



## Safety Data Sheet

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### SECTION 1: Identification

#### 1.1. Product identifier

3M™ Fluorinert™ Electronic Liquid FC-3284

#### Product Identification Numbers

80-0014-2720-4, 80-0014-4620-4, 98-0212-4912-7, ZF-0002-1416-1, ZF-0002-1418-7, ZF-0002-1882-4  
7000117284, 7000117286, 7000117286, 7100099991, 7010402242, 7100203944, 7100296996

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

##### Recommended use

For Industrial Use Only, as Testing Fluid or Heat Transfer Fluid for Electronics. Not Intended for Use as a Medical Device or Drug.

##### Restrictions on use

Fluorinert™ Electronic Liquids 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 Fluorinert 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

|                      |  |
|----------------------|--|
| <b>MANUFACTURER:</b> | 3M                                       |
| <b>DIVISION:</b>     | Electronics Materials Solutions Division |
| <b>ADDRESS:</b>      | 3M Center, St. Paul, MN 55144-1000, USA  |
| <b>Telephone:</b>    | 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.

5% of the mixture consists of ingredients of unknown acute oral toxicity.

**SECTION 3: Composition/information on ingredients**

| Ingredient                                    | C.A.S. No. | % by Wt  |
|---|------------|----------|
| PERFLUORO COMPOUNDS, C5-18                    | 86508-42-1 | 95 - 100 |
| PERFLUOROMETHOXYETHYL, DIMETHYL AMINE C5F13NO | None       | <= 3     |
| C5-C7 PERFLUOROALKANES, PRIMARILY C6          | None       | <= 2     |

**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.

**Hazardous Decomposition or By-Products**

**Substance**

Carbon monoxide  
Carbon dioxide

**Condition**

During Combustion  
During Combustion

**5.3. Special protective actions for fire-fighters**

Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

**SECTION 6: Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**

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. 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. 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 heat.

**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.

**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

#### Appearance

Physical state

Liquid

Color

Colorless

**Specific Physical Form:**

Liquid

**Odor**

Odorless

**Odor threshold**

*No Data Available*

**pH**

*Not Applicable*

**Melting point**

*Not Applicable*

**Boiling Point**

47 - 57 °C

**Flash Point**

No flash point

**Evaporation rate**

> 1 Units not avail. or not appl. [Ref Std:BUOAC=1]

**Flammability (solid, gas)**

Not Applicable

**Flammable Limits(LEL)**

None detected

**Flammable Limits(UEL)**

None detected

**Vapor Pressure**

264 mmHg [ @ 20 °C]

**Vapor Density**

10.3 [ @ 20 °C] [Ref Std:AIR=1]

**Density**

1.71 g/ml

**Specific Gravity**

1.71 [Ref Std:WATER=1]

**Solubility in Water**

Nil

**Solubility- non-water**

*No Data Available*

**Partition coefficient: n-octanol/ water**

*No Data Available*

**Autoignition temperature**

*No Data Available*

**Decomposition temperature**

*No Data Available*

**Viscosity**

0.4 centistoke

**Molecular weight**

*Not Applicable*

**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**

Heat

**10.5. Incompatible materials**

Finely divided active metals  
Alkali and alkaline earth metals

**10.6. Hazardous decomposition products****Substance****Condition**

Hydrogen Fluoride

At Elevated Temperatures - greater than 200 °C

Perfluoroisobutylene (PFIB)

At Elevated Temperatures - greater than 200 °C

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 known health effects.

**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                              |
|----------------------------|----------------------------|---------|------------------------------------|
| PERFLUORO COMPOUNDS, C5-18 | Dermal                     |         | LD50 estimated to be > 5,000 mg/kg |
| PERFLUORO COMPOUNDS, C5-18 | Inhalation-Vapor (4 hours) | Rat     | LC50 > 15.4 mg/l                   |
| PERFLUORO COMPOUNDS, C5-18 | Ingestion                  | Rat     | LD50 > 5,000 mg/kg                 |

ATE = acute toxicity estimate

**Skin Corrosion/Irritation**

| Name                       | Species | Value                     |
|----------------------------|---------|---------------------------|
| PERFLUORO COMPOUNDS, C5-18 | Rabbit  | No significant irritation |

**Serious Eye Damage/Irritation**

| Name                       | Species | Value         |
|----------------------------|---------|---------------|
| PERFLUORO COMPOUNDS, C5-18 | Rabbit  | Mild irritant |

**Skin Sensitization**

| Name                       | Species | Value          |
|----------------------------|---------|----------------|
| PERFLUORO COMPOUNDS, C5-18 | Mouse   | 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         |
|----------------------------|----------|---------------|
| PERFLUORO COMPOUNDS, C5-18 | 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          |
|----------------------------|-----------|--|---------|---------------------|----------------------------|
| PERFLUORO COMPOUNDS, C5-18 | Ingestion | Not classified for female reproduction | Rat     | NOAEL 749 mg/kg/day | prematuring into lactation |
| PERFLUORO COMPOUNDS, C5-18 | Ingestion | Not classified for male reproduction   | Rat     | NOAEL 749 mg/kg/day | 30 days                    |
| PERFLUORO COMPOUNDS, C5-18 | Ingestion | Not classified for development         | Rat     | NOAEL 749 mg/kg/day | prematuring into lactation |

**Target Organ(s)****Specific Target Organ Toxicity - single exposure**

| Name                       | Route      | Target Organ(s)       | Value          | Species | Test Result      | Exposure Duration |
|----------------------------|------------|-----------------------|----------------|---------|------------------|-------------------|
| PERFLUORO COMPOUNDS, C5-18 | Inhalation | cardiac sensitization | Not classified | Dog     | NOAEL 2,813 mg/l | 10 minutes        |

**Specific Target Organ Toxicity - repeated exposure**

| Name                       | Route      | Target Organ(s)   | Value          | Species | Test Result    | Exposure Duration |
|----------------------------|------------|---|----------------|---------|----------------|-------------------|
| PERFLUORO COMPOUNDS, C5-18 | Inhalation | heart   skin   endocrine system   gastrointestinal tract   bone, teeth, nails, and/or hair   blood   liver   immune system   muscles   nervous system   eyes   kidney and/or bladder   respiratory system | Not classified | Rat     | NOAEL 606 mg/l | 90 days           |
| PERFLUORO COMPOUNDS, C5-18 | Ingestion  | heart   endocrine system   blood  | Not classified | Rat     | NOAEL 2,000    | 30 days           |

|  |  |   |  |  |           |  |
|--|--|---|--|--|-----------|--|
|  |  | liver   nervous system   kidney and/or bladder   respiratory system |  |  | mg/kg/day |  |
|--|--|---|--|--|-----------|--|

**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.

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. 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 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**

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.

**EPCRA 311/312 Hazard Classifications:**

**Physical Hazards**

Not applicable

**Health Hazards**

Not applicable

**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 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. All required components of this product are listed on the active portion of the TSCA Inventory.

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.

### SECTION 16: Other information

#### NFPA Hazard Classification

**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.

The NFPA Health code of 3 is due to emergency situations where the material may thermally decompose and release Hydrogen Fluoride and Perfluoroisobutylene (PFIB). During normal use conditions, please reference Section 2 and Section 11 of the SDS for additional health hazard information.

#### HMIS Hazard Classification

**Health:** 0 **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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