



Material Safety Data Sheet

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 3M™ Novec™ Electronic Degreaser
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:

Specific Use: Electronic Degreaser

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

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	396 °C
Flash Point	None acc to ASTM methods D92 (open cup) and D56 (closed cup)
Flammable Limits - LEL	6.7 % volume
Flammable Limits - UEL	13.7 % 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

Accidental Release Measures: 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. Observe precautions from other sections. Call 3M- HELPS line (1-800-364-3577) for more information on handling and managing the spill. Evacuate unprotected and untrained personnel from hazard area. The spill should be cleaned up by qualified personnel. Ventilate the area with fresh air. 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. Collect the resulting residue containing solution. Place in a closed container approved for transportation by appropriate authorities. Seal the container. 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. Avoid eye contact with vapors, mists, or spray. Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water. Do not breathe thermal decomposition products. 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. Do not pierce or burn container, even after use. Do not spray near flames or sources of ignition. 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.

7.2 STORAGE

Keep container in well-ventilated area. Store away from heat. Store out of direct sunlight. 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. Do not use in a confined area or areas with little or no air movement. Provide appropriate local exhaust when product is heated.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection

Avoid eye contact with vapors, mists, or spray.

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

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 (Viton), Polyethylene/Ethylene Vinyl Alcohol.

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. Consult the current 3M Respiratory Selection Guide for additional information or call 1-800-243-4630 for 3M technical assistance.

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>
1,2-TRANS-DICHLOROETHYLENE	ACGIH	TWA	200 ppm	
1,2-TRANS-DICHLOROETHYLENE	OSHA	TWA	200 ppm	
CARBON DIOXIDE	ACGIH	TWA	5000 ppm	
CARBON DIOXIDE	ACGIH	STEL	30000 ppm	
CARBON DIOXIDE	OSHA	TWA	10000 ppm	Table Z-1A
CARBON DIOXIDE	OSHA	STEL	30000 ppm	Table Z-1A
ETHYL NONAFLUOROBUTYL ETHER	3M	TWA, as total isomers	200 ppm	
ETHYL NONAFLUROISOBUTYL ETHER	3M	TWA, as total isomers	200 ppm	
METHYL NONAFLUOROBUTYL ETHER	AIHA	TWA	750 ppm	
METHYL NONAFLUROISOBUTYL 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

Specific Physical Form:	Aerosol
Odor, Color, Grade:	Clear, Colorless Liquid with Slight Odor, Contents Under Pressure
General Physical Form:	Liquid
Autoignition temperature	396 °C
Flash Point	<i>None acc to ASTM methods D92 (open cup) and D56 (closed cup)</i>
Flammable Limits - LEL	6.7 % volume
Flammable Limits - UEL	13.7 % volume
Boiling point	43 °C
Density	1.28 g/ml
Vapor Density	<i>No Data Available</i>
Vapor Pressure	330 mmHg [<i>@ 25 °C</i>] [<i>Details: Internal Pressure for Aerosol Can is approximately 75 psig @25C</i>]
Specific Gravity	1.28 [<i>Ref Std: WATER=1</i>]
pH	<i>Not Applicable</i>
Melting point	<i>Not Applicable</i>
Solubility in Water	Negligible
Evaporation rate	<i>No Data Available</i>
Volatile Organic Compounds	67 % [<i>Details: by weight</i>]
Percent volatile	100 %
VOC Less H2O & Exempt Solvents	67 % [<i>Details: by weight</i>]
Viscosity	0.45 centipoise

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid: Strong bases; Strong oxidizing agents; Heat

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

<u>Substance</u>	<u>Condition</u>
Hydrogen Chloride	At Elevated Temperatures - extreme conditions of heat
Hydrogen Fluoride	At Elevated Temperatures - extreme conditions of heat
Perfluoroisobutylene (PFIB)	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. Dispose of empty product containers in a sanitary landfill. Facility must be capable of handling aerosol cans.

EPA Hazardous Waste Number (RCRA): Not regulated

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

SECTION 14: TRANSPORT INFORMATION

ID Number(s):

98-0212-3292-5, 98-0212-3325-3, 98-0212-3338-6

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 - 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:

Copyright was modified.

Section 3: Potential effects from inhalation information was modified.

Section 6: Release measures information was modified.

Section 7: Handling information was modified.

Section 7: Storage information was modified.

Section 8: Engineering controls information was modified.

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

Section 4: First aid for skin contact - medical assistance - was modified.

Section 4: First aid for inhalation - medical assistance - was modified.

Section 2: Ingredient table was modified.

Section 4: Note to physicians comment was added.

Section 15: 311/312 hazard categories heading was added.

Section 15: 311/312 Fire Hazard score was added.

Section 15: 311/312 Pressure Hazard score was added.

Section 15: 311/312 Reactivity Hazard score was added.

Section 15: 311/312 Immediate Hazard score was added.

Section 15: 311/312 Delayed Hazard score was added.

Section 4: Note to physicians was deleted.

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