

Safety Data Sheet

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This Safety Data Sheet has been prepared in accordance with the Malaysia Occupational Safety and Health (Chemical Classification, Labelling and Safety Data Sheets) Regulations 2013.

SECTION 1: Identification

1.1. Product identifier

3MTM NovecTM 7100 Engineered Fluid

Product Identification Numbers

70-2134-0501-5 98-0211-8940-6 98-0211-8941-4 98-0211-8946-3 98-0212-1011-1

98-0212-1102-8 98-0212-3554-8 98-0212-3635-5

1.2. Recommended use and restrictions on use

Recommended use

For Industrial Use Only. Not Intended For Use As A Medical Device Or Drug.

For Industrial or Professional use only

Restrictions on use

NovecTM 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 Malaysia Sdn. Bhd., Level 8, Block F, Oasis Square, No.2, Jalan PJU 1A/7A, Ara Damansara 47301

Petaling, Jaya, Selangor

Telephone: 03-7884 2888

3MTM NovecTM 7100 Engineered Fluid

E Mail: 3mmyehsr@mmm.com Website: www.3M.com.my

1.4. Emergency telephone number

+60 03-7884 2888

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

Not classified as hazardous according to Occupational Safety and Health (Chemical Classification, Labelling and Safety Data Sheets) Regulations 2013.

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	C.A.S. No.	% by Wt
METHYL NONAFLUOROISOBUTYL	163702-08-7	55 - 90
ETHER		
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-	163702-07-6	10 - 45
methoxy-		

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation

No need for first aid is anticipated. If symptoms develop, remove the affected person to fresh air. Get medical attention.

Skin Contact:

If exposed, wash with soap and water. If signs/symptoms develop, get medical attention.

Eye Contact

If exposed, flush eyes with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms develop, get medical attention.

If Swallowed:

Do not induce vomiting. Rinse mouth. If you feel unwell, get medical attention.

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

No critical symptoms or effects. 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. None inherent in this product.

Hazardous Decomposition or By-Products

SubstanceConditionCarbon monoxideDuring CombustionCarbon dioxideDuring CombustionHydrogen FluorideDuring Combustion - at elevated temperatures

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

Use personal protective equipment based on the results of an exposure assessment. Refer to Section 8 for PPE recommendations. If anticipated exposure resulting from an accidental release exceeds the protective capabilities of the PPE listed in Section 8, or are unknown, select PPE that offers an appropriate level of protection. Consider the physical and chemical hazards of the material when doing so. Examples of PPE ensembles for emergency response could include wearing bunker gear for a release of flammable material; wearing chemical protective clothing if the spilled material is a corrosive, a sensitizer, a significant dermal irritant, or can be absorbed through the skin; or donning a positive pressure supplied-air respirator for chemicals with inhalation hazards. For information regarding physical and health hazards, refer to sections 2 and 11 of the SDS. Ventilate the area with fresh air. Observe precautions from other sections.

6.2. Environmental precautions

Avoid release to the environment.

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 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 SDS. 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

Do not breathe 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 release to the environment. Avoid contact with oxidizing 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.

7.2. Conditions for safe storage including any incompatibilities

Store away from acids. Store away from strong bases. Store away from oxidizing agents.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

No occupational exposure limit values exist for any of the components listed in Section 3 of this SDS.

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/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

None required.

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

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.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

information on basic physical and chemical properties				
Physical state	Liquid			
Specific Physical Form:	Liquid			
Color	Colorless			
Odor	Slight Ether			
Odor threshold	No Data Available			
pH	Not Applicable			
Melting point/Freezing point	-135 ℃			
Boiling point/Initial boiling point/Boiling range	61 °C [@ 101,324.72 Pa]			
Flash Point	No flash point			
Evaporation rate	49 [Ref Std:BUOAC=1]			
Flammability	Not Applicable			
Flammable Limits(LEL)	None detected			
Flammable Limits(UEL)	None detected			
Vapor Pressure	26,931 Pa [@ 25 °C]			
Relative Vapor Density	8.6 [<i>Ref Std</i> :AIR=1]			
Density	1.5 g/ml			
Relative Density	1.5 [Ref Std:WATER=1]			
Water solubility	< 12 ppm			
Solubility- non-water	No Data Available			

Partition coefficient: n-octanol/ water	3.9 [Details:30 °C]
Autoignition temperature	405 °C [Details:(ASTM E659-84)]
Decomposition temperature	Not Applicable
Kinematic Viscosity	0.4 mm2/sec
Volatile Organic Compounds	No Data Available
Percent volatile	100 %
VOC Less H2O & Exempt Solvents	No Data Available
Molecular weight	No Data Available

Particle Characteristics	Not Applicable
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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 polymerization will not occur.

10.4. Conditions to avoid

None known.

10.5. Incompatible materials

Strong acids Strong bases Strong oxidizing agents

10.6. Hazardous decomposition products

Substance	Condition	
Substance	Contaition	
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 Vapor, Gas, Particulate	At Elevated Temperatures -	extreme conditions of
1 / /	heat	

Refer to section 5.2 for hazardous decomposition products during combustion.

If the product is exposed to extreme condition 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 labeling, 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 health effects are expected.

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
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
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	Dermal		LD50 estimated to be > 5,000 mg/kg
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	Inhalation- Vapor (4 hours)	Rat	LC50 > 1,000 mg/l
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	Ingestion	Rat	LD50 > 5,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
METHYL NONAFLUOROISOBUTYL ETHER	Rabbit	No significant irritation
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	Rabbit	No significant irritation

Serious Eye Damage/Irritation

Name		Value
METHYL NONAFLUOROISOBUTYL ETHER	Rabbit	No significant irritation
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	Rabbit	No significant irritation

Sensitization:

Skin Sensitization

Skill Sensitization		
Name	Species	Value
1,44110	Species	, 11110
METHYL NONAFLUOROISOBUTYL ETHER	Guinea	Not classified
		1 (of Glassifica
	pıg	
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	Guinea	Not classified
= #####################################		- 10 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

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3MTM NovecTM 7100 Engineered Fluid

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p1g	
P-8	

Respiratory Sensitization

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
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	In Vitro	Not mutagenic
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	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
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	Inhalation	Not classified for female reproduction	Rat	NOAEL 129 mg/l	1 generation
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	Inhalation	Not classified for male reproduction	Rat	NOAEL 129 mg/l	1 generation
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	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 NONAFLUOROISOBUT YL ETHER	Inhalation	nervous system	Not classified	Dog	LOAEL 913 mg/l	10 minutes
METHYL NONAFLUOROISOBUT YL ETHER	Inhalation	cardiac sensitization	Not classified	Dog	NOAEL 913 mg/l	10 minutes
Butane, 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-	Inhalation	nervous system	Not classified	Dog	LOAEL 913 mg/l	10 minutes
Butane, 1,1,1,2,2,3,3,4,4- nonafluoro-4-methoxy-	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 NONAFLUOROISOBUT YL ETHER	Inhalation	liver	Not classified	Rat	NOAEL 155 mg/l	13 weeks
METHYL NONAFLUOROISOBUT YL ETHER	Inhalation	bone, teeth, nails, and/or hair	Not classified	Rat	NOAEL 129 mg/l	11 weeks
METHYL NONAFLUOROISOBUT YL ETHER	Inhalation	heart skin endocrine system gastrointestinal tract hematopoietic	Not classified	Rat	NOAEL 155 mg/l	13 weeks

		system immune system muscles nervous system eyes kidney and/or bladder respiratory system				
METHYL NONAFLUOROISOBUT YL 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
Butane, 1,1,1,2,2,3,3,4,4- nonafluoro-4-methoxy-	Inhalation	liver	Not classified	Rat	NOAEL 155 mg/l	13 weeks
Butane, 1,1,1,2,2,3,3,4,4- nonafluoro-4-methoxy-	Inhalation	bone, teeth, nails, and/or hair	Not classified	Rat	NOAEL 129 mg/l	11 weeks
Butane, 1,1,1,2,3,3,4,4- nonafluoro-4-methoxy-	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
Butane, 1,1,1,2,2,3,3,4,4- nonafluoro-4-methoxy-	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 labeling, 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 #	Organism	Type	Exposure	Test Endpoint	Test Result
METHYL NONAFLUOROIS OBUTYL ETHER	163702-08-7	Fathead Minnow	Endpoint not reached	96 hours	LC50	>100 mg/l
METHYL NONAFLUOROIS OBUTYL ETHER	163702-08-7	Green algae	Estimated	72 hours	EC50	>100 mg/l
METHYL NONAFLUOROIS OBUTYL ETHER	163702-08-7	Water flea	Estimated	48 hours	EC50	>100 mg/l
METHYL NONAFLUOROIS OBUTYL ETHER	163702-08-7	Green algae	Estimated	72 hours	NOEC	100 mg/l
Butane, 1,1,1,2,2,3,3,4,4- nonafluoro-4- methoxy-	163702-07-6	Fathead Minnow	Endpoint not reached	96 hours	LC50	>100 mg/l
Butane, 1,1,1,2,2,3,3,4,4- nonafluoro-4- methoxy-	163702-07-6	Green algae	Estimated	72 hours	EC50	>100 mg/l
Butane, 1,1,1,2,2,3,3,4,4- nonafluoro-4- methoxy-	163702-07-6	Water flea	Estimated	48 hours	EC50	>100 mg/l
Butane, 1,1,1,2,2,3,3,4,4- nonafluoro-4- methoxy-	163702-07-6	Green algae	Estimated	72 hours	NOEC	100 mg/l

12.2. Persistence and degradability

Material	CAS No.	Test Type	Duration	Study Type	Test Result	Protocol
METHYL NONAFLUOROIS OBUTYL ETHER	163702-08-7	Estimated Biodegradation	28 days	Biological Oxygen Demand	22 %BOD/ThOD	OECD 301D - Closed Bottle Test
Butane, 1,1,1,2,2,3,3,4,4- nonafluoro-4- methoxy-	163702-07-6	Estimated Biodegradation	28 days	Biological Oxygen Demand	22 %BOD/ThOD	OECD 301D - Closed Bottle Test

12.3. Bioaccumulative potential

Material	CAS No.	Test Type	Duration	Study Type	Test Result	Protocol
METHYL	163702-08-7	Estimated		Log of	4.0	
NONAFLUOROIS		Bioconcentration		Octanol/H2O part.		
OBUTYL ETHER				coeff		
Butane,	163702-07-6	Estimated		Log of	4.0	
1,1,1,2,2,3,3,4,4-		Bioconcentration		Octanol/H2O part.		
nonafluoro-4-				coeff		
methoxy-						

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

According to the Environmental Quality (Scheduled Wastes) Regulations 2005, scheduled waste has to be sent to a prescribed premise for recycling, treatment or disposal. Please approach Kualiti Alam for proper schedule waste classification and disposal.

SECTION 14: Transport Information

Not hazardous for transportation.

Marine Transport (IMDG)

UN Number: None assigned.

Proper Shipping Name: None assigned. Technical Name: None assigned. Hazard Class/Division: None assigned. Subsidiary Risk: None assigned. Packing Group: None assigned. Limited Quantity: None assigned. Marine Pollutant: None assigned.

Marine Pollutant Technical Name: None assigned.

Other Dangerous Goods Descriptions:

None assigned.

Air Transport (IATA)

UN Number: None assigned.

Proper Shipping Name: None assigned. Technical Name: None assigned. Hazard Class/Division: None assigned. Subsidiary Risk: None assigned. Packing Group: None assigned. Limited Quantity: None assigned.

Marine Pollutant Technical Name: None assigned.

Other Dangerous Goods Descriptions:

Marine Pollutant: None assigned.

None assigned.

Transportation classifications are provided as a customer service. As for shipping, YOU remain responsible for complying with all applicable laws and regulations, including proper transportation classification and packaging. 3M's transportation classifications are based on product formulation, packaging, 3M policies and 3M's understanding of applicable current regulations. 3M does not guarantee the accuracy of this classification information. This information applies only to transportation classification and not the packaging, labeling or marking requirements. The above information is only for reference. If you are shipping by air or ocean, YOU are advised to check & meet applicable regulatory requirements.

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 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 Australia National Industrial Chemical Notification and Assessment Scheme (NICNAS). 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 material are in compliance with the provisions of Philippines RA 6969 requirements. 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.

SECTION 16: Other information

DISCLAIMER: The information in this Safety Data Sheet (SDS) 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 SDS or use of the product in combination with other materials. For these reasons, it is important that customers carry out their own evaluation to satisfy themselves as to the suitability of the product for their own intended applications. In addition, this SDS is being provided to convey health and safety information. If you are the importer of record of this product into Malaysia, you are responsible for all applicable regulatory requirements, including, but not limited to, product registrations/notifications, substance volume tracking, and potential substance registration/notification.

3M Malaysia SDSs are available at www.3M.com.my