



## Material Safety Data Sheet

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### SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** 3M™Novec™ Flux Remover  
**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)**

**Issue Date:** 05/02/11  
**Supersedes Date:** 10/01/08

**Document Group:** 20-0407-5

#### Product Use:

**Intended Use:** For Electronics Cleaning Only. Not Intended For Use As A Medical Device Or Drug..  
**Specific Use:** Flux Remover  
**Use – Nordic only:** Juuksutteen poistoaine. Aerosoli.

### SECTION 2: INGREDIENTS

<u>Ingredient</u>	<u>C.A.S. No.</u>	<u>% by Wt</u>
1,2-Trans-Dichloroethylene	156-60-5	65 - 72
Ethyl Nonafluoroisobutyl Ether	163702-06-5	6 - 16
Ethyl Nonafluorobutyl Ether	163702-05-4	4 - 14
Methyl Nonafluoroisobutyl Ether	163702-08-7	3 - 8
Methyl Nonafluorobutyl Ether	163702-07-6	2 - 7
Carbon Dioxide	124-38-9	1 - 5
Isopropyl Alcohol	67-63-0	1 - 5

### SECTION 3: HAZARDS IDENTIFICATION

#### 3.1 EMERGENCY OVERVIEW

**Specific Physical Form:** Aerosol

**Odor, Color, Grade:** Clear, Colorless Liquid with Slight Odor, Contents Under Pressure

**General Physical Form:** Liquid

**Immediate health, physical, and environmental hazards:** Closed containers exposed to heat from fire may build pressure and

explode. Aerosol container contains gas under pressure.

May cause target organ effects.

### 3.2 POTENTIAL HEALTH EFFECTS

#### Eye Contact:

Moderate Eye Irritation: Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

#### Skin Contact:

Moderate Skin Irritation: Signs/symptoms may include localized redness, swelling, itching, and dryness.

#### Inhalation:

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

Intentional concentration and inhalation may be harmful or fatal.

If thermal decomposition occurs:

May be harmful if inhaled.

May be absorbed following inhalation and cause target organ effects.

#### Ingestion:

Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

May be absorbed following ingestion and cause target organ effects.

#### Target Organ Effects:

Central Nervous System (CNS) Depression: Signs/symptoms may include headache, dizziness, drowsiness, incoordination, nausea, slowed reaction time, slurred speech, giddiness, and unconsciousness.

## 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:** Remove contaminated clothing and shoes. Immediately flush skin with large amounts of water. If signs/symptoms develop, get medical attention. Wash contaminated clothing and clean shoes before reuse.

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

**If Swallowed:** Do not induce vomiting unless instructed to do so by medical personnel. Give victim two glasses of water. Never give anything by mouth to an unconscious person. Get medical attention.

### 4.2 NOTE TO PHYSICIANS

Exposures resulting from intentional misuse and abuse may cause an increase in myocardial irritability. Do not administer sympathomimetic drugs unless absolutely necessary.

## SECTION 5: FIRE FIGHTING MEASURES

### 5.1 FLAMMABLE PROPERTIES

Autoignition temperature

408 °C

Flash Point	Not Applicable
Flammable Limits(LEL)	5.9 % volume
Flammable Limits(UEL)	14.5 % volume

## 5.2 EXTINGUISHING MEDIA

Non-combustible. Choose material suitable for surrounding fire.

## 5.3 PROTECTION OF FIRE FIGHTERS

**Special Fire Fighting Procedures:** 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:** Closed containers exposed to heat from fire may build pressure and explode. Aerosol container contains gas under pressure.

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

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1. Personal precautions, protective equipment and emergency procedures

If possible, seal leaking container. Place leaking containers in a well-ventilated area, preferably an operating exhaust hood, or if necessary outdoors on an impermeable surface until appropriate packaging for the leaking container or its contents is available. Evacuate unprotected and untrained personnel from hazard area. The spill should be cleaned up by qualified personnel. 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.

### 6.2. Environmental precautions

Place depressurized can and clean up wastes in a closed container approved for transportation by appropriate authorities. 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.

### Clean-up methods

Contain spilled material. Clean up residue. Place depressurized can and clean up wastes in a closed container approved for transportation by appropriate authorities. Observe precautions from other sections. Call 3M- HELPS line (1-800-364-3577) for more information on handling and managing the 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. Seal the container.

**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

Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water. Do not pierce or burn container, even after use. Do not spray near flames or sources of ignition. Avoid breathing of vapors, mists or spray. For industrial or professional use only. No smoking: Smoking while using this product can result in contamination of the tobacco and/or smoke and lead to the formation of the hazardous decomposition products mentioned in the Reactivity Data section of this MSDS. Store work clothes separately from other clothing, food and tobacco products. Avoid contact with oxidizing agents. Use general dilution

ventilation and/or local exhaust ventilation to control airborne exposures to below Occupational Exposure Limits. If ventilation is not adequate, use respiratory protection equipment. Avoid skin contact. Avoid eye contact. Do not breathe thermal decomposition products.

## 7.2 STORAGE

Store away from heat. Store out of direct sunlight. Keep container in well-ventilated area. Store away from oxidizing agents. Store away from strong bases.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 ENGINEERING CONTROLS

Use in a well-ventilated area. Provide appropriate local exhaust when product is heated. Do not use in a confined area or areas with little or no air movement.

### 8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

#### 8.2.1 Eye/Face Protection

Avoid eye contact.

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

Indirect Vented Goggles

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#### 8.2.2 Skin Protection

Avoid skin contact.

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.

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

Polymer laminate

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#### 8.2.3 Respiratory Protection

Avoid breathing of vapors, mists or spray. Under normal use conditions, airborne exposures are not expected to be significant enough to require respiratory protection.

Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: Half facepiece or fullface air-purifying respirator with organic vapor cartridges

. Select and use respiratory protection to prevent an inhalation exposure based on the results of an exposure assessment. Consult with your respirator manufacturer for selection of appropriate types of respirators.

#### 8.2.4 Prevention of Swallowing

Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water.

### 8.3 EXPOSURE GUIDELINES

<u>Ingredient</u>	<u>Authority</u>	<u>Type</u>	<u>Limit</u>	<u>Additional Information</u>
Methyl Nonafluorobutyl Ether	AIHA	TWA	750 ppm	
Carbon Dioxide	ACGIH	TWA	5000 ppm	
Carbon Dioxide	ACGIH	STEL	30000 ppm	
Carbon Dioxide	OSHA	TWA	9000 mg/m <sup>3</sup>	
Ethyl Nonafluorobutyl Ether	3M	TWA, as total isomers	200 ppm	
Ethyl Nonafluoroisobutyl Ether	3M	TWA, as total isomers	200 ppm	
Isopropyl Alcohol	ACGIH	TWA	200 ppm	
Isopropyl Alcohol	ACGIH	STEL	400 ppm	
Isopropyl Alcohol	OSHA	TWA	980 mg/m <sup>3</sup>	

Methyl Nonafluoroisobutyl Ether                      AIHA                      TWA                      750 ppm

**SOURCE OF EXPOSURE LIMIT DATA:**

ACGIH: American Conference of Governmental Industrial Hygienists  
 CMRG: Chemical Manufacturer Recommended Guideline  
 OSHA: Occupational Safety and Health Administration  
 AIHA: American Industrial Hygiene Association Workplace Environmental Exposure Level (WEEL)

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

<b>Specific Physical Form:</b>	Aerosol
<b>Odor, Color, Grade:</b>	Clear, Colorless Liquid with Slight Odor, Contents Under Pressure
<b>General Physical Form:</b>	Liquid
<b>Autoignition temperature</b>	408 °C
<b>Flash Point</b>	<i>Not Applicable</i>
<b>Flammable Limits(LEL)</b>	5.9 % volume
<b>Flammable Limits(UEL)</b>	14.5 % volume
<b>Boiling Point</b>	44 °C
<b>Density</b>	1.3 g/ml
<b>Vapor Density</b>	2.3 [ <i>@ 25 °C</i> ] [ <i>Ref Std: AIR=1</i> ]
<b>Vapor Pressure</b>	360 mmHg [ <i>@ 25 °C</i> ] [ <i>Details: Internal Pressure for Aerosol Can is approximately 75 psig @25C</i> ]
<b>Specific Gravity</b>	1.3 [ <i>Ref Std: WATER=1</i> ]
<b>pH</b>	<i>Not Applicable</i>
<b>Melting point</b>	<i>Not Applicable</i>
<b>Solubility in Water</b>	Slight (less than 10%)
<b>Evaporation rate</b>	<i>No Data Available</i>
<b>Volatile Organic Compounds</b>	67 % [ <i>Details: by weight</i> ]
<b>Kow - Oct/Water partition coef</b>	<i>No Data Available</i>
<b>Percent volatile</b>	100 %
<b>VOC Less H2O &amp; Exempt Solvents</b>	67 % [ <i>Details: by weight</i> ]
<b>Viscosity</b>	0.4 centipoise

**SECTION 10: STABILITY AND REACTIVITY**

**Stability:** Stable.

**Materials and Conditions to Avoid:**

**10.1 Conditions to avoid**  
 Heat

**10.2 Materials to avoid**

Strong bases  
 Strong oxidizing agents

**Hazardous Polymerization:** Hazardous polymerization will not occur.

**Hazardous Decomposition or By-Products**

**Substance**

Carbon monoxide  
Carbon dioxide  
Hydrogen Chloride  
  
Hydrogen Fluoride  
  
Perfluoroisobutylene (PFIB)

**Condition**

During Combustion  
During Combustion  
At Elevated Temperatures - extreme conditions of heat  
At Elevated Temperatures - extreme conditions of heat  
At Elevated Temperatures - extreme conditions of heat

**Hazardous Decomposition:** Perfluorinated Acid Fluorides

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.

Decomposition of this product at temperatures above 300 degrees C can form perfluoroisobutylene (PFIB), but PFIB will only accumulate with continuous exposure to excessive heat in a sealed vessel. The formation rate for PFIB is about 1000 times less than the rate for primary thermal decomposition products such as HF. During normal use conditions, no health hazard is associated with the use of this material due to PFIB exposure.

**SECTION 11: TOXICOLOGICAL INFORMATION**

**Component-Based Toxicology Information:**

For a mixture of ethyl nonafluorobutyl ether and its isomer, a single positive response for cardiac sensitization was observed at an exposure level of 49,000 ppm. No adverse health effects are anticipated from normal handling and use.

**SECTION 12: ECOLOGICAL INFORMATION**

**ECOTOXICOLOGICAL INFORMATION**

Available upon request

**CHEMICAL FATE INFORMATION**

Available upon request

**SECTION 13: DISPOSAL CONSIDERATIONS**

**Waste Disposal Method:** Combustion products will include HF and HCl. Facility must be capable of handling halogenated materials. Dispose of waste product in a facility permitted to accept chemical waste. Facility must be capable of handling aerosol cans. Dispose of empty product containers in a sanitary landfill.

**EPA Hazardous Waste Number (RCRA):** Not regulated

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

**SECTION 14: TRANSPORT INFORMATION**

**ID Number(s):**

98-0212-3291-7, 98-0212-3328-7, 98-0212-3339-4, 98-0212-3461-6

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

## SECTION 15: REGULATORY INFORMATION

### US FEDERAL REGULATIONS

Contact 3M for more information.

#### 311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - Yes 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.

All applicable chemical ingredients in this material are listed on the European Inventory of Existing Chemical Substances (EINECS), or are exempt polymers whose monomers are listed on EINECS. 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: 1 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: 2 Flammability: 1 Reactivity: 0 Protection: X - See PPE section.

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

#### Revision Changes:

Section 1: Product name was modified.

Section 1: Product use information was modified.

Section 16: Disclaimer (second paragraph) was modified.

Section 7: Handling information was modified.

Section 7: Storage information was modified.

Section 8: Engineering controls information was modified.

Section 8: Eye/face protection information was modified.

Section 8: Skin protection - recommended gloves information was modified.

Section 8: Respiratory protection - recommended respirators information was modified.

Section 14: Transportation legal text was modified.  
Page Heading: Product name was modified.  
Section 15: Inventories information was modified.  
Section 9: Vapor density value was modified.  
Section 9: Vapor pressure value was modified.  
Section 9: Boiling point information was modified.  
Section 5: Flammable limits (UE) information was modified.  
Section 5: Flammable limits (LEL) information was modified.  
Section 9: Property description for optional properties was modified.  
Section 8: Respiratory protection - recommended respirators guide was modified.  
Section 9: Flammable limits (LEL) information was modified.  
Section 9: Flammable limits (UEL) information was modified.  
Section 2: Ingredient table was modified.  
Section 8: Exposure guidelines ingredient information was modified.  
Section 6: 6.2. Environmental precautions heading was added.  
Section 6: 6.1. Personal precautions, protective equipment and emergency procedures heading was added.  
Section 10.1 Conditions to avoid heading was added.  
Section 10.2 Materials to avoid heading was added.  
Section 16: Web address was added.  
Section 6: Personal precautions information was added.  
Section 6: Environmental procedures information was added.  
Section 6: Methods for cleaning up information was added.  
Section 10: Materials to avoid physical property was added.  
Section 10: Conditions to avoid physical property was added.  
Section 1: Address was added.  
Copyright was added.  
Company logo was added.  
Section 6: Clean-up methods heading was added.  
Telephone header was added.  
Company Telephone was added.  
Section 1: Emergency phone information was added.  
Section 1: Emergency phone information was deleted.  
Company Logo was deleted.  
Copyright was deleted.  
Section 16: Web address heading was deleted.  
Section 6: Release measures information was deleted.  
Section 6: Release measures heading was deleted.  
Section 10: Materials and conditions to avoid physical property was deleted.  
Section 1: Address line 1 was deleted.  
Section 1: Address line 2 was deleted.

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