTION 1: Identification

#### 1.1. Product identifier

3M™ Novec™ 1700 Electronic Grade Coating

#### Product Identification Numbers

98-0212-2977-2      98-0212-2993-9      98-0212-2994-7      98-0212-2995-4      98-0212-3697-5

#### 1.2. Recommended use and restrictions on use

##### Recommended use

Protective barrier coating. For industrial use only. Not intended for use as a medical device or drug.

##### Restrictions on use

One or more components in this material are approved for specific commercial use(s) under a U.S. EPA low volume exemption. Approved commercial use: Coating for components in electronic devices.

3M Electronics Markets Materials Division (EMMD) 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 EMMD 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 Technologies (S) Pte Ltd, 10 Ang Mo Kio Street 65, Singapore 569059  
**Telephone:** +65 6450 8888  
**Website:** www.3m.com.sg

#### 1.4. Emergency telephone number

+65 6591 6888 (8.15am - 5.00pm, Monday - Friday)

### SECTION 2: Hazard identification

#### 2.1. Classification of the substance or mixture

This product is not classified as hazardous per GHS criteria as implemented by Singapore Standard SS586.

## 2.2. Label elements

### SIGNAL WORD

Not applicable.

### Symbols

Not applicable.

### Pictograms

Not applicable.

## 2.3. Other hazards

None known.

## SECTION 3: Composition/information on ingredients

This material is a mixture.

Ingredient	CAS Nbr	% by Wt
Methyl nonafluorobutyl ether	163702-07-6	20 - 80
Methyl nonafluoroisobutyl ether	163702-08-7	20 - 80
Fluoroaliphatic polymer	Trade Secret	< 5

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

#### Inhalation

Remove person to fresh air. If you are concerned, get medical advice.

#### Skin contact

Wash with soap and water. If signs/symptoms develop, 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

No need for first aid is anticipated.

### 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

Non-combustible. Use a fire fighting agent suitable for surrounding fire.

### 5.2. Special hazards arising from the substance or mixture

Exposure to extreme heat can give rise to thermal decomposition.

**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**

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.

**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**

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 metal 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**

Avoid inhalation of thermal decomposition products. For industrial or professional use only. Store work clothes separately from other clothing, food and tobacco products. Avoid release to the environment. 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.

**7.2. Conditions for safe storage including any incompatibilities**

Store in a well-ventilated place. Store away from heat. Store away from strong bases.

**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
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

CMRG : Chemical Manufacturer's Recommended Guidelines

Singapore PELs : Singapore. Workplace Safety and Health (Permissible Exposure Levels of Toxic Substances) Order

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. 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.

### 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:  
Safety glasses with side shields.

#### Skin/hand protection

No chemical protective gloves are required.

#### Respiratory protection

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.

#### 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.
Appearance/Odour	Clear, colourless, with slight ethereal odour.
Odour threshold	<i>No data available.</i>
pH	<i>Not applicable.</i>
Melting point/Freezing point	-135 °C
Boiling point/Initial boiling point/Boiling range	61 °C [ @ 101,324.72 Pa ]
Flash point	No flash point
Evaporation rate	49 [ <i>Ref Std:BUOAC=1</i> ]
Flammability (solid, gas)	Not applicable.
Flammable Limits(LEL)	None detected [ <i>Details:None (ASTM E681-94 @100 C)</i> ]
Flammable Limits(UEL)	None detected [ <i>Details:None (ASTM E681-94 @100 C)</i> ]
Vapour pressure	26,931 Pa [ @ 25 °C ]
Vapour density	8.6 [ <i>Ref Std:AIR=1</i> ]
Density	1.5 g/ml
Relative density	1.5 [ <i>Ref Std:WATER=1</i> ]
Water solubility	< 12 ppm
Solubility- non-water	<i>No data available.</i>
Partition coefficient: n-octanol/water	<i>No data available.</i>
Autoignition temperature	405 °C [ <i>Details:ASTM E659-84</i> ]
Decomposition temperature	<i>No data available.</i>
Viscosity	0.6 mPa-s [ @ 23 °C ]

<b>Molecular weight</b>	<i>No data available.</i>
<b>Percent volatile</b>	98 %
<b>VOC less H2O &amp; exempt solvents</b>	[Details:Exempt]

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

This material is considered to be non reactive under normal use conditions

### 10.2 Chemical stability

Stable.

### 10.3 Possibility of hazardous reactions

Hazardous polymerisation will not occur.

### 10.4 Conditions to avoid

Not determined

### 10.5 Incompatible materials

Strong bases.

### 10.6 Hazardous decomposition products

<u>Substance</u>	<u>Condition</u>
Carbon monoxide.	At elevated temperatures. - extreme conditions of heat
Carbon dioxide.	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

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

No known health effects.

**3M™ Novec™ 1700 Electronic Grade Coating****Skin contact**

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

**Eye contact**

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

**Ingestion**

No known health effects.

**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	Ingestion		No data available; calculated ATE >5,000 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
Fluoroaliphatic polymer	Ingestion	Rat	LD50 > 2,000 mg/kg

ATE = acute toxicity estimate

**Skin Corrosion/Irritation**

Name	Species	Value
Methyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Methyl nonafluorobutyl ether	Rabbit	No significant irritation
Fluoroaliphatic polymer	Rabbit	No significant irritation

**Serious Eye Damage/Irritation**

Name	Species	Value
Methyl nonafluoroisobutyl ether	Rabbit	No significant irritation
Methyl nonafluorobutyl ether	Rabbit	No significant irritation

**Skin Sensitisation**

Name	Species	Value
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
Methyl nonafluoroisobutyl ether	In Vitro	Not mutagenic
Methyl nonafluoroisobutyl ether	In vivo	Not mutagenic

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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
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
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
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	13 weeks

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ether					mg/l	
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

**Aspiration Hazard**

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

**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:**

Not acutely toxic to aquatic life by GHS criteria.

**Chronic aquatic hazard:**

Not chronically toxic to aquatic life by GHS criteria.

No product test data available.

Material	CAS Nbr	Organism	Type	Exposure	Test endpoint	Test result
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



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l ether						
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
Fluoroaliphatic polymer	Trade Secret		Data not available or insufficient for classification			

**12.2. Persistence and degradability**

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
Methyl nonafluorobutyl ether	163702-07-6	Estimated Biodegradation	28 days	BOD	22 % BOD/ThBOD	OECD 301D - Closed bottle test
Methyl nonafluoroisobutyl ether	163702-08-7	Estimated Photolysis		Half-life (t 1/2)	2.9 years (t 1/2)	Other methods
Methyl nonafluoroisobutyl ether	163702-08-7	Estimated Biodegradation	28 days	BOD	22 % BOD/ThBOD	OECD 301D - Closed bottle test
Fluoroaliphatic polymer	Trade Secret	Data not available-insufficient			N/A	

**12.3 : Bioaccumulative potential**

Material	CAS Nbr	Test type	Duration	Study Type	Test result	Protocol
Methyl nonafluorobutyl ether	163702-07-6	Estimated Photolysis		Half-life (t 1/2)	2.9 years (t 1/2)	Other methods
Methyl nonafluorobutyl ether	163702-07-6	Estimated Bioconcentration		Log Kow	4.0	Other methods
Methyl nonafluoroisobutyl ether	163702-08-7	Estimated Bioconcentration		Log Kow	4.0	Other methods
Fluoroaliphatic polymer	Trade Secret	Data not available or insufficient for classification	N/A	N/A	N/A	N/A

**12.4. Mobility in soil**

Please contact manufacturer for more details

**12.5 Other adverse effects**

Material	CAS Nbr	Ozone Depletion Potential	Global Warming Potential
fluoroaliphatic polymer	Trade Secret	0	

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

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

Prior to disposal, consult all applicable authorities and regulations to insure proper classification. Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Combustion products will include HF. Facility must be capable of handling halogenated materials. Combustion products will include halogen acid (HCl/HF/HBr). Facility must be capable of handling halogenated materials. Empty and clean product containers may be disposed as non-hazardous waste. Consult your specific regulations and service providers to determine available options and requirements.

**SECTION 14: Transport Information****International Regulations**

**UN No.:** Not restricted for transport.

**UN Proper shipping name:** Not restricted for transport.

**Transportation Class (IMO):** None assigned

**Transportation Class (IATA):** None assigned

**Other Dangerous Goods Descriptions (IMO):** None assigned

**Other Dangerous Goods Descriptions (IATA):** None assigned

**Packing Group:** None assigned

**Marine pollutant:** None assigned

**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. The components of this product are in compliance with the new substance notification requirements of CEPA.

**This product may contain component(s) that are regulated by the following:**

Workplace Safety and Health Act & Workplace Safety and Health (General Provisions) Regulations: this product is subject to SDS, labelling, PEL and other requirements in the Act/Regulations.

Fire Safety (Petroleum And Flammable Materials) Regulations: this product is subject to import, transport and storage requirements in the Regulation.

**SECTION 16: Other information**

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 Singapore SDSs are available at [www.3m.com.sg](http://www.3m.com.sg)**