

**MATERIAL SAFETY
DATA SHEET**

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DIVISION: SPECIALTY CHEMICALS DIVISION

TRADE NAME:

FC-1094 FLUORAD(TM) Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: 98-0211-6603-2 00-51135-10422-4 98-0211-6604-0 00-51135-10423-1
98-0211-6605-7 00-51135-10424-8 98-0211-8859-8 00-51135-10972-4

ISSUED: FEBRUARY 6, 1997

SUPERSEDES: AUGUST 22, 1996

DOCUMENT: 05-6285-0

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	80.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	3825-26-1	18.0 - 21.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	6130-43-4	0.1 - 1.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	21615-47-4	0.1 - 1.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	68259-11-0	0.1 - 1.0

NOTE: The ingredients of this product are included on TSCA.

2. PHYSICAL DATA

BOILING POINT:..... ca. 100 C
VAPOR PRESSURE:..... ca. 18 mmHg
Calc. @ 20 C
VAPOR DENSITY: ca. 0.62 Air = 1
Calc. @ 20 C
EVAPORATION RATE:..... < 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... ca. 1.1 Water = 1
PERCENT VOLATILE: 80 %
pH: ca. 5
(2.0% Aqueous)
VISCOSITY: N/A
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Light colored liquid; slight odor.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... Setflash
None
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A
AUTOIGNITION TEMPERATURE: ... N/A
EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam

Abbreviations: N/D - Not Determined N/A - Not Applicable



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3. FIRE AND EXPLOSION HAZARD DATA (continued)

SPECIAL FIRE FIGHTING PROCEDURES:

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not Applicable

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment. In the U.S.A., call (612) 733-1110 or (612) 733-6100 for 24-hour spill assistance. Contain spill. Cover with absorbent material. Collect spilled material.

For spills to ground: Collect contaminated soil. Pump contaminated water from puddles or stagnant storm sewers. Place collected waste in approved containers, and seal. For spills to ground or surface water: Notify appropriate authorities. Contact 3M to evaluate further needs.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

Pass contaminated water through anion exchange resin. If necessary, contact 3M for assistance.

ENVIRONMENTAL DATA:

Data for product solids: Chemical Oxygen Demand (COD): Nil (0.00070 g/g); 20-Day Biochemical Oxygen Demand (BOD20): Nil; 96-Hr. LC50, Bluegill Sunfish (*Lepomis macrochirus*): 569 mg/L; 96-Hr. LC50, Fathead Minnow (*Fimephales promelas*): 766 mg/L; 48-Hr EC50, *Daphnia magna*: 632 mg/L; 14-Day EC50 (cell dry weight), Green Algae (*Selenastrum capricornutum*) 73 mg/L. Soil Adsorption Coefficient (Koc): 17, indicates very high mobility. (Study used a sandy loam soil).

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.

Abbreviations: N/D - Not Determined N/A - Not Applicable

5. ENVIRONMENTAL INFORMATION (continued)

VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The components of this product are in compliance with the chemical registration requirements of: TSCA, EINECS, CDSL, AICS, MITI.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Not applicable.

OTHER PRECAUTIONARY INFORMATION:

HMS Hazard Ratings: HEALTH: 2 FLAMMABILITY: 0 REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.01	mg/m3	TWA	ACGIH	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA	3M	Y

* SKIN NOTATION: Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:

No toxicity data for the solution.

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

Single exposure may cause:

Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

No toxicity data for the solution.

INHALATION:

Illness requiring medical attention may result from a single exposure by inhalation to moderate quantities of this material.

May be absorbed by inhalation and persist in the body for an extended time.

No toxicity data for the solution.

Repeated inhalation exposure produced liver changes and elevated blood organofluoride levels in rats.

Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

No toxicity data for the solution.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

Ammonium perfluoroalkyl carboxylate was not mutagenic in invitro mutagenicity assays. Did not cause cell transformation in a mammalian cell transformation assay.

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Ammonium perfluoroalkyl carboxylate was not teratogenic in rabbits by oral administration and was not teratogenic to rats by gavage and inhalation exposures.

OTHER HEALTH HAZARD INFORMATION:

Health hazard information is based on data for ammonium perfluoroalkyl carboxylate solids.

SECTION CHANGE DATES

HEALTH HAZD. DATA SECTION CHANGED SINCE AUGUST 22, 1996ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

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3. FIRE AND EXPLOSION HAZARD DATA (continued)

protective covering for exposed areas of the head.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not Applicable

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Ventilate area. Contain spill. Cover with absorbent material. Collect spilled material. Clean up residue with water. Place in an approved metal container. Seal the container.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Chemical Oxygen Demand (COD): 0.000175 g/g; Theoretical Oxygen Demand (ThOD): 0.08 g/g; 5-Day Biochemical Oxygen Demand (BOD5): Nil; 20-Day Biochemical Oxygen Demand (BOD20): Nil; 96-Hr LC50, Fathead minnow (*Pimephales promelas*): >1000 mg/L; 96-Hr LC50, Bluegill sunfish (*Lepomis macrochirus*): 996 mg/L; 48-Hr EC50 (mobility), Water flea (*Daphnia magna*): >1000 mg/L; 14-Day EC50 (cell dry weight), Green Algae (*Selenastrum capricornutum*): 130 mg/L; 14-Day EC50 (cell count) Green Algae (*Selenastrum capricornutum*): 75 mg/L

REGULATORY INFORMATION:

Volatile Organic Compounds: N/D.
VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The components of this product are in compliance with the chemical registration requirements of: TSCA, EINECS, CDSL, AICS, MITI.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Not applicable.

OTHER PRECAUTIONARY INFORMATION:

HMS HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: C REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
AMMONIUM PERFLUOROHEXANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROHEPTANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROPENTANOATE	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:

No toxicity data for the solution. Ammonium perfluoroalkanoates can be irritating to the eye and may cause eye injury from airborne exposure.

SKIN CONTACT:

May be absorbed through the skin and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates are slightly toxic when absorbed through the skin.

INHALATION:

May be absorbed by inhalation and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates can be considered moderately toxic by inhalation on a single

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

exposure; a median lethal concentration for a 4-hour exposure in the albino rat is 930 milligrams per cubic meter.
Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

No toxicity data for the solution. A mixture of ammonium perfluoroalkanoates was moderately toxic in albino rats from a single oral exposure; acute oral LD50 (rat) is 540 mg. per kg. of body weight.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not mutagenic in invitro mutagenicity assays. The mixture did not cause cell transformation in a mammalian cell transformation assay.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not teratogenic in rabbits by oral administration and was not teratogenic to rats by gavage and inhalation exposures.

SECTION CHANGE DATES

HEALTH HAZD. DATA SECTION CHANGED SINCE AUGUST 22, 1996ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

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DIVISION: SPECIALTY CHEMICALS DIVISION

TRADE NAME:

FC-1013 FLUORAD (TM) Fluorochemical Surfactant

ID NUMBER/U.P.C.: ZF-0002-0501-1 - - - ZF-C002-0573-0 - - -
ZF-0002-0597-7 - - -

ISSUED: FEBRUARY 7, 1997

SUPERSEDES: AUGUST 20, 1996

DOCUMENT: 07-1C75-6

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	70.0
AMMONIUM PERFLUCROOCTANOATE	3825-26-1	29.0
AMMONIUM PERFLUCROHEXANOATE	21615-47-4	0.1 - 1.0
AMMONIUM PERFLUCROHEPTANOATE	6130-43-4	0 - 0.1
AMMONIUM PERFLUCROPENTANOATE	68259-11-0	0 - 0.1

2. PHYSICAL DATA

BOILING POINT:..... 100 C
VAPOR PRESSURE:..... 18 mmHg
 calc @ 20C
VAPOR DENSITY: 0.62 Air = 1
 calc @ 20C
EVAPORATION RATE:..... < 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... 1.16 Water = 1
 calc @ 20C
PERCENT VOLATILE: 70 % by wt.
pH: 4.0-7.0
VISCOSITY: < 10 CPS
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Clear, colorless to pale liquid, slight ammonia odor

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... Setflash
 None (Setflash CC)
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A
AUTOIGNITION TEMPERATURE: ... N/A
EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam
SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing, including helmet, self-contained,

Abbreviations: N/D - Not Determined N/A - Not Applicable



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3. FIRE AND EXPLOSION HAZARD DATA (continued)

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not Applicable

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Hydrogen Fluoride, Ammonia
Toxic vapors, gases or particulates may be products of thermal decomposition.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Ventilate area. Contain spill. Cover with absorbent material. Collect spilled material. Clean up residue with water. Place in an approved metal container. Seal the container.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Total Organic Carbon (TOC): 64 g/kg; Chemical Oxygen Demand (COD): 0.2 g/kg; 5-Day Biochemical Oxygen Demand (BOD5): Nil; 20-Day Biochemical Oxygen Demand (BOD20): Nil; Theoretical Oxygen Demand (ThOD): 96 g/kg; 96-Hr LC50, Fathead minnow (*Pimephales promelas*): >1000 mg/L; 96-Hr LC50, Bluegill sunfish (*Lepomis macrochirus*): 970 mg/L; 48-Hr EC50 (Mobility), Water flea (*Daphnia magna*): >1000 mg/L; 14-Day EC50 (cell dry weight), Green algae (*Selenastrum capricornutum*): 120 mg/L; 14-Day EC50 (cell count), Green algae (*Selenastrum capricornutum*): 70 mg/L

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Do not store containers on their sides. Store at room temperature.

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:
 Not applicable.

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
AMMONIUM PERFLUOROHXANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROHEPTANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROPENTANOATE	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:

Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

No toxicity data for the solution. Ammonium perfluoroalkanoates can be irritating to the eye and may cause eye injury from airborne exposure.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates are slightly toxic when absorbed through the skin.

INHALATION:

May be absorbed by inhalation and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

can be considered moderately toxic by inhalation on a single exposure; a median lethal concentration for a 4-hour exposure in the albino rat is 930 milligrams per cubic meter.
Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

No toxicity data for the solution. A mixture of ammonium perfluoroalkanoates was moderately toxic in albino rats from a single oral exposure; acute oral LD50 (rat) is 540 mg. per kg. of body weight.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not mutagenic in invitro mutagenicity assays. The mixture did not cause cell transformation in a mammalian cell transformation assay.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not teratogenic in rabbits by oral administration and was not teratogenic to rats by gavage and inhalation exposures.

SECTION CHANGE DATES

HEALTH HAZD. DATA SECTION CHANGED SINCE AUGUST 20, 1996ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

SECTION CHANGE DATES

Abbreviations: N/D - Not Determined N/A - Not Applicable

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DIVISION: SPECIALTY CHEMICALS DIVISION
TRADE NAME:
EX-1003 FLUORAD(TM) Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: ZF-0002-0122-6 - - -

ISSUED: FEBRUARY 7, 1997
SUPERSEDES: AUGUST 22, 1996
DOCUMENT: 10-4270-4

1. INGREDIENT	C.A.S. NO.		PERCENT
WATER	7732-18-5		50.0
AMMONIUM PERFLUCROOCTANOATE	3825-26-1	43.0 -	45.0
INERT PERFLUORO COMPOUNDS	Unknown	<	3.0
TRIDECAFLUOROHEPTANOIC ACID, AMMONIUM SALT	6130-43-4	0.5 -	1.0
AMMONIUM NONAFLUOROPENTANOATE	68259-11-0	0.5 -	1.0

NOTE: Inert Perfluoro Compounds are not on TSCA. Not for commercial sale
or use in the U.S.

2. PHYSICAL DATA

BOILING POINT:	ca. 100 C
VAPOR PRESSURE:	18 mmHg
	Calc. @ 20 C
VAPOR DENSITY:	C.62 Air = 1
	Calc. @ 20 C
EVAPORATION RATE:	< 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER:	complete
SP. GRAVITY:	ca. 1.3 Water = 1
	(Bulk)
PERCENT VOLATILE:	50 %
pH:	8.0-9.5
	(0.5% Aqueous)
VISCOSITY:	N/D
MELTING POINT:	N/D
APPEARANCE AND ODOR:	Clear, colorless to pale yellow liquid, slight ammonia odor.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	Setaflash
	Non-Flammable
FLAMMABLE LIMITS - LEL:	N/A
FLAMMABLE LIMITS - UEL:	N/A

Abbreviations: N/D - Not Determined N/A - Not Applicable



3M_MN05434588

3. FIRE AND EXPLOSION HAZARD DATA (continued)

AUTOIGNITION TEMPERATURE: ... N/D

EXTINGUISHING MEDIA:

Water, Carbon dioxide, Dry chemical, Foam

SPECIAL FIRE FIGHTING PROCEDURES:

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not applicable.

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Cover with absorbent material. Collect spilled material. Place in an approved metal container.

RECOMMENDED DISPOSAL:

Discharge spent solutions and small quantities (less than 5 gal.(19 L)) to a wastewater treatment system. Reduce discharge rate if foaming occurs. Incinerate in a permitted hazardous waste incinerator in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Data are for product solids: Chemical Oxygen Demand (COD): Nil (700 mg/Kg); 20-Day Biochemical Oxygen Demand (BOD20): Nil; 96-Hr. LC50, Bluegill Sunfish (Lepomis macrochirus): 569 mg/L; 96-Hr. LC50, Fathead Minnow(Pimephales promelas): 766 mg/L; 48-Hr EC50, Daphnia magna: 632 mg/L; 14-Day EC50 (cell dry weight), Green Algae (Selenastrum capricornutum) 73 mg/L; 30-Min. EC50, Microtox System, Photobacterium phosphoreum: >1,000 mg/L; OECD EC50: >1,000 mg/L.

REGULATORY INFORMATION:

Volatile Organic Compounds: N/D.

VOC Less H2O & Exempt Solvents: N/D.

This product is in compliance with the chemical registration requirements of EINECS.

Abbreviations: N/D - Not Determined N/A - Not Applicable

5. ENVIRONMENTAL INFORMATION (continued)

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Flush skin with large amounts of water. If irritation persists, get medical attention.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

If swallowed: If conscious, induce vomiting immediately as directed by medical personnel.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. The following should be worn alone or in combination, as appropriate, to prevent eye contact: Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: apron, head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex).

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Use in a well-ventilated area. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

Do not eat, drink or smoke when using this product. Wash exposed

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

areas thoroughly with soap and water. Wash hands after handling and before eating.

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Not applicable.

OTHER PRECAUTIONARY INFORMATION:

HMSI HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: 0 REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
INERT PERFLUORO COMPOUNDS	NONE	NONE	NONE	NONE	
TRIDecaFLUOROHEPTANOIC ACID, AMMONIUM SALT	0.1	mg/m3	TWA	3M	Y
AMMONIUM NONaFLUOROPENTANOATE	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:

Severe Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, cloudy appearance of the cornea, impaired vision and possible permanently impaired vision.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

INHALATION:

Illness requiring medical attention may result from a single exposure

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

by inhalation to moderate quantities of this material.

May be absorbed by inhalation and persist in the body for an extended time.

Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Not teratogenic in rabbits by oral administration. Not teratogenic to rats by gavage or inhalation exposures.

OTHER HEALTH HAZARD INFORMATION:

A Product Toxicity Summary Sheet is available.

SECTION CHANGE DATES

HEALTH HAZD. DATA SECTION CHANGED SINCE AUGUST 22, 1996ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

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DIVISION: SPECIALTY CHEMICALS DIVISION
TRADE NAME:
EX-1005 FLUORAD(TM) Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: ZF-0002-0544-1 - - - ZF-C002-0668-8 - - -
ZF-0002-0689-4 - - - ZF-0002-0726-4 - - -
ZF-0002-0787-6 - - - 98-0211-5687-6 00-51135-10218-3

ISSUED: FEBRUARY 7, 1997
SUPERSEDES: OCTOBER 8, 1996
DOCUMENT: 10-4351-2

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	70.0
AMMONIUM PERFLUCROCTANOATE	3825-26-1	26.0 -
LOWER PERFLUOROALKYL CARBOXYLATE SALT	21615-47-4	1.0 -
LOWER PERFLUOROALKYL CARBOXYLATE SALT	6130-43-4	1.0 -
LOWER PERFLUOROALKYL CARDOXYLATE SALT	68259-11-0	0.1 -

2. PHYSICAL DATA

BOILING POINT:..... 100 C
VAPOR PRESSURE:..... 18 mmHg
Calc. @ 20 C
VAPOR DENSITY: 0.62 Air = 1
Calc. @ 20 C
EVAPORATION RATE:..... N/A
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... ca. 1.2 Water = 1
(Bulk)
PERCENT VOLATILE: 70 %
pH: 5.0-6.0
(2% Aqueous)
VISCOSITY: N/D
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Light yellow liquid.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... None (Setaflash CC)
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A

Abbreviations: N/D - Not Determined N/A - Not Applicable



3M_MN05435506

3. FIRE AND EXPLOSION HAZARD DATA (continued)

AUTOIGNITION TEMPERATURE: ... N/A

EXTINGUISHING MEDIA:

Water, Carbon dioxide, Dry chemical, Foam

SPECIAL FIRE FIGHTING PROCEDURES:

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not applicable.

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Ventilate area. Contain spill. Cover with absorbent material. Collect spilled material. Clean up residue with water. Place in an approved metal container. Seal the container.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Not determined.

REGULATORY INFORMATION:

Volatile Organic Compounds: N/D.
VOC Less H₂O & Exempt Solvents: N/D.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The components of this product are in compliance with the chemical registration requirements of: TSCA, EINECS, CDSL, AICS, MITI.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water. Get immediate medical attention.

SKIN CONTACT:

Flush skin with large amounts of water. If irritation persists, get medical attention.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: apron, head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex).

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Keep container tightly closed.

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

OTHER PRECAUTIONARY INFORMATION:

HMS HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: C REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
LOWER PERFLUOROALKYL CARBOXYLATE SALT	0.1	mg/m3	TWA	3M	Y
LOWER PERFLUOROALKYL CARBOXYLATE SALT	0.1	mg/m3	TWA	3M	Y
LOWER PERFLUOROALKYL CARBOXYLATE SALT	0.1	mg/m3	TWA	3M	Y

* SKIN NOTATION: Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:

Severe Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, cloudy appearance of the cornea, impaired vision and possible permanently impaired vision.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

INHALATION:

Illness requiring medical attention may result from a single exposure by inhalation to moderate quantities of this material.

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

May be absorbed by inhalation and persist in the body for an extended time.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

SECTION CHANGE DATES

HEALTH HAZD. DATA SECTION CHANGED SINCE OCTOBER 8, 1996ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

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DIVISION: SPECIALTY CHEMICALS DIVISION
TRADE NAME:
EX-1006 FLUORAD (TM) Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: 2F-0002-0827-0 - - -

ISSUED: FEBRUARY 7, 1997
SUPERSEDES: AUGUST 22, 1996
DOCUMENT: 07-3196-8

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	70.0
AMMONIUM PERFLUCROOCTANOATE	3825-26-1	28.0
PERFLUORO COMPOUNDS ++	Unknown	1.0
AMMONIUM PERFLUCROHEXANOATE	21615-47-4	0.1 - 1.0
AMMONIUM PERFLUCROHEPTANOATE	6130-43-4	0.1 - 1.0
AMMONIUM PERFLUCROPENTANOATE	68259-11-0	0 - 0.1

NOTE: +- NOT ON TSCA. NOT FOR COMMERCIAL USE OR SALE IN THE U.S.

2. PHYSICAL DATA

BOILING POINT:..... 100 C
(Typical)
VAPOR PRESSURE:..... 18 mmHg
calc @ 20C
VAPOR DENSITY: 0.62 Air = 1
calc @ 20C
EVAPORATION RATE:..... < 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... 1.2 Water = 1
PERCENT VOLATILE: 70 % by wt
pH: 6.0-8.0
VISCOSITY: N/D
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Clear, colorless to pale liquid, slight ammonia odor

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... > 100 C SetFlash
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A
AUTOIGNITION TEMPERATURE: ... N/A
EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam

Abbreviations: N/D - Not Determined N/A - Not Applicable



3M_MN05423793

3. FIRE AND EXPLOSION HAZARD DATA (continued)

SPECIAL FIRE FIGHTING PROCEDURES:

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

None known.

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Ventilate area. Contain spill. Cover with absorbent material. Collect spilled material. Clean up residue with water. Place in an approved metal container. Seal the container.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Chemical Oxygen Demand (COD) = 0.0002 g/g; Theoretical Oxygen Demand (ThOD) = 0.11 g/g; 20-Day Biochemical Oxygen Demand (BOD20) = Nil; Fathead minnow (pimephales promelas) 96-hr LC50 = >1000 mg/L; Water flea (Daphnia magna) 48-hr EC50 = >1000 mg/L; Bluegill sunfish (Lepomis macrochirus) 96-hr LC50 = 967 mg/L; Green algae (Selenastrum capricornutum) 14-day EC50 (cell dry weight) = 124 mg/L.

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The ingredients of this product are in compliance with EINECS.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Not applicable.

OTHER PRECAUTIONARY INFORMATION:

HMS HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: 1 REACTIVITY: 0
PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
PERFLUORO COMPOUNDS +-	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROHXANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROHEPTANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROPENTANOATE	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:

Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

No toxicity data for the solution. Ammonium perfluoroalkanoates can be irritating to the eye and may cause eye injury from airborne exposure.

SKIN CONTACT:

May be absorbed through the skin and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates are slightly toxic when absorbed through the skin.

INHALATION:

May be absorbed by inhalation and persist in the body for an extended

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates can be considered moderately toxic by inhalation on a single exposure; a median lethal concentration for a 4-hour exposure in the albino rat is 930 milligrams per cubic meter. Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

No toxicity data for the solution. A mixture of ammonium perfluoroalkanoates was moderately toxic in albino rats from a single oral exposure; acute oral LD50 (rat) is 540 mg. per kg. of body weight.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not mutagenic in invitro mutagenicity assays. The mixture did not cause cell transformation in a mammalian cell transformation assay.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not teratogenic in rabbits by oral administration and was not teratogenic to rats by gavage and inhalation exposures.

SECTION CHANGE DATES

HEALTH HAZD. DATA SECTION CHANGED SINCE AUGUST 22, 1996ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

SECTION CHANGE DATES

Abbreviations: N/D - Not Determined N/A - Not Applicable

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DIVISION: SPECIALTY CHEMICALS DIVISION
TRADE NAME:

EX-1002 FLUORAD(TM) Brand Fluorochemical Salt

ID NUMBER/U.P.C.: ZF-0002-0098-8 - - - ZF-C002-0110-1 - - -

ISSUED: FEBRUARY 7, 1997
SUPERSEDES: AUGUST 22, 1996
DOCUMENT: 10-4C89-8

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	75.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	3825-26-1	20.0 -
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	6130-43-4	1.0 -
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	21615-47-4	1.0 -
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	68259-11-0	1.0 -

2. PHYSICAL DATA

BOILING POINT:..... ca. 100 C
VAPOR PRESSURE:..... ca. 18 mmHg
Calc. @ 20 C
VAPOR DENSITY: ca. 0.62 Air = 1
Calc. @ 20 C
EVAPORATION RATE:..... < 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... 1.1 Water = 1
PERCENT VOLATILE: ca. 75 %
pH: 8.0-9.5
VISCOSITY: N/D
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Clear, colorless to pale yellow liquid, slight ammonium odor

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... None (Setaflash CC)
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A
AUTOIGNITION TEMPERATURE: ... N/A
EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam
SPECIAL FIRE FIGHTING PROCEDURES:
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

Abbreviations: N/D - Not Determined N/A - Not Applicable



3M_MN05433545

3. FIRE AND EXPLOSION HAZARD DATA (continued)

protective covering for exposed areas of the head.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not applicable.

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment. In the U.S.A., call (612) 733-1110 or (612) 733-6100 for 24-hour spill assistance. Cover with absorbent material. Collect spilled material. Place in a U.S. DOT-approved container.

RECOMMENDED DISPOSAL:

Discharge spent solutions and small quantities (less than 5 gal.(19 L)) to a wastewater treatment system. Reduce discharge rate if foaming occurs. Incinerate in a permitted hazardous waste incinerator in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Chemical Oxygen Demand (COD): Nil; 20-Day Biochemical Oxygen Demand (BOD20): Nil; 96-Hr. LC50, Bluegill Sunfish (Lepomis macrochirus): 2280 mg/L; 96-Hr. LC50, Fathead Minnow(Pimephales promelas): 3060 mg/L. 48-Hr. EC50, Daphnia magna: 2530 mg/L; 14-Day EC50, Green Algae (Selenastrum capricornutum): 292 mg/L (cell dry wt.); 14-Day EC50, Selenastrum capricornutum: 172 mg/L (cell count). No adverse effects upon hatchability of Pimephales promelas eggs at 100 mg/L.

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H2O & Exempt Solvents: N/A.

The components of this product are in compliance with the chemical registration requirements of: TSCA, EINECS, CDSL, AICS, MITI.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Flush skin with large amounts of water. If irritation persists, get medical attention.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at room temperature. Keep container closed when not in use.

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

FIRE AND EXPLOSION AVOIDANCE:
 Not applicable.

OTHER PRECAUTIONARY INFORMATION:
 HMIS HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: 0 REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.01	mg/m3	TWA	ACGIH	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:
 - ACGIH: American Conference of Governmental Industrial Hygienists
 - AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
 - 3M: 3M Medical Department Guideline
 - NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:
 Mild Eye Irritation: signs/symptoms can include redness, swelling, pain, and tearing.

SKIN CONTACT:
 Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

INHALATION:
 Illness may occur after a single overexposure by inhalation to relatively large quantities of this material.
 Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

May be absorbed by inhalation and persist in the body for an extended

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

time.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

The oral LD50 for ammonium perfluoroalkyl carboxylate is 540 milligrams per kilogram of body weight in the albino rat.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Not teratogenic in rabbits by oral administration. Not teratogenic to rats by gavage or inhalation exposures.

SECTION CHANGE DATES

HEALTH HAZD. DATA SECTION CHANGED SINCE AUGUST 22, 1996ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

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the intention of earning a profit thereon.

DIVISION: SPECIALTY CHEMICALS DIVISION

TRADE NAME:

FC-1094 FLUORAD(TM) Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: 98-0211-6603-2 00-51135-10422-4 98-0211-6604-0 00-51135-10423-1
98-0211-6605-7 00-51135-10424-8 98-0211-8859-8 00-51135-10972-4

ISSUED: FEBRUARY 19, 1997

SUPERSEDES: FEBRUARY 8, 1997

DOCUMENT: 05-6285-0

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	80.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	3825-26-1	18.0 - 21.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	6130-43-4	0.1 - 1.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	21615-47-4	0.1 - 1.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	68259-11-0	0.1 - 1.0

NOTE: The ingredients of this product are included on TSCA.

2. PHYSICAL DATA

BOILING POINT:..... ca. 100 C
VAPOR PRESSURE:..... ca. 18 mmHg
Calc. @ 20 C
VAPOR DENSITY: ca. 0.62 Air = 1
Calc. @ 20 C
EVAPORATION RATE:..... < 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... ca. 1.1 Water = 1
PERCENT VOLATILE: 80 %
pH: ca. 5
(2.0% Aqueous)
VISCOSITY: N/A
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Light colored liquid; slight odor.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... Setflash
None
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A
AUTOIGNITION TEMPERATURE: ... N/A
EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam

Abbreviations: N/D - Not Determined N/A - Not Applicable



3M_MN05419466

3. FIRE AND EXPLOSION HAZARD DATA (continued)

SPECIAL FIRE FIGHTING PROCEDURES:

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not Applicable

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment. In the U.S.A., call (612) 733-1110 or (612) 733-6100 for 24-hour spill assistance. Contain spill. Cover with absorbent material. Collect spilled material.

For spills to ground: Collect contaminated soil. Pump contaminated water from puddles or stagnant storm sewers. Place collected waste in approved containers, and seal. For spills to ground or surface water: Notify appropriate authorities. Contact 3M to evaluate further needs.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

Pass contaminated water through anion exchange resin. If necessary, contact 3M for assistance.

ENVIRONMENTAL DATA:

Data for product solids: Chemical Oxygen Demand (COD): Nil (0.00070 g/g); 20-Day Biochemical Oxygen Demand (BOD20): Nil; 96-Hr. LC50, Bluegill Sunfish (*Lepomis macrochirus*): 569 mg/L; 96-Hr. LC50, Fathead Minnow (*Fimephales promelas*): 766 mg/L; 48-Hr EC50, *Daphnia magna*: 632 mg/L; 14-Day EC50 (cell dry weight), Green Algae (*Selenastrum capricornutum*) 73 mg/L. Soil Adsorption Coefficient (Koc): 17, indicates very high mobility. (Study used a sandy loam soil).

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.

Abbreviations: N/D - Not Determined N/A - Not Applicable

5. ENVIRONMENTAL INFORMATION (continued)

VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The components of this product are in compliance with the chemical registration requirements of: TSCA, EINECS, CDSL, AICS, MITI.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Not applicable. Nonflammable.

OTHER PRECAUTIONARY INFORMATION:

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 section 4 of this MSDS.

HMS HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: 0 REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE AUTH	SKIN*
	VALUE	UNIT		
WATER	NONE	NONE	NONE NONE	
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.01	mg/m3	TWA ACGIH	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA 3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA 3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA 3M	Y

* SKIN NOTATION: Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- 3M: 3M Medical Department Guideline
- NONE: None Established

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA

EYE CONTACT:

No toxicity data for the solution.
Single exposure may cause:

- Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

No toxicity data for the solution.

INHALATION:

Illness requiring medical attention may result from a single exposure by inhalation to moderate quantities of this material.

May be absorbed by inhalation and persist in the body for an extended time.

No toxicity data for the solution.

Repeated inhalation exposure produced liver changes and elevated blood organofluoride levels in rats.

Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

No toxicity data for the solution.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

Ammonium perfluoroalkyl carboxylate was not mutagenic in invitro

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

mutagenicity assays. Did not cause cell transformation in a mammalian cell transformation assay.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Ammonium perfluoroalkyl carboxylate was not teratogenic in rabbits by oral administration and was not teratogenic to rats by gavage and inhalation exposures.

OTHER HEALTH HAZARD INFORMATION:

Health hazard information is based on data for ammonium perfluoroalkyl carboxylate solids.

SECTION CHANGE DATES

PRECAUT. INFO. SECTION CHANGED SINCE FEBRUARY 6, 1997 ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

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the intention of earning a profit thereon.

DIVISION: SPECIALTY CHEMICALS DIVISION

TRADE NAME:

EX-1002 FLUORAD(TM) Brand Fluorochemical Salt

ID NUMBER/U.P.C.: ZF-0002-0098-8 - - - ZF-C002-0110-1 - - -

ISSUED: FEBRUARY 19, 1997

SUPERSEDES: FEBRUARY 7, 1997

DOCUMENT: 10-4C89-8

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	75.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	3825-26-1	20.0 - 25.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	6130-43-4	1.0 - 3.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	21615-47-4	1.0 - 3.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	68259-11-0	1.0 - 3.0

2. PHYSICAL DATA

BOILING POINT:..... ca. 100 C
VAPOR PRESSURE:..... ca. 18 mmHg
Calc. @ 20 C
VAPOR DENSITY: ca. 0.62 Air = 1
Calc. @ 20 C
EVAPORATION RATE:..... < 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... 1.1 Water = 1
PERCENT VOLATILE: ca. 75 %
pH: 8.0-9.5
VISCOSITY: N/D
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Clear, colorless to pale yellow liquid, slight ammonium odor

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... None (Setaflash CC)
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A
AUTOIGNITION TEMPERATURE: ... N/A
EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam
SPECIAL FIRE FIGHTING PROCEDURES:
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

Abbreviations: N/D - Not Determined N/A - Not Applicable



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3. FIRE AND EXPLOSION HAZARD DATA (continued)

protective covering for exposed areas of the head.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not applicable.

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment. In the U.S.A., call (612) 733-1110 or (612) 733-6100 for 24-hour spill assistance. Cover with absorbent material. Collect spilled material. Place in a U.S. DOT-approved container.

RECOMMENDED DISPOSAL:

Discharge spent solutions and small quantities (less than 5 gal.(19 L)) to a wastewater treatment system. Reduce discharge rate if foaming occurs. Incinerate in a permitted hazardous waste incinerator in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Chemical Oxygen Demand (COD): Nil; 20-Day Biochemical Oxygen Demand (BOD20): Nil; 96-Hr. LC50, Bluegill Sunfish (Lepomis macrochirus): 2280 mg/L; 96-Hr. LC50, Fathead Minnow(Pimephales promelas): 3060 mg/L. 48-Hr. EC50, Daphnia magna: 2530 mg/L; 14-Day EC50, Green Algae (Selenastrum capricornutum): 292 mg/L (cell dry wt.); 14-Day EC50, Selenastrum capricornutum: 172 mg/L (cell count). No adverse effects upon hatchability of Pimephales promelas eggs at 100 mg/L.

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H2O & Exempt Solvents: N/A.

The components of this product are in compliance with the chemical registration requirements of: TSCA, EINECS, CDSL, AICS, MITI.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Flush skin with large amounts of water. If irritation persists, get medical attention.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at room temperature. Keep container closed when not in use.

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

FIRE AND EXPLOSION AVOIDANCE:
Not applicable. Nonflammable.

OTHER PRECAUTIONARY INFORMATION:
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 section 4 of this MSDS.

HMSI HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: 0 REACTIVITY: 0
PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE AUTH	SKIN*
	VALUE	UNIT		
WATER	NONE	NONE	NONE NONE	
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.01	mg/m3	TWA ACGIH	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA 3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA 3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA 3M	Y

* SKIN NOTATION: Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:
- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:
Mild Eye Irritation: signs/symptoms can include redness, swelling, pain, and tearing.

SKIN CONTACT:
Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

INHALATION:
Illness may occur after a single overexposure by inhalation to relatively large quantities of this material.

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

May be absorbed by inhalation and persist in the body for an extended time.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

The oral LD50 for ammonium perfluoroalkyl carboxylate is 340 milligrams per kilogram of body weight in the albino rat.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Not teratogenic in rabbits by oral administration. Not teratogenic to rats by gavage or inhalation exposures.

SECTION CHANGE DATES

PRECAUT. INFO. SECTION CHANGED SINCE FEBRUARY 7, 1997 **ISSUE**

Abbreviations: N/D - Not Determined N/A - Not Applicable

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DIVISION: SPECIALTY CHEMICALS DIVISION
TRADE NAME:
EX-1005 FLUORAD(TM) Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: ZF-0002-0544-1 - - - ZF-0002-0668-8 - - -
ZF-0002-0689-4 - - - ZF-0002-0726-4 - - -
ZF-0002-0787-6 - - - 98-0211-5687-6 00-51135-10218-3

ISSUED: FEBRUARY 19, 1997
SUPERSEDES: FEBRUARY 7, 1997
DOCUMENT: 10-4351-2

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	70.0
AMMONIUM PERFLUCROCTANOATE	3825-26-1	26.0 -
LOWER PERFLUOROALKYL CARBOXYLATE SALT	21615-47-4	1.0 -
LOWER PERFLUOROALKYL CARBOXYLATE SALT	6130-43-4	1.0 -
LOWER PERFLUOROALKYL CARDOXYLATE SALT	68259-11-0	0.1 -

2. PHYSICAL DATA

BOILING POINT:..... 100 C
VAPOR PRESSURE:..... 18 mmHg
Calc. @ 20 C
VAPOR DENSITY: 0.62 Air = 1
Calc. @ 20 C
EVAPORATION RATE:..... N/A
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... ca. 1.2 Water = 1
(Bulk)
PERCENT VOLATILE: 70 %
pH: 5.0-6.0
(2% Aqueous)
VISCOSITY: N/D
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Light yellow liquid.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... None (Setaflash CC)
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A

Abbreviations: N/D - Not Determined N/A - Not Applicable



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3. FIRE AND EXPLOSION HAZARD DATA (continued)

AUTOIGNITION TEMPERATURE: ... N/A

EXTINGUISHING MEDIA:

Water, Carbon dioxide, Dry chemical, Foam

SPECIAL FIRE FIGHTING PROCEDURES:

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not applicable.

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Ventilate area. Contain spill. Cover with absorbent material. Collect spilled material. Clean up residue with water. Place in an approved metal container. Seal the container.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Not determined.

REGULATORY INFORMATION:

Volatile Organic Compounds: N/D.
VOC Less H₂O & Exempt Solvents: N/D.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The components of this product are in compliance with the chemical registration requirements of: TSCA, EINECS, CDSL, AICS, MITI.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water. Get immediate medical attention.

SKIN CONTACT:

Flush skin with large amounts of water. If irritation persists, get medical attention.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: apron, head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex).

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Keep container tightly closed. Nonflammable.

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

OTHER PRECAUTIONARY INFORMATION:

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 section 4 of this MSDS.

HMIS HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: C REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
LOWER PERFLUOROALKYL CARBOXYLATE SALT	0.1	mg/m3	TWA	3M	Y
LOWER PERFLUOROALKYL CARBOXYLATE SALT	0.1	mg/m3	TWA	3M	Y
LOWER PERFLUOROALKYL CARBOXYLATE SALT	0.1	mg/m3	TWA	3M	Y

* SKIN NOTATION: Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:

Severe Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, cloudy appearance of the cornea, impaired vision and possible permanently impaired vision.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

INHALATION:

Illness requiring medical attention may result from a single exposure

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

by inhalation to moderate quantities of this material.

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

May be absorbed by inhalation and persist in the body for an extended time.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3823-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

SECTION CHANGE DATES

PRECAUT. INFO. SECTION CHANGED SINCE FEBRUARY 7, 1997 ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

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3. FIRE AND EXPLOSION HAZARD DATA (continued)

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not Applicable

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Hydrogen Fluoride, Ammonia
Toxic vapors, gases or particulates may be products of thermal decomposition.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Ventilate area. Contain spill. Cover with absorbent material. Collect spilled material. Clean up residue with water. Place in an approved metal container. Seal the container.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Total Organic Carbon (TOC): 64 g/kg; Chemical Oxygen Demand (COD): 0.2 g/kg; 5-Day Biochemical Oxygen Demand (BOD5): Nil; 20-Day Biochemical Oxygen Demand (BOD20): Nil; Theoretical Oxygen Demand (ThOD): 96 g/kg; 96-Hr LC50, Fathead minnow (*Pimephales promelas*): >1000 mg/L; 96-Hr LC50, Bluegill sunfish (*Lepomis macrochirus*): 970 mg/L; 48-Hr EC50 (Mobility), Water flea (*Daphnia magna*): >1000 mg/L; 14-Day EC50 (cell dry weight), Green algae (*Selenastrum capricornutum*): 120 mg/L; 14-Day EC50 (cell count), Green algae (*Selenastrum capricornutum*): 70 mg/L

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Do not store containers on their sides. Store at room temperature.

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:
 Not applicable. Nonflammable.

OTHER PRECAUTIONARY INFORMATION:
 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 section 4 of this MSDS.

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
AMMONIUM PERFLUOROHEXANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROHEPTANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROPENTANOATE	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:
 - ACGIH: American Conference of Governmental Industrial Hygienists
 - AHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
 - 3M: 3M Medical Department Guideline
 - NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:
 Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

No toxicity data for the solution. Ammonium perfluoroalkanoates can be irritating to the eye and may cause eye injury from airborne exposure.

SKIN CONTACT:
 Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

are slightly toxic when absorbed through the skin.

INHALATION:

May be absorbed by inhalation and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates can be considered moderately toxic by inhalation on a single exposure; a median lethal concentration for a 4-hour exposure in the albino rat is 930 milligrams per cubic meter.

Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

No toxicity data for the solution. A mixture of ammonium perfluoroalkanoates was moderately toxic in albino rats from a single oral exposure; acute oral LD50 (rat) is 540 mg. per kg. of body weight.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not mutagenic in invitro mutagenicity assays. The mixture did not cause cell transformation in a mammalian cell transformation assay.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not teratogenic in rabbits by oral administration and was not teratogenic to rats by gavage and inhalation exposures.

SECTION CHANGE DATES

PRECAUT. INFO. SECTION CHANGED SINCE FEBRUARY 7, 1997 ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

Abbreviations: N/D - Not Determined N/A - Not Applicable

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DIVISION: SPECIALTY CHEMICALS DIVISION
TRADE NAME:
EX-1003 FLUORAD(TM) Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: ZF-0002-0122-6 - - -

ISSUED: FEBRUARY 19, 1997
SUPERSEDES: FEBRUARY 7, 1997
DOCUMENT: 10-4270-4

1. INGREDIENT	C.A.S. NO.		PERCENT
WATER	7732-18-5		50.0
AMMONIUM PERFLUOROOCTANOATE	3825-26-1	43.0 -	45.0
INERT PERFLUORO COMPOUNDS	Unknown	<	3.0
TRIDECAFLUOROHEPTANOIC ACID, AMMONIUM SALT	6130-43-4	0.5 -	1.0
AMMONIUM NONAFLUOROPENTANOATE	68259-11-0	0.5 -	1.0

NOTE: Inert Perfluoro Compounds are not on TSCA. Not for commercial sale
or use in the U.S.

2. PHYSICAL DATA

BOILING POINT:	ca. 100 C
VAPOR PRESSURE:	18 mmHg
	Calc. @ 20 C
VAPOR DENSITY:	C.62 Air = 1
	Calc. @ 20 C
EVAPORATION RATE:	< 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER:	complete
SP. GRAVITY:	ca. 1.3 Water = 1
	(Bulk)
PERCENT VOLATILE:	50 %
pH:	8.0-9.5
	(0.5% Aqueous)
VISCOSITY:	N/D
MELTING POINT:	N/D
APPEARANCE AND ODOR:	Clear, colorless to pale yellow liquid, slight ammonia odor.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	Setaflash
	Non-Flammable
FLAMMABLE LIMITS - LEL:	N/A
FLAMMABLE LIMITS - UEL:	N/A

Abbreviations: N/D - Not Determined N/A - Not Applicable



3M_MN05434593

3. FIRE AND EXPLOSION HAZARD DATA (continued)

AUTOIGNITION TEMPERATURE: ... N/D

EXTINGUISHING MEDIA:

Water, Carbon dioxide, Dry chemical, Foam

SPECIAL FIRE FIGHTING PROCEDURES:

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not applicable.

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Cover with absorbent material. Collect spilled material. Place in an approved metal container.

RECOMMENDED DISPOSAL:

Discharge spent solutions and small quantities (less than 5 gal.(19 L)) to a wastewater treatment system. Reduce discharge rate if foaming occurs. Incinerate in a permitted hazardous waste incinerator in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Data are for product solids: Chemical Oxygen Demand (COD): Nil (700 mg/Kg); 20-Day Biochemical Oxygen Demand (BOD20): Nil; 96-Hr. LC50, Bluegill Sunfish (Lepomis macrochirus): 569 mg/L; 96-Hr. LC50, Fathead Minnow(Pimephales promelas): 766 mg/L; 48-Hr EC50, Daphnia magna: 632 mg/L; 14-Day EC50 (cell dry weight), Green Algae (Selenastrum capricornutum) 73 mg/L; 30-Min. EC50, Microtox System, Photobacterium phosphoreum: >1,000 mg/L; OECD EC50: >1,000 mg/L.

REGULATORY INFORMATION:

Volatile Organic Compounds: N/D.
VOC Less H2O & Exempt Solvents: N/D.

This product is in compliance with the chemical registration requirements of EINECS.

Abbreviations: N/D - Not Determined N/A - Not Applicable

5. ENVIRONMENTAL INFORMATION (continued)

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Flush skin with large amounts of water. If irritation persists, get medical attention.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

If swallowed: If conscious, induce vomiting immediately as directed by medical personnel.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. The following should be worn alone or in combination, as appropriate, to prevent eye contact: Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: apron, head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex).

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Use in a well-ventilated area. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

Do not eat, drink or smoke when using this product. Wash exposed

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

areas thoroughly with soap and water. Wash hands after handling and before eating.

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Not applicable. Nonflammable.

OTHER PRECAUTIONARY INFORMATION:

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 section 4 of this MSDS.

HMSI HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: C REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
INERT PERFLUORO COMPOUNDS	NONE	NONE	NONE	NONE	
TRIDECAFLUOROHEPTANOIC ACID, AMMONIUM SALT	0.1	mg/m3	TWA	3M	Y
AMMONIUM NONAFLUOROPENTANOATE	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:

Severe Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, cloudy appearance of the cornea, impaired vision and possible permanently impaired vision.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact):

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

INHALATION:

Illness requiring medical attention may result from a single exposure by inhalation to moderate quantities of this material.

May be absorbed by inhalation and persist in the body for an extended time.

Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Not teratogenic in rabbits by oral administration. Not teratogenic to rats by gavage or inhalation exposures.

OTHER HEALTH HAZARD INFORMATION:

A Product Toxicity Summary Sheet is available.

SECTION CHANGE DATES

PRECAUT. INFO. SECTION CHANGED SINCE FEBRUARY 7, 1997 ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

SECTION CHANGE DATES

Abbreviations: N/D - Not Determined N/A - Not Applicable

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**MATERIAL SAFETY
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DIVISION: SPECIALTY CHEMICALS DIVISION
TRADE NAME:
EX-1006 FLUORAD (TM) Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: ZF-0002-0827-0 - - -

ISSUED: FEBRUARY 19, 1997
SUPERSEDES: FEBRUARY 7, 1997
DOCUMENT: 07-3196-8

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	70.0
AMMONIUM PERFLUCROOCTANOATE	3825-26-1	28.0
PERFLUORO COMPOUNDS ++	Unknown	1.0
AMMONIUM PERFLUCROHEXANOATE	21615-47-4 0.1 -	1.0
AMMONIUM PERFLUCROHEPTANOATE	6130-43-4 0.1 -	1.0
AMMONIUM PERFLUCROPENTANOATE	68259-11-0 0 -	0.1

NOTE: +- NOT ON TSCA. NOT FOR COMMERCIAL USE OR SALE IN THE U.S.

2. PHYSICAL DATA

BOILING POINT:..... 100 C
(Typical)
VAPOR PRESSURE:..... 18 mmHg
calc @ 20C
VAPOR DENSITY: 0.62 Air = 1
calc @ 20C
EVAPORATION RATE:..... < 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... 1.2 Water = 1
PERCENT VOLATILE: 70 % by wt
pH: 6.0-8.0
VISCOSITY: N/D
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Clear, colorless to pale liquid, slight ammonia odor

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... > 100 C Setalash
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A
AUTOIGNITION TEMPERATURE: ... N/A
EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam

Abbreviations: N/D - Not Determined N/A - Not Applicable



3M_MN05423799

3. FIRE AND EXPLOSION HAZARD DATA (continued)

SPECIAL FIRE FIGHTING PROCEDURES:

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

None known.

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Ventilate area. Contain spill. Cover with absorbent material. Collect spilled material. Clean up residue with water. Place in an approved metal container. Seal the container.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Chemical Oxygen Demand (COD) = 0.0002 g/g; Theoretical Oxygen Demand (ThOD) = 0.11 g/g; 20-Day Biochemical Oxygen Demand (BOD20) = Nil; Fathead minnow (pimephales promelas) 96-hr LC50 = >1000 mg/L; Water flea (Daphnia magna) 48-hr EC50 = >1000 mg/L; Bluegill sunfish (Lepomis macrochirus) 96-hr LC50 = 967 mg/L; Green algae (Selenastrum capricornutum) 14-day EC50 (cell dry weight) = 124 mg/L.

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The ingredients of this product are in compliance with EINECS.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep

Abbreviations: N/D - Not Determined N/A - Not Applicable

7. PRECAUTIONARY INFORMATION (continued)

container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:
 Not applicable. Nonflammable.

OTHER PRECAUTIONARY INFORMATION:
 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 section 4 of this MSDS.

HMS HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: 1 REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
PERFLUORO COMPOUNDS +-	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROHXANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROHEPTANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROPENTANOATE	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:
 - ACGIH: American Conference of Governmental Industrial Hygienists
 - AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
 - 3M: 3M Medical Department Guideline
 - NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:
 Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

No toxicity data for the solution. Ammonium perfluoroalkanoates can be irritating to the eye and may cause eye injury from airborne exposure.

SKIN CONTACT:
 May be absorbed through the skin and persist in the body for an extended time.

Abbreviations: N/D - Not Determined N/A - Not Applicable

8. HEALTH HAZARD DATA (continued)

No toxicity data for the solution. Some ammonium perfluoroalkanoates are slightly toxic when absorbed through the skin.

INHALATION:

May be absorbed by inhalation and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates can be considered moderately toxic by inhalation on a single exposure; a median lethal concentration for a 4-hour exposure in the albino rat is 930 milligrams per cubic meter. Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

No toxicity data for the solution. A mixture of ammonium perfluoroalkanoates was moderately toxic in albino rats from a single oral exposure; acute oral LD50 (rat) is 540 mg. per kg. of body weight.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not mutagenic in invitro mutagenicity assays. The mixture did not cause cell transformation in a mammalian cell transformation assay.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not teratogenic in rabbits by oral administration and was not teratogenic to rats by gavage and inhalation exposures.

SECTION CHANGE DATES

PRECAUT. INFO. SECTION CHANGED SINCE FEBRUARY 7, 1997 ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable

SECTION CHANGE DATES

Abbreviations: N/D - Not Determined N/A - Not Applicable

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DIVISION: SPECIALTY CHEMICALS DIVISION

TRADE NAME:

FC-1094 FLUORAD(TM) Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: 98-0211-6603-2 00-51135-10422-4 98-0211-6604-0 00-51135-10423-1
98-0211-6605-7 00-51135-10424-8 98-0211-8859-8 00-51135-10972-4

ISSUED: FEBRUARY 27, 1997

SUPERSEDES: FEBRUARY 19, 1997

DOCUMENT: 05-6285-0

1. INGREDIENT	C.A.S. NO.	PERCENT
WATER	7732-18-5	80.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	3825-26-1	18.0 - 21.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	6130-43-4	0.1 - 1.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	21615-47-4	0.1 - 1.0
AMMONIUM PERFLUCROALKYL CARBOXYLATE ..	68259-11-0	0.1 - 1.0

NOTE: The ingredients of this product are included on TSCA.

2. PHYSICAL DATA

BOILING POINT:..... ca. 100 C
VAPOR PRESSURE:..... ca. 18 mmHg
Calc. @ 20 C
VAPOR DENSITY: ca. 0.62 Air = 1
Calc. @ 20 C
EVAPORATION RATE:..... < 1.0 Butyl Acetate = 1
SOLUBILITY IN WATER: complete
SP. GRAVITY:..... ca. 1.1 Water = 1
PERCENT VOLATILE: 80 %
pH: ca. 5
(2.0% Aqueous)
VISCOSITY: N/A
MELTING POINT:..... N/A
APPEARANCE AND ODOR: Light colored liquid; slight odor.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... Setflash
None
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A
AUTOIGNITION TEMPERATURE: ... N/A
EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately



3M_MN05419472

3. FIRE AND EXPLOSION HAZARD DATA (continued)

SPECIAL FIRE FIGHTING PROCEDURES:

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not Applicable

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment. In the U.S.A., call (612) 733-1110 or (612) 733-6100 for 24-hour spill assistance. Contain spill. Cover with absorbent material. Collect spilled material.

For spills to ground: Collect contaminated soil. Pump contaminated water from puddles or stagnant storm sewers. Place collected waste in approved containers, and seal. For spills to ground or surface water: Notify appropriate authorities. Contact 3M to evaluate further needs.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

Pass contaminated water through anion exchange resin. If necessary, contact 3M for assistance.

ENVIRONMENTAL DATA:

Data for product solids: Chemical Oxygen Demand (COD): Nil (0.00070 g/g); 20-Day Biochemical Oxygen Demand (BOD20): Nil; 96-Hr. LC50, Bluegill Sunfish (*Lepomis macrochirus*): 569 mg/L; 96-Hr. LC50, Fathead Minnow (*Fimephales promelas*): 766 mg/L; 48-Hr EC50, *Daphnia magna*: 632 mg/L; 14-Day EC50 (cell dry weight), Green Algae (*Selenastrum capricornutum*) 73 mg/L. Soil Adsorption Coefficient (Koc): 17, indicates very high mobility. (Study used a sandy loam soil).

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

5. ENVIRONMENTAL INFORMATION (continued)

VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The components of this product are in compliance with the chemical registration requirements of: TSCA, EINECS, CDSL, AICS, MITI.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

7. PRECAUTIONARY INFORMATION (continued)

protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Store at temperatures above 32 degrees F (0 degrees C). Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:

Not applicable. Nonflammable.

OTHER PRECAUTIONARY INFORMATION:

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 section 4 of this MSDS.

HMS HAZARD RATINGS: HEALTH: 2 FLAMMABILITY: 0 REACTIVITY: 0
 PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE AUTH	SKIN*
	VALUE	UNIT		
WATER	NONE	NONE	NONE NONE	
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.01	mg/m3	TWA ACGIH	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA 3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA 3M	Y
AMMONIUM PERFLUOROALKYL CARBOXYLATE ..	0.1	mg/m3	TWA 3M	Y

* SKIN NOTATION: Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

8. HEALTH HAZARD DATA

EYE CONTACT:

No toxicity data for the solution.
Single exposure may cause:

Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

SKIN CONTACT:

Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

No toxicity data for the solution.

INHALATION:

Illness requiring medical attention may result from a single exposure by inhalation to moderate quantities of this material.

May be absorbed by inhalation and persist in the body for an extended time.

No toxicity data for the solution.

Repeated inhalation exposure produced liver changes and elevated blood organofluoride levels in rats.

Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

No toxicity data for the solution.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

Ammonium perfluoroalkyl carboxylate was not mutagenic in invitro

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

8. HEALTH HAZARD DATA (continued)

mutagenicity assays. Did not cause cell transformation in a mammalian cell transformation assay.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Ammonium perfluoroalkyl carboxylate was not teratogenic in rabbits by oral administration and was not teratogenic to rats by gavage and inhalation exposures.

OTHER HEALTH HAZARD INFORMATION:

Health hazard information is based on data for ammonium perfluoroalkyl carboxylate solids.

SECTION CHANGE DATES

HEADING	SECTION CHANGED SINCE FEBRUARY 19, 1997	ISSUE
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Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

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3. FIRE AND EXPLOSION HAZARD DATA (continued)

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.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not Applicable

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Hydrogen Fluoride, Ammonia
Toxic vapors, gases or particulates may be products of thermal decomposition.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Ventilate area. Contain spill. Cover with absorbent material. Collect spilled material. Clean up residue with water. Place in an approved metal container. Seal the container.

RECOMMENDED DISPOSAL:

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

ENVIRONMENTAL DATA:

Total Organic Carbon (TOC): 64 g/kg; Chemical Oxygen Demand (COD): 0.2 g/kg; 5-Day Biochemical Oxygen Demand (BOD5): Nil; 20-Day Biochemical Oxygen Demand (BOD20): Nil; Theoretical Oxygen Demand (ThOD): 96 g/kg; 96-Hr LC50, Fathead minnow (*Pimephales promelas*): >1000 mg/L; 96-Hr LC50, Bluegill sunfish (*Lepomis macrochirus*): 970 mg/L; 48-Hr EC50 (Mobility), Water flea (*Daphnia magna*): >1000 mg/L; 14-Day EC50 (cell dry weight), Green algae (*Selenastrum capricornutum*): 120 mg/L; 14-Day EC50 (cell count), Green algae (*Selenastrum capricornutum*): 70 mg/L

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H2O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex)

Coverall made of Tyvek(r). Wear rubber boots when cleaning up spills.

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of vapors, mists or spray. Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Do not store containers on their sides. Store at room temperature.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

7. PRECAUTIONARY INFORMATION (continued)

Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:
Not applicable. Nonflammable.

OTHER PRECAUTIONARY INFORMATION:
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 section 4 of this MSDS.

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
WATER	NONE	NONE	NONE	NONE	
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
AMMONIUM PERFLUOROHXANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROHEPTANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROPENTANOATE	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:
- ACGIH: American Conference of Governmental Industrial Hygienists
- AHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline
- NONE: None Established

8. HEALTH HAZARD DATA

EYE CONTACT:
Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

No toxicity data for the solution. Ammonium perfluoroalkanoates can be irritating to the eye and may cause eye injury from airborne exposure.

SKIN CONTACT:
Mild Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, and itching.

May be absorbed through the skin and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

8. HEALTH HAZARD DATA (continued)

are slightly toxic when absorbed through the skin.

INHALATION:

May be absorbed by inhalation and persist in the body for an extended time.

No toxicity data for the solution. Some ammonium perfluoroalkanoates can be considered moderately toxic by inhalation on a single exposure; a median lethal concentration for a 4-hour exposure in the albino rat is 930 milligrams per cubic meter. Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

No toxicity data for the solution. A mixture of ammonium perfluoroalkanoates was moderately toxic in albino rats from a single oral exposure; acute oral LD50 (rat) is 540 mg. per kg. of body weight.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3825-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

MUTAGENICITY:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not mutagenic in invitro mutagenicity assays. The mixture did not cause cell transformation in a mammalian cell transformation assay.

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

A mixture of ammonium perfluorooctanoate, ammonium perfluoroheptanoate, ammonium perfluoropentanoate and ammonium perfluorohexanoate was not teratogenic in rabbits by oral administration and was not teratogenic to rats by gavage and inhalation exposures.

SECTION CHANGE DATES

HEADING	SECTION CHANGED SINCE FEBRUARY 19, 1997 ISSUE
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Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

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**MATERIAL SAFETY
DATA SHEET**

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DIVISION: SPECIALTY CHEMICALS DIVISION
TRADE NAME:
FC-126 FLUORAD Brand Fluorochemical Surfactant

ID NUMBER/U.P.C.: ZF-0002-0377-6 - - - ZF-C002-1102-7 - - -
93-0211-1740-7 00-51135-02214-6 98-0211-6624-8 00-51135-10443-9
93-0211-7393-9 00-51135-10761-4

ISSUED: MARCH 17, 1997
SUPERSEDES: AUGUST 23, 1996
DOCUMENT: 10-3804-1

1. INGREDIENT	C.A.S. NO.	PERCENT
AMMONIUM PERFLUCROOCTANOATE	3825-26-1	80.0 - 90.0
AMMONIUM PERFLUCROHEXANOATE	21615-47-4	6.0 - 12.0
AMMONIUM PERFLUCROHEPTANOATE	6130-43-4	1.0 - 5.0
AMMONIUM PERFLUCROPENTANOATE	68259-11-0	1.0 - 5.0

2. PHYSICAL DATA

BOILING POINT:..... N/A
VAPOR PRESSURE:..... N/A
VAPOR DENSITY: N/A
EVAPORATION RATE:..... N/A
SOLUBILITY IN WATER: apprec.
SP. GRAVITY:..... ca. 0.5 Water = 1
(Bulk)
PERCENT VOLATILE: N/A
pH: 4
(2% Aqueous)
VISCOSITY: N/A
MELTING POINT:..... N/D
APPEARANCE AND ODOR: Light colored powder; slight odor.

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... Nonflammable
FLAMMABLE LIMITS - LEL: N/A
FLAMMABLE LIMITS - UEL: N/A
AUTOIGNITION TEMPERATURE: ... N/A
EXTINGUISHING MEDIA:
Water, Carbon dioxide, Dry chemical, Foam
SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing, including helmet, self-contained,
positive pressure or pressure demand breathing apparatus, bunker coat

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately



3M_MN05429408

3. FIRE AND EXPLOSION HAZARD DATA (continued)

and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

See Hazardous Decomposition section for products of combustion.

4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS TO AVOID:

Not Applicable

HAZARDOUS POLYMERIZATION: Will Not Occur

HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide and Carbon Dioxide, Oxides of Nitrogen, Hydrogen Fluoride, Ammonia.

5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:

Observe precautions from other sections. Collect spilled material. Use wet sweeping compound or water to avoid dusting. Clean up residue with water. Place in a closed container.

RECOMMENDED DISPOSAL:

Large quantities may adversely affect biological wastewater treatment systems. Do not use in products or processes that could result in aquatic concentrations greater than 1/10 of the lowest EC50 or LC50 concentration. Incinerate large quantities in an industrial or commercial incinerator. Combustion products will include HF. Do not dispose of in a sanitary landfill. Disposal alternative: Dispose of waste product in a facility permitted to accept chemical waste.

ENVIRONMENTAL DATA:

3M COMPOSED HAZARD ASSESSMENT

ENVIRONMENTAL FATE AND EFFECTS:

This substance did not degrade significantly in a ready biodegradation test. This compound is completely fluorinated (perfluorinated), or it contains perfluorinated portions. Perfluoroalkyl groups resist degradation in most natural environments.

This substance has minimal toxicity to aquatic organisms (100 mg/L < Lowest LC50, EC50, or IC50 < or = 1000 mg/L).

This substance has insignificant toxicity to wastewater treatment system organisms (sludge respiration IC50 > 1000 mg/L).

This substance has not been found to bioconcentrate or accumulate significantly in one or more living organisms.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

5. ENVIRONMENTAL INFORMATION (continued)

SUPPORTING DATA

Biodegradation:

Theoretical Oxygen Demand (ThOD): 0.320 g/g
Chemical Oxygen Demand (COD): 0.0008 g/g
20-Day Biochemical Oxygen Demand (BOD₂₀): 0.0007 g/g

Aquatic toxicity:

Fathead minnow (*Pimephales promelas*) 96-hr LC50: 300 mg/L
Water flea (*Daphnia magna*) 96-hr LC50: 220 mg/L
Green algae (*Selenastrum capricornutum*) 96-hr EC50: >1800 mg/L
Microtox(tm) (*Photobacterium phosphoreum*) 30-min EC50: 870 mg/L

Wastewater treatment (OECD Method 209):

Activated Sludge Respiration Inhibition 3-hr EC50: >1000 mg/L

Bioconcentration:

Fathead minnow (*Pimephales promelas*) 312-hr. Bioconcentration Factor (BCF): 1.8

REGULATORY INFORMATION:

Volatile Organic Compounds: N/A.
VOC Less H₂O & Exempt Solvents: N/A.

Since regulations vary, consult applicable regulations or authorities before disposal. U.S. EPA Hazardous Waste Number = None (Not U.S. EPA Hazardous).

The components of this product are in compliance with TSCA, EINECS, CDSL, AICS and MITI.

EPCRA HAZARD CLASS:

FIRE HAZARD:	PRESSURE:	REACTIVITY:	ACUTE:	CHRONIC:
No	No	No	Yes	Yes

6. SUGGESTED FIRST AID

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT:

Immediately flush skin with large amounts of water. Remove contaminated clothing. If irritation persists, call a physician. Wash contaminated clothing before reuse.

INHALATION:

If signs/symptoms occur, remove person to fresh air. If signs/symptoms continue, call a physician.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

6. SUGGESTED FIRST AID (continued)

IF SWALLOWED:

Do not induce vomiting. Drink two glasses of water. Call a physician.

7. PRECAUTIONARY INFORMATION

EYE PROTECTION:

Avoid eye contact. Wear vented goggles.

SKIN PROTECTION:

Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: butyl rubber. Use one or more of the following personal protection items as necessary to prevent skin contact: head covering, coveralls. Protective garments (other than gloves) should be made of either of the following materials: polyethylene/polyvinylidene chloride (Saranex).

VENTILATION PROTECTION:

Use with appropriate local exhaust ventilation. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:

Avoid breathing of airborne material. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: full-face high-efficiency filter respirator, full-face supplied air respirator.

PREVENTION OF ACCIDENTAL INGESTION:

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

RECOMMENDED STORAGE:

Keep container dry. Keep container closed when not in use.

PREVENT MOISTURE CONTAMINATION TO KEEP POWDER FREE FLOWING.

FIRE AND EXPLOSION AVOIDANCE:

No smoking while handling this material.

OTHER PRECAUTIONARY INFORMATION:

HMS HAZARD RATINGS: HEALTH: 3 FLAMMABILITY: 0 REACTIVITY: 0
PERSONAL PROTECTION: X (See precautions, section 7.)

INGREDIENTS	EXPOSURE LIMITS		TYPE AUTH	SKIN*
	VALUE	UNIT		

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

7. PRECAUTIONARY INFORMATION (continued)

INGREDIENTS	EXPOSURE LIMITS		TYPE	AUTH	SKIN*
	VALUE	UNIT			
AMMONIUM PERFLUOROOCTANOATE	0.01	mg/m3	TWA	ACGIH	Y
AMMONIUM PERFLUOROHXANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROHEPTANOATE	0.1	mg/m3	TWA	3M	Y
AMMONIUM PERFLUOROPENTANOATE	0.1	mg/m3	TWA	3M	Y

* **SKIN NOTATION:** Listed substances indicated with "Y" under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- AIHA: American Industrial Hygiene Assoc. Workplace Environmental Exposure Level Guideline
- 3M: 3M Medical Department Guideline

8. HEALTH HAZARD DATA

EYE CONTACT:

Severe Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, cloudy appearance of the cornea, impaired vision and possible permanently impaired vision.

Based on data on a similar material airborne product may cause eye injury consisting of corneal opacity.

SKIN CONTACT:

Moderate Skin Irritation: signs/symptoms can include redness, swelling, itching, and dryness.

May be absorbed through the skin and persist in the body for an extended time.

Irritation may persist for several days if product is not promptly removed from the skin.

INHALATION:

May be absorbed by inhalation and persist in the body for an extended time.

Single overexposure, above recommended guidelines, may cause:

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

Prolonged or repeated overexposure, above recommended guidelines, may cause:

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

8. HEALTH HAZARD DATA (continued)

Liver Effects: signs/symptoms can include yellow skin(jaundice) and tenderness of upper abdomen.

IF SWALLOWED:

Ingestion is not a likely route of exposure to this product.

Illness may result from a single swallowing of a moderate quantity of this material.

CANCER:

WARNING: Contains a chemical which can cause cancer. (3025-26-1) (1983 and 1993 studies conducted jointly by 3M and DuPont).

REPRODUCTIVE/DEVELOPMENTAL TOXINS:

Not teratogenic in rabbits by oral administration. Not teratogenic to rats by gavage or inhalation exposures.

OTHER HEALTH HAZARD INFORMATION:

A 3M Product Toxicity Summary Sheet is available.

SECTION CHANGE DATES

ENVIRON. DATA SECTION CHANGED SINCE AUGUST 23, 1996ISSUE

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