



Safety Data Sheet

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SECTION 1: Identification

1.1. Product identifier

3M™ Novec™ Engineered Fluid 8200

Product Identification Numbers

98-0212-2775-0, 98-0212-2776-8

1.2. Recommended use and restrictions on use

Recommended use

For Industrial Use Only. Not Intended for Use As A Medical Device Or Drug., Cleaning Movie Film

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 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

MANUFACTURER:	3M
DIVISION:	Electronics Materials Solutions Division
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number

1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

2.1. Hazard classification

Not classified as hazardous according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.

2.2. Label elements

Signal word

Not applicable.

Symbols

Not applicable.

Pictograms

Not applicable.

2.3. Hazards not otherwise classified

None.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
ETHYL NONAFLUOROBUTYL ETHER	163702-05-4	20 - 80
ETHYL NONAFLUOROISOBUTYL ETHER	163702-06-5	20 - 80

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:

No need for first aid is anticipated.

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:

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

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, 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

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. Warning! A motor could be an ignition source and could cause flammable gases or vapors in the spill area to burn or explode. 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 dikes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up

Contain spill. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. 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.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Do not breathe thermal decomposition products. Avoid skin contact with hot material. Do not use in a confined area with minimal air exchange. Store work clothes separately from other clothing, food and tobacco products. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. 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. Keep container tightly closed. 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	C.A.S. No.	Agency	Limit type	Additional Comments
ETHYL NONAFLUOROBUTYL ETHER	163702-05-4	Manufacturer determined	TWA(as total isomers):200 ppm	
ETHYL NONAFLUOROISOBUTYL ETHER	163702-06-5	Manufacturer determined	TWA(as total isomers):200 ppm	

ACGIH : American Conference of Governmental Industrial Hygienists

AIHA : American Industrial Hygiene Association

CMRG : Chemical Manufacturer's Recommended Guidelines

OSHA : United States Department of Labor - Occupational Safety and Health Administration

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/vapors/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:
Indirect Vented Goggles

Skin/hand protection

Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing. Note: Nitrile gloves may be worn over polymer laminate gloves to improve dexterity. Gloves made from the following material(s) are recommended: Polymer laminate

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

General Physical Form:	Liquid
Specific Physical Form:	Liquid
Odor, Color, Grade:	Clear colorless liquid with faint odor
Odor threshold	<i>No Data Available</i>
pH	<i>Not Applicable</i>
Melting point	-138 °C
Boiling Point	76 °C
Flash Point	No flash point
Evaporation rate	33 [<i>Ref Std:</i> BUOAC=1]
Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	210 g/m3 [<i>Details:</i> ASTM E681-94 Method]
Flammable Limits(UEL)	1070 g/m3 [<i>Details:</i> ASTM E681-94 Method]
Vapor Pressure	109 mmHg [<i>@ 25 °C</i>]
Vapor Density	9.1 [<i>Ref Std:</i> AIR=1]
Density	1.43 g/ml
Specific Gravity	1.43 [<i>Ref Std:</i> WATER=1]
Solubility in Water	Nil
Solubility- non-water	<i>No Data Available</i>
Partition coefficient: n-octanol/ water	4.2 [<i>Details:</i> at 30 °C]

Autoignition temperature	375 °C [Details: ASTM E659-78 Method]
Decomposition temperature	Not Applicable
Viscosity	0.4 centistoke
Molecular weight	No Data Available
Volatile Organic Compounds	[Details: Exempt]
Percent volatile	100 %
VOC Less H2O & Exempt Solvents	[Details: Exempt]

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 bases

10.6. Hazardous decomposition products

<u>Substance</u>	<u>Condition</u>
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 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:

May be harmful in contact with skin.

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:

May be harmful if swallowed.

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
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-Vapor (4 hours)	Rat	LC50 > 989 mg/l
ETHYL NONAFLUOROBUTYL ETHER	Ingestion	Rat	LD50 > 2,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
ETHYL NONAFLUOROISOBUTYL ETHER	Rabbit	No significant irritation
ETHYL NONAFLUOROBUTYL ETHER	Rabbit	No significant irritation

Serious Eye Damage/Irritation

Name	Species	Value
ETHYL NONAFLUOROISOBUTYL ETHER	Rabbit	No significant irritation
ETHYL NONAFLUOROBUTYL ETHER	Rabbit	No significant irritation

Skin Sensitization

Name	Species	Value
ETHYL NONAFLUOROISOBUTYL ETHER	Guinea pig	Not sensitizing
ETHYL NONAFLUOROBUTYL ETHER	Guinea pig	Not sensitizing

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
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

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
ETHYL NONAFLUOROISOBUTYL ETHER	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 260 mg/l	during gestation
ETHYL NONAFLUOROBUTYL ETHER	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 260 mg/l	during gestation

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
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	All data are negative	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	All data are negative	Rat	NOAEL 989 mg/l	4 hours

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
ETHYL NONAFLUOROISOBUTYL ETHER	Inhalation	liver kidney and/or bladder respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 263.4 mg/l	4 weeks
ETHYL NONAFLUOROISOBUTYL ETHER	Inhalation	heart endocrine system bone marrow hematopoietic system immune system nervous system	All data are negative	Rat	NOAEL 263.4 mg/l	4 weeks
ETHYL NONAFLUOROISOBUTYL ETHER	Ingestion	blood liver kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,000 mg/kg/day	28 days
ETHYL NONAFLUOROISOBUTYL ETHER	Ingestion	heart endocrine system bone marrow hematopoietic system immune system nervous system respiratory system	All data are negative	Rat	NOAEL 1,000 mg/kg/day	28 days
ETHYL NONAFLUOROBUTYL ETHER	Inhalation	liver kidney and/or bladder respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 263.4 mg/l	4 weeks
ETHYL NONAFLUOROBUTYL ETHER	Inhalation	heart endocrine system bone marrow hematopoietic system immune system nervous system	All data are negative	Rat	NOAEL 263.4 mg/l	4 weeks
ETHYL	Ingestion	blood liver kidney	Some positive data exist, but the	Rat	NOAEL	28 days

NONAFLUOROBUTYL ETHER		and/or bladder	data are not sufficient for classification		1,000 mg/kg/day	
ETHYL NONAFLUOROBUTYL ETHER	Ingestion	heart endocrine system bone marrow hematopoietic system immune system nervous system respiratory system	All data are negative	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**Ecotoxicological information**

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

Chemical fate information

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

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. Combustion products will include HF. 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.

EPA Hazardous Waste Number (RCRA): Not regulated

SECTION 14: Transport Information

For Transport Information, please visit <http://3M.com/Transportinfo> or call 1-800-364-3577 or 651-737-6501.

SECTION 15: Regulatory information**15.1. US Federal Regulations**

Contact 3M for more information.

311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - Yes Delayed Hazard - No

15.2. State Regulations

Contact 3M for more information.

15.3. Chemical Inventories

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 product are in compliance with the new substance notification requirements of CEPA.

The components of this material are in compliance with the China "Measures on Environmental Management of New Chemical Substance". Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of the Korean Toxic Chemical 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 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 chemical notification requirements of TSCA.

Contact 3M for more information.

15.4. International Regulations

Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.
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SECTION 16: Other information

NFPA Hazard Classification

Health: 3 Flammability: 0 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.

HMIS Hazard Classification

Health: 1 Flammability: 0 Physical Hazard: 0 Personal Protection: X - See PPE section.

Hazardous Material Identification System (HMIS® IV) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® IV ratings are to be used with a fully implemented HMIS® IV program. HMIS® is a registered mark of the American Coatings Association (ACA).

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Conversion to GHS format SDS.

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