SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: DRY CLEANING GRADE SOLVENT F

SYNONYMS: Fluorocarbon 113; Trichlorofluoroethane

PRODUCT CODE: 780

PRODUCT USE: Dry cleaning solvent for clothing.
If this product is used in combination with other products, refer to the
Material Safety Data Sheet for those products.

TECHNICAL INFORMATION: 1-800-669-5740 Press 1 then 1, then Extension 7500

MSDS FORM NUMBER: 82352 ISSUE: September 11, 2006

ORIGINAL ISSUE: July 20, 1989 SUPERSEDES: October 29, 2003

PREPARED BY: Product MSDS Coordinator APPROVED BY: MSDS Task Force
SECTION 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE
Volatile liquid, clear and colorless, sweet odor

WARNING!

PHYSICAL HAZARDS
None known, but keep away from sparks or flame.

HEALTH HAZARDS
May be harmful if inhaled.
May be harmful if swallowed.
May irritate the respiratory tract (nose, throat, and lungs), eyes, and skin.
Contains material which may cause birth defects.
Contains material which may cause central nervous system damage.
Suspect cancer hazard. Contains material (less than 0.2WT%) which may cause cancer.
Risk of cancer depends on duration and level of exposure.

ENVIRONMENTAL HAZARDS
Harmful to fish.

OSHA Regulated Chemicals
1,2-Butylene oxide (106-88-7)
Present (Select Carcinogen)

POTENTIAL HEALTH EFFECTS

INHALATION (BREATHING):
High concentrations of vapor or mist may be harmful if inhaled. High
concentrations of vapor or mist may irritate the respiratory tract (nose, throat,
and lungs). High concentrations of vapor or mist may cause nausea, vomiting,
headaches, dizziness, loss of coordination, numbness, and other central
nervous system effects. Massive acute overexposure may cause rapid central
nervous system depression, sudden collapse, coma, and/or death.

EYES:
May cause irritation.

SKIN:
May cause irritation. Not likely to be absorbed through the skin in harmful
amounts.
INGESTION (SWALLOWING): May be harmful if swallowed. May cause throat irritation, nausea, vomiting, and central nervous system effects as noted under INHALATION (BREATHING). Breathing product into the lungs during ingestion or vomiting may cause lung injury and possible death.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with pre-existing cardiovascular, respiratory tract (nose, throat, and lungs), central nervous system, eye, and/or skin disorders may have increased susceptibility to the effects of exposure.

CHRONIC: Prolonged or repeated inhalation may cause toxic effects as noted under INHALATION (BREATHING). Prolonged or repeated inhalation of 1,1,1-trichloroethane can cause heart, liver and kidney damage. Prolonged or repeated eye contact may cause inflammation of the membrane lining the eyelids and covering the eyeball (conjunctivitis). Prolonged or repeated skin contact may cause drying, cracking, redness, itching, and/or swelling (dermatitis). Prolonged or repeated inhalation or ingestion exposure may have reproductive toxicity and/or teratogenicity effects. Prolonged or repeated exposure may have mutagenistic effects.

CANCER INFORMATION: This product contains 1,2-butylene oxide which may cause cancer. Risk of cancer depends on duration and level of exposure. For more information, see SECTION 11: CARCINOGENICITY.

Also see SECTION 15: CALIFORNIA.

POTENTIAL ENVIRONMENTAL EFFECTS May be harmful to aquatic life based upon components. See SECTION 12: ECOLOGICAL INFORMATION.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Component</th>
<th>Synonyms</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>76-13-1</td>
<td>1,1,2-Trichloro-1,2,2-trifluoroethane</td>
<td>CFC 113; Freon 113</td>
<td>99-100</td>
</tr>
<tr>
<td>106-88-7</td>
<td>1,2-Butylene oxide</td>
<td>1,2-Epoxybutane</td>
<td>0-0.2</td>
</tr>
<tr>
<td>71-55-6</td>
<td>1,1,1-Trichloroethane</td>
<td>Methyl chloroform</td>
<td>0-0.1</td>
</tr>
</tbody>
</table>

Component Related Regulatory Information
This product may be regulated, have exposure limits or other information identified as the following: Chlorofluorocarbons.

SECTION 4: FIRST AID MEASURES

INHALATION (BREATHING): Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Oxygen should only be administered by qualified personnel. Someone should stay with victim. Get medical attention if breathing difficulty persists.
EYES: If irritation or redness from exposure to vapor develops, move away from exposure into fresh air. Upon contact, immediately flush eyes with plenty of lukewarm water, holding eyelids apart, for 15 minutes. Get medical attention.

SKIN: For skin contact flush with large amounts of water while removing contaminated clothing. Wash contaminated clothing before reuse. If irritation persists, get medical attention.

INGESTION (SWALLOWING): Do NOT induce vomiting. Immediately get medical attention. Call 1-800-468-1760. If spontaneous vomiting occurs, keep head below hips to avoid breathing the product into the lungs. Never give anything by mouth to an unconscious person.

NOTE TO PHYSICIANS: Treat symptomatically and supportively. Increased sensitivity of the heart to Adrenaline (epinephrine) may be caused by overexposure to product. Administration of gastric lavage, if warranted, should be performed by qualified medical personnel. Treatment may vary with condition of victim and specifics of incident. Call 1-800-468-1760 for additional information.

SECTION 5: FIRE FIGHTING MEASURES

HAZARDOUS COMBUSTION PRODUCTS: Decomposition and combustion materials may be toxic. Product itself does not burn, but may decompose upon heating to produce phosgene, halogenated compounds and carbon monoxide.

CONDITIONS OF FLAMMABILITY: Product will not burn.

PROTECTIVE EQUIPMENT FOR FIREFIGHTERS: A positive-pressure, self-contained breathing apparatus (SCBA) and full-body protective equipment are required for fire emergencies.

EXTINGUISHING MEDIA: Not applicable.
NFPA 704
HAZARD IDENTIFICATION: This information is intended solely for the use by individuals trained in this system.

FIRE FIGHTING INSTRUCTIONS: Keep storage containers cool with water spray.

FIRE AND EXPLOSION HAZARDS: Heated containers may rupture. "Empty" containers may retain residue and can be dangerous. Product is not sensitive to mechanical impact or static discharge.

SECTION 6: ACCIDENTAL RELEASE MEASURES
Do not touch or walk through spilled product. Stop leak if you can do it without risk. Wear protective equipment and provide engineering controls as specified in SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Ventilate area and avoid breathing vapor or mist. A vapor suppressing foam may be used to reduce vapors. Contain spill away from surface water and sewers. Contain spill as a liquid for possible recovery, or sorb with compatible sorbent material and shovel with a clean tool into a sealable container for disposal.

Additionally, for large spills: Water spray may reduce vapor, but may not prevent ignition in closed spaces. Dike far ahead of liquid spill for collection and later disposal.

There may be specific regulatory reporting requirements associated with spills, leaks, or releases of this product. Also see SECTION 15: REGULATORY INFORMATION.

SECTION 7: HANDLING AND STORAGE
HANDLING: Use clean tools. Do not breathe vapor or mist. Use in a well ventilated area. Avoid contact with eyes, skin, clothing, and shoes.
SHIPPING AND STORING: Keep container tightly closed when not in use and during transport. Store containers in a cool, dry place. Do not pressurize, cut, weld, braze, solder, drill, or grind containers. Keep containers away from flame, sparks, static electricity, or other sources or ignition.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE GUIDELINES: Component Exposure Limits

1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)
ACGIH: 1000 ppm TWA
1250 ppm STEL
OSHA: 1000 ppm TWA; 7600 mg/m3 TWA
1250 ppm STEL; 9500 mg/m3 STEL
NIOSH: 1000 ppm TWA; 7600 mg/m3 TWA
1250 ppm STEL; 9500 mg/m3 STEL

1,1,1-Trichloroethane (71-55-6)
ACGIH: 350 ppm TWA
450 ppm STEL
OSHA: 350 ppm TWA; 1900 mg/m3 TWA
450 ppm STEL; 2450 mg/m3 STEL
NIOSH: 350 ppm Ceiling (15 min); 1900 mg/m3 Ceiling (15 min)

ENGINEERING CONTROLS: Provide general ventilation needed to maintain concentration of vapor or mist below applicable exposure limits. Where adequate general ventilation is unavailable, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION: Use NIOSH-certified, air-supplied respirators (self-contained breathing apparatus or air-line) respiratory protective equipment when concentration of vapor or mist exceeds applicable exposure limits. Selection and use of respiratory protective equipment should be in accordance in the USA with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4.

EYE PROTECTION: Where eye contact is likely, wear chemical goggles; contact lens use is not recommended.

SKIN PROTECTION: Where skin contact is likely, wear chemical impervious protective gloves; use of polyvinyl chloride (PVC), natural rubber (latex) or equivalent gloves is not recommended.
To avoid prolonged or repeated contact where spills and splashes are likely, wear appropriate chemical-resistant faceshield, boots, apron, whole body suits, or other protective clothing.

PERSONAL HYGIENE:
Use good personal hygiene. Wash thoroughly with soap and water after handling product and before eating, drinking, or using tobacco products. Clean affected clothing, shoes, and protective equipment before reuse. Discard leather articles, such as shoes, saturated with this product.

OTHER PROTECTIVE EQUIPMENT:
Where spills and splashes are likely, facilities storing or using this product should be equipped with an emergency eyewash and shower, both equipped with clean water, in the immediate work area.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE, APPEARANCE, AND ODOR: Volatile liquid, clear and colorless, sweet odor

ODOR THRESHOLD: 135 ppm

MOLECULAR WEIGHT: 187.4

SPECIFIC GRAVITY: 1.56 (water = 1) at 77ºF (25ºC)

DENSITY: 13 LB/US gal (1560 g/l)

VAPOR DENSITY: 6.5 (air =1)

VAPOR PRESSURE: 284 mmHg at 68ºF (20ºC)

BOILING POINT: 118ºF (48ºC)

FREEZING/MELTING POINT: -33ºF (-36ºC)

pH: Not available

EVAPORATION RATE: 0.45 (acetone = 1)

SOLUBILITY IN WATER: Insoluble

FLASH POINT: Not applicable

FLAMMABLE LIMITS IN AIR: LOWER: Not applicable  UPPER: Not applicable

AUTOIGNITION TEMPERATURE: 1256ºF (680ºC)
% VOLATILE: 0 WT%; 0 LB/US gal; 0 g/l
As per 40 CFR Part 51.100(s).

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable under normal temperatures and pressures.

CONDITIONS TO AVOID: Avoid contact with incompatible materials, listed below.

INCOMPATIBILITY: Avoid alkalies, oxidizing agents, reactive metals, reactive halogens, or powdered metals. Explosive mixtures may be formed when in contact with powdered metals.

REACTIVITY: Polymerization is not known to occur under normal temperature and pressures. Not reactive with water.

HAZARDOUS DECOMPOSITION PRODUCTS: None under normal temperatures and pressures. See also SECTION 5: HAZARDOUS COMBUSTION PRODUCTS.

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICITY DATA:
Component Analysis - LD50/LC50
1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)
Inhalation LC50 Rat: 38500 mg/kg/4H; Inhalation LC50 Rat: 52500 ppm/4H; Oral LD50 Rat: 43 g/kg
1,2-Butylene oxide (106-88-7)
Inhalation LC50 Rat: >6.3 mg/L/4H; Oral LD50 Rat: 500 mg/kg; Dermal LD50 Rabbit: 1757 mg/kg
1,1,1-Trichloroethane (71-55-6)
Inhalation LC50 Rat: 18000 ppm/4H; Oral LD50 Rat: >2000 mg/kg; Dermal LD50 Rat: >2000 mg/kg; Dermal LD50 Rabbit: >15800 mg/kg

ACUTE EFFECTS: Irritating to eyes, respiratory system and skin. High concentrations of vapor or mist may cause nausea, vomiting, headaches, dizziness, loss of coordination, numbness, and other central nervous system effects. Massive acute overexposure may cause rapid central nervous system depression, sudden collapse, coma, and/or death. Breathing product into the lungs during ingestion or vomiting may cause lung injury and possible death.
REPEATED DOSE EFFECTS: Based on best current information, there is no known human sensitization associated with this product.

1,2-Butylene oxide has demonstrated animal effects of mutagenicity. 1,1,1-Trichloroethane has demonstrated experimental effects of mutagenicity. Based on best current information, the other component listed in SECTION 2 is not a mutagen.

1,1,1-Trichloroethane has demonstrated animal effects of reproductive toxicity. Based on best current information, the other components listed in SECTION 2 are not reproductive toxicants.

1,1,1-Trichloroethane has demonstrated animal effects of teratogenicity. Based on best current information, the other components listed in SECTION 2 are not teratogens.

CARCINOGENICITY: 1,2-Butylene oxide is categorized by IARC as possibly carcinogenic to humans (Group 2B).

Based on best current information for the other components listed in SECTION 2, there is no known carcinogenicity as categorized by ACGIH A1 or A2 substances; as categorized by IARC Group 1, Group 2A, or Group 2B agents; or as listed by NTP as either known carcinogens or substances for which there is limited evidence of carcinogenicity in humans or sufficient evidence of carcinogenicity in experimental animals.

TARGET ORGAN EFFECTS: Also see SECTION 15: CALIFORNIA.

Prolonged or repeated inhalation of 1,1,1-trichloroethane can cause heart, liver and kidney damage.
# SECTION 12: ECOLOGICAL INFORMATION

## ECOTOXICITY:

### Component Analysis - Ecotoxicity - Aquatic Toxicity

**1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)**

<table>
<thead>
<tr>
<th>Test &amp; Species</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>96 Hr LC50 Oryzias latipes</td>
<td>6240 mg/L</td>
</tr>
<tr>
<td>96 Hr LC50 Pimephales promelas</td>
<td>1250 mg/L</td>
</tr>
<tr>
<td>96 Hr LC50 Brachydanio rerio</td>
<td>7 mg/L</td>
</tr>
</tbody>
</table>

**1,2-Butylene oxide (106-88-7)**

<table>
<thead>
<tr>
<th>Test &amp; Species</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>96 Hr LC50 Leuciscus idus</td>
<td>100-220 mg/L</td>
</tr>
<tr>
<td>72 Hr EC50 Scenedesmus subspicatus</td>
<td>&gt;500 mg/L</td>
</tr>
</tbody>
</table>

**1,1,1-Trichloroethane (71-55-6)**

<table>
<thead>
<tr>
<th>Test &amp; Species</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>96 Hr LC50 Pimephales promelas</td>
<td>42.3 mg/L</td>
</tr>
<tr>
<td>96 Hr LC50 Lepomis macrochirus</td>
<td>72 mg/L</td>
</tr>
<tr>
<td>96 Hr LC50 Cyprinus carpio</td>
<td>42.3 mg/L</td>
</tr>
<tr>
<td>96 Hr LC50 Poecilia reticulata</td>
<td>52.9 mg/L</td>
</tr>
<tr>
<td>96 Hr LC50 Poecilia reticulata</td>
<td>69.7 mg/L</td>
</tr>
<tr>
<td>96 Hr EC50 Skeletonema costatum</td>
<td>&gt;669 mg/L</td>
</tr>
</tbody>
</table>

## PERSISTENCE/DEGRADABILITY:

No information available for the product.

## BIOACCUMULATION/ACCUMULATION:

Product is not expected to bioaccumulate.

## MOBILITY IN ENVIRONMENTAL MEDIA:

Product is expected to have high mobility in water and soil.

## OTHER ADVERSE EFFECTS:

May be harmful to aquatic life based upon components. See **SECTION 12: ECOLOGICAL INFORMATION**.

## OCTANOL/WATER PARTITION COEFFICIENT:

Not Available

## VOLATILE ORGANIC COMPOUNDS:

0 WT%; 0 LB/US gal; 0 g/l  
As per 40 CFR Part 51.100(s).
SECTION 13: DISPOSAL CONSIDERATIONS

DISPOSAL: Dispose in accordance with federal, state, provincial, and local regulations. Regulations may also apply to empty containers. The responsibility for proper waste disposal lies with the owner of the waste. Contact Safety-Kleen regarding proper recycling or disposal.

USEPA WASTE CODE(S): F001 for degreasing and F002 for all other uses. Based on available data, this information applies to the product as supplied to the user. Processing, use, or contamination by the user may change the waste code applicable to the disposal of this product. The following waste code may also apply: U226.

SECTION 14: TRANSPORT INFORMATION

DOT: Shipping Name: Not regulated

TDG: Shipping Name: Not regulated

EMERGENCY RESPONSE GUIDE NUMBER: Not applicable Reference North American Emergency Response Guidebook

SECTION 15: REGULATORY INFORMATION

USA REGULATIONS

OSHA OSHA Regulated Chemicals 1,2-Butylene oxide (106-88-7) Present (Select Carcinogen)

SARA SECTIONS 302 AND 304: Based on the ingredients listed in SECTION 2, this product does not contain any "extremely hazardous substances" listed pursuant to Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) Section 302 or Section 304 as identified in 40 CFR Part 355, Appendix A and B.

SARA SECTIONS 311 AND 312: This product poses the following health hazard(s) as defined in 40 CFR Part 370 and is subject to the requirements of sections 311 and 312 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard
SARA SECTION 313: The following components are subject to the requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR Part 372.

<table>
<thead>
<tr>
<th>Material</th>
<th>CAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,2-trichloro-1,2,2-trifluoroethane</td>
<td>76-13-1</td>
</tr>
<tr>
<td>1,2-Butylene oxide</td>
<td>106-88-7</td>
</tr>
<tr>
<td>1,1,1-trichloroethane</td>
<td>71-55-6</td>
</tr>
</tbody>
</table>

CERCLA: Based on the ingredients listed in SECTION 2, this product contains the following "hazardous substance" listed under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) in 40 CFR Part 302, Table 302.4 with the following reportable quantities (RQ):

<table>
<thead>
<tr>
<th>Material</th>
<th>CAS</th>
<th>RQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2-Butylene oxide</td>
<td>106-88-7</td>
<td>100 lb (45.4 kg)</td>
</tr>
<tr>
<td>1,1,2-trichloro-1,2,2-trifluoroethane</td>
<td>76-13-1</td>
<td>1000 lb (454 kg)</td>
</tr>
</tbody>
</table>

TSCA: All the components of this product are listed on, or are automatically included as "naturally occurring chemical substances" on, or are exempted from the requirement to be listed on, the TSCA Inventory.

CALIFORNIA: This product may contain a detectable amount of methyl chloride CAS 75-09-2. WARNING: This chemical is known to the State of California to cause cancer.

This product does not contain detectable amounts of any chemical known to the State of California to cause birth defects or other reproductive harm.

CANADIAN REGULATIONS
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all information required by the CPR.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): All the components of this product are listed on, or are automatically included as "substance occurring in nature" on, or are exempted from the requirements to be listed on, the Canadian Domestic Substances List (DSL).
SECTION 16. OTHER INFORMATION

REVISION INFORMATION: Regulatory update, updated to ANSI Z400.1-2004 format. This MSDS has been revised in the following sections: Section 1 (Dates), Section 2 (Composition updated), Section 3 (switched to Emergency Overview), Section 4 (Phone Numbers), Section 5 (Fire Fields), Section 8 (Exposure Limits added), Section 11 (Toxicology fields updated), Section 12 (Ecotoxicity Information, fields updated), Section 16 (Revision Information).

LABEL/OTHER INFORMATION: Not available.