



Safety Data Sheet

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This Safety Data Sheet has been prepared in accordance with the Canadian Hazardous Products Regulations.

SECTION 1: Identification

1.1. Product identifier

3M™ Novec™ 2708 Electronic Grade Coating

Product Identification Numbers

98-0212-3668-6 98-0212-3691-8 JF-1000-5119-8 UU-0125-5927-2

1.2. Recommended use and restrictions on use

Intended Use

Protective Barrier Coating. For Industrial Use Only. Not Intended for Use as a Medical Device or Drug.

Restrictions on use

Approved commercial use(s): Protective coating on electronic components. 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

| | |
|-------------------|--|
| Company: | 3M Canada Company |
| Division: | Electronics Materials Solutions Division |
| Address: | 1840 Oxford Street East, Post Office Box 5757, London, Ontario N6A 4T1 |
| Telephone: | (800) 364-3577 |
| Website: | www.3M.ca |

1.4. Emergency telephone number

Medical Emergency Telephone: 1-800-3M HELPS / 1-800-364-3577; Transportation Emergency Telephone (CANUTEC): (613) 996-6666

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

Physical Hazards Not Otherwise Classified - Category 1.

2.2. Label elements

Signal word

Danger

Symbols

Exclamation mark |

Pictograms



Hazard statements

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

Precautionary statements

Prevention:

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

2.3. Other hazards

None known.

10% of the mixture consists of ingredients of unknown acute dermal toxicity.

SECTION 3: Composition/information on ingredients

This material is a mixture.

| Ingredient | C.A.S. No. | % by Wt | Common Name |
|--------------------------------|--------------|---------|--|
| Ethyl nonafluoroisobutyl ether | 163702-06-5 | 50 - 84 | Propane, 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3,-heptafluoro - |
| Ethyl nonafluorobutyl ether | 163702-05-4 | 9 - 42 | Butane, 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluoro- |
| Fluorinated Polymer | Trade Secret | 5 - 9.5 | Not Applicable |
| 1-methoxy-2-propyl acetate | 108-65-6 | 3 - 5 | 2-Propanol, 1-methoxy-, acetate |

Fluorinated polymer is a non-hazardous Trade Secret material according to WHMIS criteria.

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:

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:

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. No closed-cup flash point but flam/expl. vapor air mixture Material displays no closed-cup flash point but may form flammable/explosive vapor air mixture.

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/extreme heat Keep away from sparks, flames, and extreme heat. Evacuate area. 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

Eliminate ignition sources when cleaning spill Eliminate all potential ignition sources when cleaning up spill. Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and 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. Store work clothes separately from other clothing, food and tobacco products. Avoid breathing dust/fume/gas/mist/vapours/spray. 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. Keep away from sparks/flames/extreme heat Keep away from sparks, flames, and extreme heat.

7.2. Conditions for safe storage including any incompatibilities

Store away from heat.

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 |
|--------------------------------|-------------|-------------------------|---|---------------------|
| 1-methoxy-2-propyl acetate | 108-65-6 | AIHA | TWA:50 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) | |

ACGIH : American Conference of Governmental Industrial Hygienists

AIHA : American Industrial Hygiene Association

CMRG : Chemical Manufacturer's Recommended Guidelines

TWA: Time-Weighted-Average

STEL: Short Term Exposure Limit

CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls

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 vapour concentration below lower explosive concentration.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

None required.

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.

Gloves made from the following material(s) are recommended: Butyl Rubber

Neoprene

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 vapors

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

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|----------------|--------|
| Physical state | Liquid |
|----------------|--------|

| | |
|--|---|
| Colour | Yellow-Orange |
| Odour | Slight Ether |
| Odour threshold | <i>No Data Available</i> |
| pH | <i>Not Applicable</i> |
| Melting point/Freezing point | <i>Not Applicable</i> |
| Boiling point | 76 °C |
| Flash Point | No flash point [<i>Test Method: Closed Cup</i>] [<i>Details: ASTM D3278-96e1</i>] |
| Evaporation rate | <i>No Data Available</i> |
| Flammability (solid, gas) | Not Applicable |
| Flammable Limits(LEL) | 2.14 % [<i>Details: ASTM E681 Method at 175 °C</i>] |
| Flammable Limits(UEL) | 15.96 % [<i>Details: ASTM E681 Method at 175 °C</i>] |
| Vapour Pressure | 14,532.1 Pa [<i>@ 25 °C</i>] |
| Vapour Density and/or Relative Vapour Density | <i>No Data Available</i> |
| Density | 1.4 g/ml |
| Relative density | 1.4 [<i>Ref Std: WATER=1</i>] |
| Water solubility | <i>No Data Available</i> |
| Solubility- non-water | <i>No Data Available</i> |
| Partition coefficient: n-octanol/ water | <i>No Data Available</i> |
| Autoignition temperature | 375 °C |
| Decomposition temperature | <i>No Data Available</i> |
| Viscosity/Kinematic Viscosity | <i>No Data Available</i> |
| Volatile Organic Compounds | <i>No Data Available</i> |
| Percent volatile | 89 - 92 % |
| VOC Less H2O & Exempt Solvents | <i>No Data Available</i> |
| Molecular weight | <i>No Data Available</i> |

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

Heat
Sparks and/or flames

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products

| <u>Substance</u> | <u>Condition</u> |
|-------------------|---|
| Hydrocarbons | At Elevated Temperatures - Extreme conditions of heat |
| 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 |

Perfluoroisobutylene (PFIB)

of heat

At Elevated Temperatures - Extreme conditions

Toxic Vapor, Gas, Particulate

of heat

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:

Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

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 |
|--------------------------------|----------------------------|---------|---|
| Overall product | Dermal | | No data available; calculated ATE >2,000 - =5,000 mg/kg |
| Overall product | Ingestion | | No data available; calculated ATE >2,000 - =5,000 mg/kg |
| Ethyl nonafluoroisobutyl ether | Dermal | | LD50 estimated to be 2,000 - 5,000 mg/kg |
| Ethyl nonafluoroisobutyl ether | Inhalation-Vapor (4 hours) | Rat | LC50 > 989 mg/l |
| Ethyl nonafluoroisobutyl ether | Ingestion | Rat | LD50 > 2,000 mg/kg |
| Ethyl nonafluorobutyl ether | Dermal | | LD50 estimated to be 2,000 - 5,000 mg/kg |
| Ethyl nonafluorobutyl ether | Inhalation-Vapor (4 hours) | Rat | LC50 > 989 mg/l |
| Ethyl nonafluorobutyl ether | Ingestion | Rat | LD50 > 2,000 mg/kg |
| Fluorinated Polymer | Ingestion | Rat | LD50 > 2,000 mg/kg |

| | | | |
|----------------------------|----------------------------|--------|--------------------|
| 1-methoxy-2-propyl acetate | Dermal | Rabbit | LD50 > 5,000 mg/kg |
| 1-methoxy-2-propyl acetate | Inhalation-Vapor (4 hours) | Rat | LC50 > 28.8 mg/l |
| 1-methoxy-2-propyl acetate | Ingestion | Rat | LD50 8,532 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 |
| Fluorinated Polymer | Rabbit | No significant irritation |
| 1-methoxy-2-propyl acetate | 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 |
| 1-methoxy-2-propyl acetate | Rabbit | Mild irritant |

Skin Sensitization

| Name | Species | Value |
|--------------------------------|------------|----------------|
| Ethyl nonafluoroisobutyl ether | Guinea pig | Not classified |
| Ethyl nonafluorobutyl ether | Guinea pig | Not classified |
| 1-methoxy-2-propyl acetate | Guinea pig | Not classified |

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 |
| 1-methoxy-2-propyl acetate | In Vitro | 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 | 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 |
| 1-methoxy-2-propyl acetate | Ingestion | Not classified for female reproduction | Rat | NOAEL 1,000 mg/kg/day | prematuring & during gestation |
| 1-methoxy-2-propyl acetate | Ingestion | Not classified for male reproduction | Rat | NOAEL 1,000 mg/kg/day | prematuring & during gestation |

| | | | | | |
|----------------------------|------------|--------------------------------|-----|-----------------------|--------------------------------|
| 1-methoxy-2-propyl acetate | Ingestion | Not classified for development | Rat | NOAEL 1,000 mg/kg/day | prematuring & during gestation |
| 1-methoxy-2-propyl acetate | Inhalation | Not classified for development | Rat | NOAEL 21.6 mg/l | during organogenesis |

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 | Not classified | Rat | NOAEL 989 mg/l | 4 hours |
| Ethyl nonafluorobutyl ether | Inhalation | cardiac sensitization | Some positive data exist, but the data are not sufficient for classification | Dog | NOAEL 204 mg/l | 17 minutes |
| Ethyl nonafluorobutyl ether | Inhalation | respiratory irritation | Not classified | Rat | NOAEL 989 mg/l | 4 hours |
| 1-methoxy-2-propyl acetate | Inhalation | respiratory irritation | Some positive data exist, but the data are not sufficient for classification | | NOAEL Not available | |
| 1-methoxy-2-propyl acetate | Ingestion | central nervous system depression | Some positive data exist, but the data are not sufficient for classification | Rat | NOAEL not available | |

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 heart endocrine system gastrointestinal tract bone marrow hematopoietic system immune system nervous system | Not classified | Rat | NOAEL 263.4 mg/l | 4 weeks |
| Ethyl nonafluoroisobutyl ether | Ingestion | blood liver kidney and/or bladder heart endocrine system bone marrow hematopoietic system immune system nervous system respiratory system | Not classified | Rat | NOAEL 1,000 mg/kg/day | 28 days |
| Ethyl nonafluorobutyl ether | Inhalation | liver kidney and/or bladder respiratory system heart endocrine system gastrointestinal tract bone marrow hematopoietic system immune system nervous system | Not classified | Rat | NOAEL 263.4 mg/l | 4 weeks |
| Ethyl nonafluorobutyl ether | Ingestion | blood liver kidney and/or bladder heart endocrine system bone marrow | Not classified | Rat | NOAEL 1,000 mg/kg/day | 28 days |

| | | | | | | |
|----------------------------|------------|--|----------------|-------------------------|-----------------------|---------|
| | | hematopoietic system immune system nervous system respiratory system | | | | |
| 1-methoxy-2-propyl acetate | Inhalation | kidney and/or bladder | Not classified | Rat | NOAEL 16.2 mg/l | 9 days |
| 1-methoxy-2-propyl acetate | Inhalation | olfactory system | Not classified | Mouse | LOAEL 1.62 mg/l | 9 days |
| 1-methoxy-2-propyl acetate | Inhalation | blood | Not classified | Multiple animal species | NOAEL 16.2 mg/l | 9 days |
| 1-methoxy-2-propyl acetate | Ingestion | endocrine system | Not classified | Rat | NOAEL 1,000 mg/kg/day | 44 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

No data 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 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.

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. 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. This product complies with Measures on Environmental Management of New Chemical Substances. All ingredients are listed on or exempt from on China IECSC inventory.

SECTION 16: Other information

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.

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

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

HMIS Hazard Classification

Health: 1 Flammability: 1 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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3M Canada SDSs are available at www.3M.ca