



Material Safety Data Sheet

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: FC-770 FLUORINERT(TM) Electronic Liquid

MANUFACTURER: 3M

DIVISION: Electronics Markets Materials Division

ADDRESS: 3M Center
St. Paul, MN 55144-1000

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

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Product Use:

Intended Use: Heat transfer fluid

SECTION 2: INGREDIENTS

Ingredient

Perfluoro Compounds, (Primarily Perfluoro N-Alkyl Morpholines, C=1-3)

C.A.S. No.

86508-42-1

% by Wt

100

SECTION 3: HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Odor, Color, Grade: Colorless, clear liquid.

General Physical Form: Liquid

Immediate health, physical, and environmental hazards:

3.2 POTENTIAL HEALTH EFFECTS

Eye Contact:

No health effects are expected.

Skin Contact:

No health effects are expected.

Inhalation:

If thermal decomposition occurs:
May be harmful if inhaled.

Ingestion:

No health effects are expected.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

COD= Nil; BOD20= Nil; 48-Hr. EC50, Water flea(Daphnia magna) of immiscible mixture= >1500 mg/l; 96-Hr. LC50 Screen, Fathead Minnow(Pimephales promelas) of immiscible mixture= >1000 mg/l; U.S. Clean Water Act, Section 307, Toxic Pollutants = None.

SECTION 4: FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Eye Contact: Flush eyes with large amounts of water. If signs/symptoms persist, get medical attention.

Skin Contact: Wash affected area with soap and water. If signs/symptoms develop, get medical attention.

Inhalation: If signs/symptoms develop, remove person to fresh air. If signs/symptoms persist, get medical attention.

If Swallowed: No need for first aid is anticipated.

SECTION 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Autoignition temperature	No Data Available
Flash Point	Not Applicable
Flammable Limits - LEL	Not Applicable
Flammable Limits - UEL	Not Applicable

5.2 EXTINGUISHING MEDIA

Non-combustible. Choose material suitable for surrounding fire. Material will not burn.

5.3 PROTECTION OF FIRE FIGHTERS

Special Fire Fighting Procedures: Water may be used to blanket the fire. Exposure to extreme heat can give rise to thermal decomposition. Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

Unusual Fire and Explosion Hazards: No unusual fire or explosion hazards are anticipated.

Note: See STABILITY AND REACTIVITY (SECTION 10) for hazardous combustion and thermal decomposition information.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Observe precautions from other sections. Call 3M- HELPS line (1-800-364-3577) for more information on handling and managing the spill. Ventilate the area with fresh air. Contain spill. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water. 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. Collect as much of the spilled material as possible. Clean up residue with detergent and water. Collect the resulting residue containing solution. Place in a closed container approved for transportation by appropriate authorities. Dispose of collected material as soon as possible.

In the event of a release of this material, the user should determine if the release qualifies as reportable according to local, state, and federal regulations.

SECTION 7: HANDLING AND STORAGE

7.1 HANDLING

For industrial or professional use only. Avoid breathing of vapors, mists or spray. Avoid skin contact with hot material. Do not breathe thermal decomposition products. Use with appropriate local exhaust ventilation.

7.2 STORAGE

Keep container in well-ventilated area. Keep container tightly closed. Store away from heat. Store out of direct sunlight.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 ENGINEERING CONTROLS

Use with appropriate local exhaust ventilation. Provide appropriate local exhaust when product is heated. Do not use in a confined area or areas with little or no air movement. For those situations where the fluid 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 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection

As a good industrial hygiene practice:
Avoid eye contact.

The following eye protection(s) are recommended: Safety Glasses with side shields.

8.2.2 Skin Protection

Gloves are not required when product is uncontaminated and at room temperature. Avoid skin contact with extremely cold or hot product. Wear appropriate gloves when handling this product to protect skin from low or high temperatures. If the product becomes contaminated during use, select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials.

8.2.3 Respiratory Protection

Under normal use conditions, airborne exposures are not expected to be significant enough to require respiratory protection.
During heating:

Avoid breathing of vapors, mists or spray.

If thermal degradation products are expected, use fullface supplied air respirator.

8.2.4 Prevention of Swallowing

Not applicable.

8.3 EXPOSURE GUIDELINES

None Established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Odor, Color, Grade:	Colorless, clear liquid.
General Physical Form:	Liquid
Autoignition temperature	<i>No Data Available</i>
Flash Point	<i>Not Applicable</i>
Flammable Limits - LEL	<i>Not Applicable</i>
Flammable Limits - UEL	<i>Not Applicable</i>
Boiling point	94 °C
Density	1.8 g/ml
Vapor Density	14.0 [Ref Std: AIR=1]
Vapor Pressure	42 mmHg [@ 20 °C]
Specific Gravity	1.8 [Ref Std: WATER=1]
pH	<i>Not Applicable</i>
Melting point	<i>No Data Available</i>
Solubility in Water	Negligible
Evaporation rate	1.0 [Ref Std: BUOAC=1]
Volatile Organic Compounds	<i>No Data Available</i>
Percent volatile	100 %
VOC Less H2O & Exempt Solvents	<i>No Data Available</i>
Viscosity	0.8 centipoise [@ 25 °C]

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid: None known **Additional Information:** Finely divided active metals, alkali and alkaline earth metals.

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

Substance

Carbon monoxide
Carbon dioxide
Hydrogen Fluoride
Toxic Vapor, Gas, Particulate

Condition

During Combustion
During Combustion
During Combustion
During Combustion

Hazardous Decomposition: Hydrogen fluoride has an ACGIH Threshold Limit Value of 3 parts per million (as fluoride) as a Ceiling Limit and an OSHA PEL of 3 ppm of fluoride as an eight hour Time-Weighted Average and 6 ppm of fluoride as a Short Term Exposure Limit. The odor threshold for HF is 0.04 ppm, providing good warning properties for exposure.

SECTION 11: TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

Not determined.

CHEMICAL FATE INFORMATION

Not determined.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: Reclaim if feasible. To reclaim or return, contact your 3M sales representative.

Incinerate in an industrial or commercial facility in the presence of a combustible material. As a disposal alternative, dispose of waste product in a facility permitted to accept chemical waste. Combustion products will include HF. Facility must be capable of handling halogenated materials.

EPA Hazardous Waste Number (RCRA): Not regulated

Since regulations vary, consult applicable regulations or authorities before disposal.

SECTION 14: TRANSPORT INFORMATION

ID Number(s):

98-0212-3392-3, 98-0212-3393-1, ZF-0002-1623-2, ZF-0002-1624-0, ZF-0002-1625-7

Please contact the emergency numbers listed on the first page of the MSDS for Transportation Information for this material.

SECTION 15: REGULATORY INFORMATION

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

STATE REGULATIONS

Contact 3M for more information.

CHEMICAL INVENTORIES

The components of this product are in compliance with the chemical notification requirements of TSCA.

Contact 3M for more information.

INTERNATIONAL REGULATIONS

Contact 3M for more information.

This MSDS 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: 0 Reactivity: 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: 0 Flammability: 0 Reactivity: 0 Protection: X - See PPE section.

Hazardous Material Identification System (HMIS(r)) 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(r) ratings are to be used with a fully implemented HMIS(r) program. HMIS(r) is a registered mark of the National Paint and Coatings Association (NPCA).

Revision Changes:

Section 7: Handling comment was added.

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