



Material Safety Data Sheet

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 3M(TM) PFG-3480 Specialty Gas
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: 07/13/2007
Supersedes Date: 02/20/2007

Document Group: 09-6382-7

Product Use:

Intended Use: FOR INDUSTRIAL USE ONLY. NOT INTENDED FOR USE AS A MEDICAL DEVICE OR DRUG.
Specific Use: Only for Wafer Etch Chamber Cleaning (plasma cleaning agent) and heat transfer agent in industrial applications

SECTION 2: INGREDIENTS

<u>Ingredient</u>	<u>C.A.S. No.</u>	<u>% by Wt</u>
Octafluorotetrahydrofuran	773-14-8	99.5 - 100
Other Perfluorinated Species +(6354P)	Trade Secret	< 0.5

SECTION 3: HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Specific Physical Form: gas

Odor, Color, Grade: colorless, odorless

General Physical Form: Gas

Immediate health, physical, and environmental hazards:

May cause target organ effects. May cause frostbite.

3.2 POTENTIAL HEALTH EFFECTS

Eye Contact:

Frostbite: Signs/symptoms may include intense pain, clouding of the cornea, redness, swelling, and blindness.

Skin Contact:

Frostbite: Signs/symptoms may include intense pain, discoloration of skin, and tissue destruction.

Inhalation:

Simple Asphyxiation: Signs/symptoms may include increased heart rate, rapid respirations, drowsiness, headache, incoordination, altered judgement, nausea, vomiting, lethargy, seizures, coma, and may be fatal.

If thermal decomposition occurs:
May be harmful if inhaled.

May be absorbed following inhalation and cause target organ effects.

Ingestion:

No health effects are expected.

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.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

Product Ozone Depletion Potential (ODP) is zero.
Product Global Warming Potential (GWP) is calculated to be 13,900 (100 yr. ITH)
Atmospheric lifetime <4000 years.

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: 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. No need for first aid is anticipated.

SECTION 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Autoignition temperature	No Data Available
Flash Point	[Details: nonflammable]
Flammable Limits - LEL	[Details: nonflammable]
Flammable Limits - UEL	[Details: nonflammable]

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: 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: Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation and personal protective equipment. Evacuate unprotected and untrained personnel from the hazard area. The spill should be cleaned up by qualified personnel. Ventilate the area. **WARNING !** A motor could be an ignition source and could cause flammable gases or vapors in the spill area to burn or explode. If it can be done safely, place the leaking containers in an exhaust hood or well-ventilated area. Contain spill, using absorbent if necessary. Collect spilled material with non-sparking tools. Clean up residue. Place depressurized cans and clean up wastes in a metal container approved for transportation. Seal the container. **WARNING !** To avoid problems with pressure buildup, slowly leaking pressurized aerosol cans should not be placed in sealed containers.

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. Contents may be under pressure, open carefully. Avoid breathing of vapors. 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.

7.2 STORAGE

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 ventilation on open containers. Do not use in a

confined area or areas with little or no air movement. Do not remain in area where available oxygen may be reduced. Do not allow gas to come into contact with heat sources.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection

Avoid eye contact.

The following eye protection(s) are recommended: Full Face Shield, Indirect Vented Goggles. When connecting and disconnecting cylinders and lines.

8.2.2 Skin Protection

Wear insulated gloves to protect against frostbite.

When connecting and disconnecting cylinders and lines. Wear gloves and clothing to prevent frostbite from direct contact with liquid/gas.

8.2.3 Respiratory Protection

Avoid breathing of vapors.

Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: Fullface supplied-air respirator. Consult the current 3M Respiratory Selection Guide for additional information or call 1-800-243-4630 for 3M technical assistance. If respiratory protection is needed, a supplied air respirator is recommended.

Organic vapor cartridge respirators are not recommended because they do not effectively absorb this material.

8.2.4 Prevention of Swallowing

Not applicable.

8.3 EXPOSURE GUIDELINES

None Established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Specific Physical Form:	gas
Odor, Color, Grade:	colorless, odorless
General Physical Form:	Gas
Autoignition temperature	<i>No Data Available</i>
Flash Point	[<i>Details: nonflammable</i>]
Flammable Limits - LEL	[<i>Details: nonflammable</i>]
Flammable Limits - UEL	[<i>Details: nonflammable</i>]
Boiling point	-0.8 °C
Density	1.52 g/ml
Vapor Density	<i>No Data Available</i>
Vapor Pressure	30.8 psia [@ 20 °C]
Specific Gravity	1.52 [<i>Ref Std: WATER=1</i>]
pH	<i>Not Applicable</i>
Melting point	<i>Not Applicable</i>
Solubility In Water	<i>Not Applicable</i>
Evaporation rate	<i>No Data Available</i>
Volatile Organic Compounds	[<i>Details: Exempt</i>]

Percent volatile	100 %
VOC Less H2O & Exempt Solvents	[Details: Exempt]
Viscosity	0.1 centipoise

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid: Heat(excessive temperatures >300C)

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

<u>Substance</u>	<u>Condition</u>
Carbon monoxide	At Elevated Temperatures - e.g. under fire conditions
Carbon dioxide	At Elevated Temperatures - e.g. under fire conditions
Hydrogen Fluoride	At Elevated Temperatures - e.g. under fire conditions
Perfluoroisobutylene (PFIB)	At Elevated Temperatures - e.g. under fire conditions

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

<u>Test Type</u>	<u>Result</u>	<u>Protocol</u>
	See 3.3	

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, incinerate in an industrial or commercial facility. Combustion products will include HF. Facility must be capable of handling halogenated materials. 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):
98-0212-2895-6, 98-0212-2896-4

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

This material contains one or more substances which are subject to a TSCA Consent Order or Significant New Use Rule.

Contact 3M for more information.

311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - Yes Reactivity Hazard - No Immediate Hazard - Yes Delayed Hazard - No

This material contains a chemical which requires export notification under TSCA Section 12[b]:

<u>Ingredient (Category if applicable)</u>	<u>C.A.S. No</u>	<u>Regulation</u>	<u>Status</u>
Octafluorotetrahydrofuran	773-14-8	Toxic Substances Control Act (TSCA) 5 SNUR or Consent Order Chemicals	Applicable

STATE REGULATIONS

Contact 3M for more information.

CHEMICAL INVENTORIES

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

One or more of the components of this product have been notified to ELINCS (European List of Notified or New Chemical Substances). Certain restrictions apply. Contact the selling division for additional information.

Contact 3M for more information.

INTERNATIONAL REGULATIONS

Contact 3M for more information.

ADDITIONAL INFORMATION

New Jersey Trade Secret Registry (EIN) 04499600-+

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: 3 **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 16: HMIS hazard classification for health was modified.
- Section 3: Potential effects from inhalation information was modified.
- Section 7: Handling information was modified.
- Section 7: Storage information was modified.
- Section 8: Eye/face protection information was modified.
- Section 4: First aid for ingestion (swallowing) - medical assistance - was modified.
- Section 3: Immediate other hazard(s) was modified.
- Section 3: Other potential health effects heading was added.
- Section 8: Respiratory protection information was added.
- Section 10: Hazardous decomposition or by-products phrase was added.
- Section 8: Respiratory protection - recommended respirators information was added.
- Section 4: First aid for ingestion (swallowing) - decontamination - was added.
- Section 4: First aid for ingestion (swallowing) - intervention - was added.
- Section 8: Respiratory protection - recommended respirators was added.
- Section 3: Other health effects information was added.
- Section 8: Respiratory protection - recommended respirators guide was added.

Section 10: Hazardous decomposition heading was added.

Section 8: Respiratory protection - recommended respirators punctuation was added.

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

Section 8: Skin protection - recommended gloves text was deleted.

Section 8: Skin protection - protective clothing text was deleted.

Section 8: Skin protection - recommended gloves - punctuation was deleted.

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