



CFF 800 / CFF 800LP

OWNER'S MANUAL
&
INSTALLATION INSTRUCTIONS

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Revision: 4.7

Approvals



UL Listing EX26659



NYC Fire Dept.
Certificate of Approval
#5903



General Directorate of Civil Defence
Ministry of Interior



Installation, Inspection and Maintenance Manual for CFF 800 & CFF 800LP

This unit is assembled with UL listed and Factory Mutual approved components.

The CFF 800 & CFF 800LP are built in accordance with NFPA 17, refer to NFPA 17 for installation, maintenance and inspection requirements.

WARRANTY

1-Year Limited Warranty

This Automatic Extinguishing Unit is warranted to the original owner to be free of defects in factory workmanship and material, and against loss of weight or pressure, to the extent as noted within this manual that remanufacturing is required, for a period of one (1) year from date of manufacture, provided that it has not been misused, damaged, or initiated.

The foregoing warranty is expressly in lieu of any other warranties, expressed or implied, including, but not limited to, warranties of merchantability or fitness for a particular purpose. Cease Fire® shall not be responsible for any incidental, contingent, or consequential charges or damages.

“What To Do In A Fire Emergency”

If a fire breaks out:

1. ***Warn Everyone!*** Make certain everyone is clear of the area immediately and remains safely outside.
2. Call the Fire Department ***regardless*** of how small the fire seems to be. Post emergency phone numbers by each telephone.
3. ***Important!*** Locate an exit so you can escape in case the fire should get out of control. Keep low to avoid breathing in smoke and heated fumes that can be fatal.

TYPES OF FIRE CLASSIFICATIONS

Per NFPA Standards:

Class Fires - Class A fires occur in ordinary combustible materials, such as; wood, cloth, paper, rubber, and many plastics.

Class B Fires – Class B fires involve flammable liquids, paints, and lacquers.

Class C Fires – Class C fires involve energized electrical equipment where the non-conductivity of the extinguishing media is of importance.

INSTALLATION INSTRUCTIONS

Cease Fire® System Units were tested by Factory Mutual Research Corp. & Underwriters Laboratory, for Class A, B and C fires. For total flood applications, the area being protected should be a reasonably tight enclosure where combined openings do not exceed one percent of the total surface area square footage.

Cease Fire® System Unit CFF 800 must be hung vertically & the CFF 800LP must be hung horizontally with the sprinkler deflector pointed downward. The unit is to be used in areas where the temperature falls between 32° degrees and 120° degrees Fahrenheit (0° to 48.89° degrees Celsius). The unit is to be mounted or attached to a secure ceiling, for example, wood, metal, or concrete. Ensure there are no obstructions to the free flow operations of the sprinkler head and disbursement of the extinguishment within the enclosure.

Do not mount on suspended ceiling or loose tiles.

The pressure switch on Cease Fire® units is to be installed in accordance with national electrical codes, and any local requirements.

CYLINDER ANCHORING NOTES

1. Anchor each end of strut to the building structure as follows:
 - **WOOD FRAMING** – ¼" DIA x 2" HEX HEAD LAG SCREWS WITH ¾" O.D. WASHERS CONFORMING TO ANSI/ASME B18.2.1, GRADE 1. DRILL 5/32" PILOT HOLE.
 - **STEEL BEAM** – ¼"-20 SELF TAPPING SHEET METAL SCREWS GRADE 5 HEAT TREATED WITH DRILLING TIP AND LEAD THREADS HARDENED TO ROCKWELL C52 (BEAM SHALL BE 1/8" THICK MINIMUM).
 - **CONCRETE** – 3/8" DIA CONCRETE FASTENER INSTALLED PER MANUFACTURER REQUIREMENTS.
2. ANCHOR CEILING FLANGE TO STRUT WITH FOUR ¼" DIA BOLTS (UNISTRUT PART HHCS025075EG) AND STRUT NUTS (UNISTRUT PART 03300-1420). TORQUE BOLTS PER UNISTRUT REQUIREMENTS.
3. APPLY TEFLON TAPE TO THREADS, AND SCREW CYLINDER HAND TIGHT TO CEILING FLANGE.
4. FOR TOTAL FLOOD APPLICATIONS, MAXIMUM DISTANCE FROM CYLINDER TO WALL SHALL BE 4'-0" AND MAXIMUM DISTANCE FROM CYLINDER TO WALL CORNER SHALL BE 5'-6". THIS DOES NOT APPLY TO LOCAL APPLICATION (I.E. SPOT PROTECTION).

NOTE: TWO 6" (MINIMUM) PIECES OF UNISTRUT P3300 (OR EQUIVALENT) (OMIT WHERE FLANGE CAN ANCHOR DIRECTLY TO BUILDING STRUCTURE) ANCHOR THROUGH UN CUT SLOTS IN STRUT.

COVERAGE

The coverage area for Cease Fire® System Units is determined according to the following table:

Coverage Area - Total Flood Applications Class A, B, and C Fires

CFF 800 / CFF 800LP	
	12.2 ft. high room
Volume, Cubic ft.	820
Cubic M	23.22
Ceiling Height, ft.	12.2
Meters	3.72
Max Wall Length, ft	8.2
Meters	2.50

Each unit installed for total flooding protection shall be attached to the ceiling and centered within the enclosure or portions of the enclosure which it protects.

Coverage Area – Local Application (i.e., Spot Protection) Class A, B, and C Fires (For Indoor Applications Only)

CFF 800 / CFF 800LP		
	6.1 ft. sprinkler height	12.2 ft. sprinkler height
Area, Square ft.	2.5	2.5
Square M	0.23	0.23
Sprinkler Height, ft.	6.1	12.2
Meters	1.86	3.72

Each unit installed for local application protection shall be mounted with the sprinkled head at a height above the hazard within the table above and centered above the hazard.

PRESSURE SWITCH SPECIFICATION

The Cease Fire® System Units' pressure switch specifications are as follows:

1. Set Point Range: 2 - 120 PSI (.14 – 8.3 BAR)
2. Set Point Tolerance: +/- 1 PSI or 5% (.07 BAR)
3. Max Operating Pressure: 250 PSI (17 BAR)
4. Proof Pressure: 750 PSI (51 BAR)
5. Differential: 8-16%
6. Current Rating: 5 AMP
7. Voltage Rating: 24 Volts DC or 250 Volt AC
8. Media Connection: 1/8" NPT Male Brass
9. Circuit Form: SPST-NO or SPST-NC
10. Electrical Connection: 8-32 Screw Terminals
11. Diaphragm Material: BUNA N

Cease Fire® System Units come standard with a Pressure Switch that is suggested to be used with a Normally Closed wiring scheme that will close on descending pressure at 95 PSI (6.55 BAR). This configuration is designed to give a signal to indicate when the Cease Fire® System Unit has discharged and/or a leak or drop in pressure has occurred.

SPRINKLER HEAD SPECIFICATIONS

The Cease Fire® System Units' sprinkler head specifications are as follows:

1. Sprinkler Nominal Temperature Rating: 155°F (68°C)
2. Sprinkler Temperature Classification: Ordinary
3. Maximum Ambient Temperature: 100°F (38°C)
4. Bulb Color: Red
5. Glass bulb fluid temperature rating: -65°F (-55°C)
6. Hydrostatic test: 500 PSI (34.47 BAR)
7. Thread Size: ¾" NPT (20 mm BSP)
8. Spring: USA Patent No. 4,167,974
9. Bulb: USA Patent No. 4,796,710

Cease Fire® System Units come standard with a Sprinkler Head that has a Nominal Temperature Rating of 155°F (68°C).

Cease Fire® System Units also have Sprinkler Head options for Nominal Temperature Ratings of 135 °F (57 °C), 175°F (79°C), 200°F (93°C), and 286°F (141°C) for pre-engineered units and 135 °F (57 °C) for automatic units.

OPERATIONS

Automatic Extinguisher Unit – A unit that has no manual means of actuation and discharges extinguishing agent upon thermal actuation is intended for use in a normally unoccupied space and is limited to a single unit covering the protected area. Multiple automatic units may be used in the same protected enclosure provided that each unit is capable of covering the entire enclosure (main/reserve).

Pre-Engineered System – A system that is tested in accordance with the limitations prescribed by the manufacturer for maximum and minimum pipe lengths, accessories, number of fittings, number of types of nozzles and nozzle placement, types of fire risks and their maximum areas, volume or both areas and volumes of protection. When multiple pre-engineered units are protecting the same enclosure, the enclosure shall be divided into sections or modules so that each section contains a unit that does not exceed the area and volume limitations for the unit.

Pre-Engineered Systems with electrical activation are intended to be used with a UL Listed control panel that is compatible with the electric actuator. When used with a control panel, additional detection, notification, and actuation (pull station) devices may be used provided they are compatible with the control panel. Reference the control panel's installation manual for compatibility information.

The Cease Fire® Unit is self-activating. Each unit is designed to discharge automatically by means of a thermal sprinkler head rated at 155°F (68°C). The temperature rating for each sprinkler head is stamped on the star shaped deflector in both Fahrenheit and Celsius measurements. The temperature of the sprinkler head is fixed and must be designated at the time of purchase. When the temperature rise to activate the Cease Fire® unit, the sprinkler head opens automatically and dispenses the entire contents in less than 10 seconds onto the fire and throughout the enclosure being protected. If the unit is equipped with the optional pressure switch, a signal is sent at the time of discharge to activate any remaining pre-engineered units protecting the same enclosure as well as any accessory equipment, such as an alarm. Cease Fire® Pre-Engineered Systems containing 2 or more Fire Suppression units shall be wired in such a way that the units will initiate simultaneously as a total flooding system. It is important to avoid exposure to smoke, vapors, and the fire by-products. Ventilate the area thoroughly before reentry.

Cease Fire® recommends that the empty/discharged unit be immediately replaced.

SPECIFICATIONS

1. Operating Pressure: At 70 F/21 C is 175 PSI (12.07 BAR)
2. Storage Temperature: 32° to 120° F / 0° to 48.89°C Contents:
 - CF-33 (MAP is the only powder ingredient in excess of 95%, by weight)
 - HFC-227ea (Clean Agent Gas)
 - Vessel test pressure - 585PSI (40.33 BAR)

INSPECTION, MAINTENANCE, AND REMANUFACTURING

All Cease Fire® Units are to be inspected and maintained in accordance with this manual and/or NFPA 17.

INSPECTION

Cease Fire® recommends that a “quick check” be performed monthly, following the procedures outlined below. Minimal technical knowledge is required to perform this inspection.

INSPECTION STEPS:

- a. The unit is in its proper location.
- b. Obstructions have not been placed below or alongside the unit.
- c. The label is clean and intact.
- d. No obvious physical damage or conditions exist that may prevent operations.
- e. Pressure is in operable range (see attached Figure 1, Extinguisher Temperature vs. Pressure Graph).
- f. If any deficiencies are found, corrective action shall be taken immediately.
- g. Personnel making inspections shall keep records for those extinguishing units found to need corrective actions. The report shall be filed with the owner or designated responsible party.

MAINTENANCE

Cease Fire® requires that semi-annual maintenance be conducted in accordance with this manual by a trained person who has undergone the instructions necessary, or, as required, licensed to reliably perform maintenance. The maintenance shall consist of:

- a. Check to see that the hazard has not changed.
- b. Examine the container, sprinkler head, head assembly, any auxiliary equipment including pressure switch, wiring, and signaling devices.
- c. If an examination of the container reveals corrosion or pitting, the unit should be replaced or returned to the factory for testing. If substantial corrosion is observed on the hanger assembly, the hanger assembly should be replaced.
- d. The fixed temperature sensing element needs replacement only after discharge.
- e. When the maintenance of the unit reveals defective parts which could cause an impairment or failure of proper operations, the affected parts shall be replaced.
- f. The maintenance report noting an inspector’s initials and license number, with recommendations noted if any, shall be filed with the owner, or with the designated responsible party.

- g. Cease Fire® recommends that alternate protection acceptable to the authority having jurisdiction be provided.

Table 1.2 - Unit Pressures Adjusted for Temperature

Temperature	Pressure
32°F/0°C	132 PSI (7.9 BAR)
70°F/21°C	175 PSI (12.1 BAR)
100°F/38°C	220 PSI (15.2 BAR)

Table 1.1 - Unit Weights

Weight Type	Value (lbs/Kg)
Gross Weight	28.25 / 12.81
Mechanical Parts	9.6 / 4.4
Weight Maximum	29.4 / 13.34

REMANUFACTURING

Cease Fire® System Units have a unique blend of patent pending extinguishment agents. *These units can be remanufactured only by Cease Fire®, and are not to be refilled in the field.*

Contact Cease Fire® Corporate for further information.

CLEAN UP AFTER DISCHARGE

Cease Fire® System Units have a blend of HFC-227ea and Dry Chemical mixture. After discharge, Cease Fire® recommends the following clean up steps:

HFC-227ea is a gaseous extinguishing agent and leaves no residue. Once the fire is extinguished, HFC-227ea dissipates with normal air exchange.

Dry Chemical/CF33: Cease Fire® recommends the following clean up steps:

Corrosion need not be of concern when accompanied by prompt clean up. For the most part, dry chemical agents can be readily cleaned by wiping and/or vacuuming the exposed materials. Cease Fire® recommends a HEPA Filter vacuum for clean up.

WARNING - *Clean up procedures should be initiated after the fire has been totally extinguished and the area has been ventilated.*

TOXICITY INFORMATION UNIT CONTENTS

Cease Fire® CFF 800 & CFF 800LP Automatic Fire Extinguisher Units contain a unique blend of HFC-227ea and CF33 Dry Chemical Agent. General information regarding the extinguishers' contents is as follows. Should more detailed information be required, contact Cease Fire® Corporate.

- a. Dry Chemical, CF33: Monoammonium Phosphate is considered a non-toxic nuisance dust. CF33 does not possess any toxicological properties, which would require special handling other than good industrial hygiene and safety practices. However, as with any finely divided material, it may produce mild irritation effects, especially when used in an enclosed area. In general, these effects are neither serious nor permanent.

- b. HFC-227ea poses no acute or chronic hazard when it is handled in accordance with Dupont recommendations and when exposure is maintained below the recommended exposure limits.

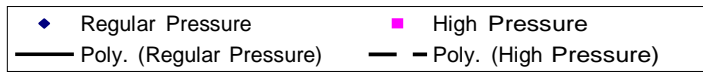
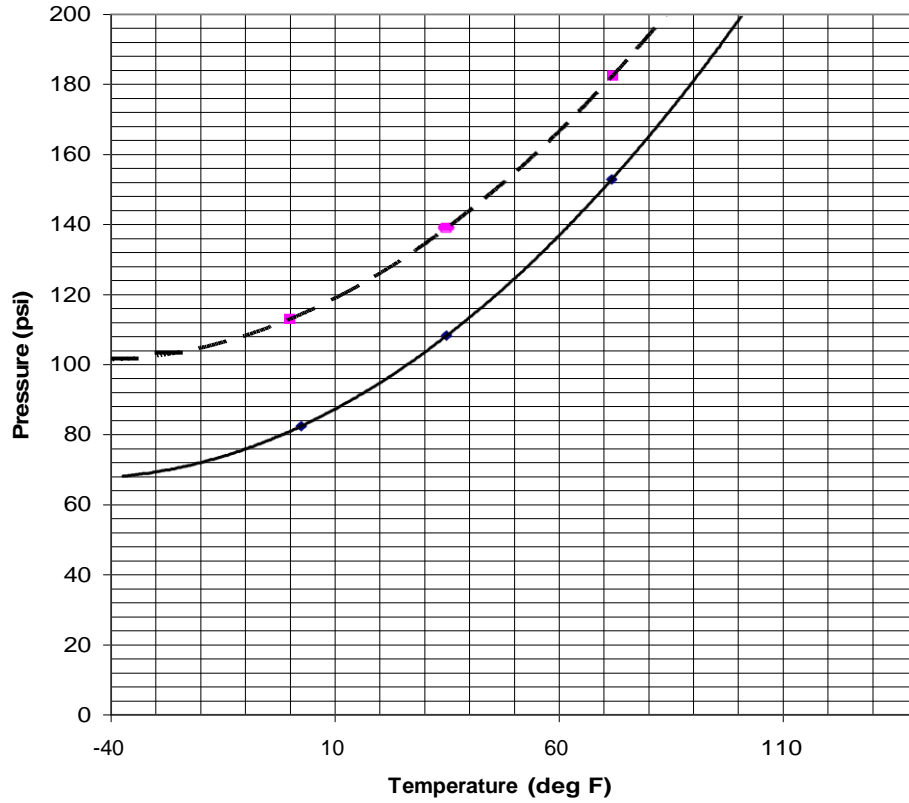
TOXICITY FROM FIRE

“WARNING: The concentrated extinguishing agent when applied to fire can produce toxic by-products. Avoid exposure to vapors, fumes, and products of combustion.” The majority of deaths during fires are caused by toxic smoke from fire. Nearly all fuels produce potentially lethal gases, such as carbon monoxide. Other burning materials provide their own unique hazards, for example; Class A fires of burning wood and paper produce “Acrolein”, Class B fires of burning polyurethane foam produces “Cyanide”, and Class C fires of burning PVC cable insulation creates hydrogen chloride gas. The longer the fire burns, the higher the concentration of these types of gases

BREAKDOWN OF UNITS

STANDARD COMPONENTS	PART NUMBER
HFC-227ea	CF-100
ABC Powder	CF-200
Cylinder DDI	CF-600
Coupling	CF-700
4" Extension	CF-711
O-ring	CF-800
155° F Upright Sprinkler Head	CF-900
90° Elbow	CF-950
45° Street Elbow	CF-1000
Tank Valve	CF-1100
Pressure Switch	CF-1201
Plug	CF-1300
Pressure Gauge	CF-1400
Hanger Flange	CF-1800
CFF Series Label	CF-2100
CFF Series Owner's Manual	CF-3100

Temp vs Pressure



$$y = 0.006x^2 + 0.5726x + 80.591$$

$$y = 0.006x^2 + 0.5311x + 113.03$$

$$R^2 = 1$$

$R^2 = 1$

Revision Records

Old Revision Number	New Revision Number	Section Number/Page Revised	Description of Revision	Revised by	Date
4.4	4.5	Page 6/8/9/10	Revised material name FE-227 to current name HFC-227ea	Cody Kitterman	5/01/2014
4.5	4.6	Page 10	Changed part number for Pressure Switch from CF-1200 to CF-1201	Cody Kitterman	3/31/2015
4.6	4.6	Page 9/11	Change to remanufacturing rules & Updated part names and numbers	Cody Kitterman	5/26/2016
4.6	4.6	Page 14	Updated CF-33 MSDS	Cody Kitterman	8/10/2016
4.6	4.6	Page 1/2/4/10/11	Added CFF 800LP Verbiage	Cody Kitterman	9/08/2017
4.6	4.6	Page 1	Added CSFM Mark	Cody Kitterman	3/22/2018
4.6	4.6	Page 1	Added NYC Approval	Cody Kitterman	3/29/2018
4.6	4.6	Pages 14-25	Updated CF-33 SDS	Cody Kitterman	11/12/2019
4.6	4.6	Page 14	Updated CF-33 SDS Address	Cody Kitterman	9/9/2020
4.6	4.6	Page 1	Updated NYC Approval #	Cody Kitterman	11/15/2021
4.6	4.7	Page 2	Updated Approvals Page	Cody Kitterman	6/20/2023
4.7	4.7	All	General Updates	Cody Kitterman	6/20/23



SAFETY DATA SHEET

CF-33 Dry Chemical Agent

Issue Date: 05-08-

2018

1. Product and Company Identification

Material Name	CF-33 Dry Chemical Agent
Revision Date	08-01-2016
Issue Date	08-01-2003
CAS #	Mixture
Product Use	Fire Suppression System
Manufacturer / Importer / Supplier	
Name	Cease Fire, LLC
	9321 NE 72 nd Ave Suite 12
	Vancouver, WA 98665
Phone	360-567-0990
Internet	http://www.ceasefire.com
Emergency Phone Number	CHEMTREC 800-535-5053 or 360-600-2591

2. Hazards Identification

Emergency overview	WARNING
	Irritating to eyes and skin
Potential health effects	
Routes of exposure	Eye contact. Skin contact. Inhalation, Ingestion
Eyes	Avoid contact with eyes. Contact with eyes may cause irritation.

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Skin	Avoid contact with skin. May cause skin irritation.
Inhalation	Inhalation of dust may cause respiratory irritation.
Ingestion	Not a likely route of entry.
Target organs	Eyes. Respiratory system. Skin.
Signs and symptoms	Coughing and irritation of airways.

3. Composition / Information on Ingredients

Hazardous Components	CAS #	Percent
Calcium Carbonate	1317-65-3	<1
Non-hazardous Components	CAS #	Percent
Mono-ammonium Phosphate	7722-76-1	50-77
Ammonium Sulfate	7783-20-2	15-45
Attapulgite Clay	12174-11-7	3-8
Mica-potassium Aluminum Silicate	12001-26-2	1-3
Silicone Oil Methyl Hydrogen Polysiloxane	63148-57-2	<1
Amorphous Silica Precipitated Synthetic Zeoliteghs	7631-86-9	<1
Yellow 14 Pigment – Diazo Dye	5468-75-7	<1
Additional Additives Unique to CF-33		PROPRIETARY

4. First Aid Measures

First aid procedures

Eye contact	May cause irritation. Irrigate eyes with water and repeat until pain free. Seek medical attention if irritation develops, or if vision changes occur.
Skin contact	May cause skin irritation. In case of contact, wash with plenty of soap and water. Seek medical attention if irritation persists.
Inhalation	May cause irritation, along with coughing. If respiratory irritation or distress occurs, remove victim to fresh air. Give oxygen and artificial respiration if needed. Seek medical attention if irritation persists.
Ingestion	Overdose symptoms may include numbness or tingling in hands or feet, uneven hear rate, paralysis, feeling faint, chest pain or heavy feeling, pain spreading to the arm or shoulder, nausea, diarrhea, sweating, general ill feeling, or seizure (convulsions). If the victim is conscious and alert, give 2-3 glasses of water to drink. If conscious, do not induce vomiting. Seek immediate medical attention. Do not leave the victim unattended. To prevent aspiration of swallowed product, lay victim on side with head lower than waist.
Notes to physician	Symptoms may be delayed.
General Advice	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. Show this material safety data sheet to the doctor in attendance.

5. Fire Fighting Measures

Flammable Properties	Not Flammable
Flash Point	Not Determined
Suitable Extinguishing Media	Non-combustible. Use Extinguishing media suitable for surrounding conditions.
Hazardous Combustion Products	Carbon and sulfur oxides
<u>Explosion Data</u>	
Sensitivity to Mechanical Impact	Not sensitive
Sensitivity to Static Discharge	Not sensitive

Unusual fire/explosion hazards	In a fire this material may decompose, releasing toxic and irritating oxides of carbon, sulfur, potassium, ammonia and nitrogen.
Protective Equipment	As in any fire, wear self-contained breathing apparatus in pressure-demand, NIOSH approved or equivalent and full protective gear.

6. Accidental Release Measures

Personal precautions	Avoid inhalation, and contact with skin, eyes, and clothing.
Personal Protective Equipment	Minimum – safety glasses, gloves, and a dust respirator.
Emergency Procedures	N/A
Methods for Containment	Prevent further leakage or spillage if safe to do so.
Methods for Clean Up	Avoid dust formation. Clean up released material using vacuum or wet sweep and shovel to minimize generation of dust. Bag and transfer to properly labeled containers. Ventilate area and wash spill site after material pickup is complete.
Environmental Precautions	Prevent material from entering waterways.
Other	If Product is contaminated, use PPE and containment appropriate to the nature of the most toxic chemical/material in the mixture.

7. Handling and Storage

Personal Precautions	Use appropriate PPE when handling or maintaining equipment and wash thoroughly after handling (see Section 8).
Conditions for Safe Storage/Handling	Keep product in original container or fire suppression system unit. Contents may be under pressure – inspect the fire suppression system unit consistent with product labeling to ensure container integrity.
Incompatible Products	Do not mix with other extinguishing agents, particularly potassium bicarbonate and sodium bicarbonate. Incompatible with strong oxidizing agents and strong acids. Do not store in high humidity. Do not combine with chlorine compounds.

8. Exposure Controls/Personal Protection

Chemical Name	OSHA PEL	ACGIH TLV	DFG MAK*	EU BLV
Mono-ammonium phosphate	PNOC** Total dust, 15 mg/m ³ Respirable fraction, 5 mg/m ³	PNOC Total dust, 10mg/m ³ Respirable fraction, 3 mg/m ³	PNOC Total dust, 4 mg/m ³ Respirable fraction, 1.5 mg/m ³	NA
Ammonium Sulfate	PNOC** Total dust, 15 mg/m ³ Respirable fraction, 5 mg/m ³	PNOC Total dust, 10mg/m ³ Respirable fraction, 3 mg/m ³	PNOC Total dust, 4 mg/m ³ Respirable fraction, 1.5 mg/m ³	NA
Mica	6 mg/m ³	3 mg/m ³	NR	NA
Attapulgite Clay	PNOC** Total dust, 15 mg/m ³ Respirable fraction, 5 mg/m ³	PNOC Total dust, 10mg/m ³ Respirable fraction, 3 mg/m ³	PNOC Total dust, 4 mg/m ³ Respirable fraction, 1.5 mg/m ³	
Silicone Oil	NR**	NR	NR	NA
Calcium Carbonate	PNOC** Total dust, 15 mg/m ³ Respirable fraction, 5 mg/m ³	PNOC Total dust, 10mg/m ³ Respirable fraction, 3 mg/m ³	-----	NA
Amorphous Silica	80 mg/m ³ % Silica	10 mg/m ³	4 mg/m ³	NA
Yellow 14 Pigment	NR	NR	NR	NA

*Germany regulatory limits **PNOC = Particulates not otherwise classified (ACGIH) also known as Particulates not otherwise regulated (OSHA) *** NR = Not Regulated. All values are 8-hour time weighted average concentrations.

9. Physical and Chemical Properties

Appearance	Light yellow powder, finely divided odorless solid.
Specific Gravity	(H ₂ O = 1): 1.80
Solubility in Water	Slightly Water Soluble
Melting Point	374°Fahrenheit / 190°Celsius
Freezing Point	No information available
Initial Boiling Point	No information available
Physical State	Crystalline Powder
pH	Mixture approximately 4 to 5; NH ₄ H ₂ PO ₄ : 4.2 in 0.2 molar solution; (NH ₄) ₂ SO ₄ : 5.5 in 0.1 molar solution
Flash Point	None
Auto-ignition Temperature	None
Flammability	Not Flammable
Flammability/Explosive Limits in Air	Upper – No; Lower – No
Explosive Properties	None
Oxidizing Properties	None
Volatile Component (%vol)	Not Applicable
Evaporation Rate	No information available
Vapor Density	No information available
Viscosity	No information available

10. Stability and Reactivity

Stability	Stable under recommended storage and handling conditions
Reactivity	No reactivity for these chemicals is expected.
Incompatibles	Strong alkalis (bases), magnesium, strong oxidizers, isocyanuric acids and chlorine compounds.
Conditions to Avoid	Storage or handling near incompatibles.
Hazardous Decomposition Products	Heat of fire may release carbon monoxide, carbon dioxide, and sulfur dioxide. Also, ammonia, oxides of phosphorus and nitrogen oxides may be released during decomposition.
Possibility of Hazardous Reactions	Slight
Hazardous Polymerization	Does not occur.

11. Toxicological Information

Likely Routes of Exposure	Inhalation, skin, and eye contact
Symptoms Immediate	
Inhalation	Irritation, coughing.
Eyes	Irritation
Skin	Irritation
Delayed	Symptoms appear to be relatively immediate.
Acute Toxicity	Relatively non-toxic
Chronic Toxicity	
Short-term Exposure	None known.
Long-term exposure	As with all dusts, pneumoconiosis, or “dust lung” disease, may result from chronic exposure.
Reproductive Toxicity	This product’s ingredients are not known to have reproductive or teratogenic effects.

12. Ecological Information

Ecotoxicity	Harmful effects to aquatic organisms after long-term exposure. Provides nutrient nitrogen and phosphorus to plant life.
Persistence/Degradability	Degrades rapidly in humid/wet environment.
Probability of rapid biodegradation	NH ₄ H ₂ PO ₄ Est: 0.693 (Rapid); (NH ₄) ₂ SO ₄ : Est: 0.684 (Rapid)
Anaerobic biodegradation probability	NH ₄ H ₂ PO ₄ Est: 0.398 (Slow); (NH ₄) ₂ SO ₄ : Est: 0.398 (Slow)
Bioaccumulation potential	Low
Mobility in soil	Slow evaporation rate; water soluble; may leach to groundwater.
Other Adverse Ecological Effects	No other known effects at this time

Aquatic Toxicity Values – Environment – Estimates

Chemical Name	Acute (LC50)	EC50
Mono-ammonium phosphate	2,91e+07 mg/L Fish 96 hr.; 9.4e+06 mg/L Daphnid 48hr;	6.70e+05 mg/L Gr. Algae 96 hr.
Ammonium Sulfate	2521 mg/L Fish 96 hr.; 1244 mg/L Daphnid 48 hr.;	518 mg/L Gr. Algae 96 hr.

13. Disposal Considerations

Safe Handling	Use appropriate PPE when handling and washing thoroughly after handling (see Section 8).
Waste Disposal Considerations	Dispose in accordance with federal, state, and local regulations.
Contaminated Packaging	Dispose in accordance with federal, state, and local regulations.

Notes: This product is not a RCRA characteristically hazardous or listed hazardous waste. Dispose of it according to state or local laws, which may be more restrictive than federal laws or regulations. Used products may be altered or contaminated, creating different disposal considerations.

14. Transport Information

UN Number	NA
UN Proper Shipping Name	NA
Transport Hazard Class	NA
Packing Group	NA
Marine Pollutant	NO
IATA	Not Regulated
DOT	Not Regulated

Notes: This product is not defined as a hazardous material under U.S. Department of Transportation (DOT) 49 CFR 172, or by Transport Canada “Transportation of Dangerous Goods” regulations.

Special Precautions for Shipping:

The transportation information above covers the CF-33 Dry Chemical Agent as shipped in bulk containers and not when contained in a dry chemical fire suppression system. If shipped in a stored pressure-type fire suppression system, and pressurized with a non-flammable, non-toxic inert expellant gas, the fire suppression system is considered a hazardous material by the U. S. Department of Transportation and Transport Canada. The proper shipping name shall be FIRE EXTINGUISHER and the UN designation is UN 1044. The DOT hazard class/division is LIMITED QUANTITY when pressurized to less than 241psig and when shipped via highway or rail. UN Class 2.2 Non-Flammable Gas, when shipping via air. Packing Group – N/A.

15. Regulatory Information

International Inventory Status: All ingredients are in the following inventories.

Country	Agency	Status
United States of America	TSCA	Yes
Canada	DSL	Yes
Europe	EINECS/ELINCS	Yes
Australia	AICS	Yes

Japan	MITI	Yes
South Korea	KECL	Yes

European Risk and Safety Phrases		
EU Classification	XN	Irritant
R Phrases	20	Harmful by inhalation
	22	Harmful if swallowed
S Phrases	36/37/38	Irritating to eyes, respiratory system, and skin
	22	Do not breath dust
	24/25	Avoid contact with skin and eyes
	26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
	36	Wear suitable protective clothing
	37/39	Wear suitable gloves and eye protection

U.S. Federal Regulatory Information

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) – This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372. None of the chemicals in this product are under SARA reporting requirements or have SARA threshold planning quantities (TPQs) or CERCLA reportable quantities (RQs), or are regulated under TSCA 8(d).

SARA 311/312 Hazard Categories:

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
*-Sudden Release of Pressure Hazard	Yes
Reactive Hazard	No

***- Only applicable if material is in a pressurized fire suppression system unit.**

Clean Water/Clean Air Acts

This product does not contain any substance regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42) or Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61) and Section 112 of the Clean Air Act Amendments of 1990.

U.S. State Regulatory Information

Chemicals in the product are covered under specific State regulations, as denoted below:

Alaska – Designated Toxic and Hazardous Substance:	None
California – Permissible Exposure Limits for Chemical Contaminants:	None
California Proposition 65:	No component is listed on the California Proposition 65 list.
Florida – Substance List:	Mica Dust
Illinois – Toxic Substance List:	None
Kansas – Section 302/303 List:	None
Massachusetts – Substance List:	Mica Dust
Missouri – Employer Information/Toxic Substance List:	None
New Jersey – Right to Know Hazardous Substance List:	None
North Dakota – List of Hazardous Chemicals, Reportable Quantities:	None
Pennsylvania – Hazardous Substance List:	None

Rhode Island – Hazardous Substance List:	Mica Dust
Texas – Hazardous Substance List:	No
West Virginia – Hazardous Substance List:	None
Wisconsin – Toxic and Hazardous Substances:	None

Other:

Mexico – Grade	No component listed.
Canada – WHMIS Hazard Class	Ammonium Sulfate listed as not a dangerous product according to HPR classification criteria.

16. Other Information

This SDS conforms to requirements under U.S., U.K., Canadian, Australian, and EU regulations or standards, and conforms to the proposed 2003 ANSI Z400.1 format.

Issuing Date	01-August-2003
Revision Date	08-May-2018
Revision Notes	None

The Information herein is given in good faith but no warranty, expressed or implied, is made.

MATERIAL SAFETY DATA SHEET
HFC227ea
FILE NO.: MSDS227ea A-Gas RemTec
MSDS DATE: December /2012

SECTION 5: FIRE-FIGHTING MEASURES CONTINUED

EXTINGUISHING MEDIA: HFC227ea is a fire extinguishing media. Use extinguishing media appropriate for surrounding fire.

PROTECTIVE EQUIPMENT: General fire fighting protective equipment.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Cylinders are equipped with pressure release devices to vent contents exposed to high temperatures. Cylinders may rupture under fire conditions. Cool cylinders with water spray.

HAZARDOUS DECOMPOSITION PRODUCTS: Combustion or heat of fire may produce hazardous decomposition. Gas will decompose in high heat forming toxic gases such as hydrogen fluoride and Carbonyl fluoride.

SECTION 6: ACCIDENTAL RELEASE MEASURES

IMMEDIATE RESPONSE: If the release is caused by an open valve and it is safe for operator to close, do so. If possible to transfer the remaining gas in the cylinder in a safe manner to a separate tank, do so. If the release cannot be isolated or closed and it is a significant amount, allow the gas to release in place or safely move cylinder to a safe area. Evacuate area in the event of a significant release in an enclosed area.

ACCIDENTAL RELEASE MEASURES: Keep unwind. Ventilate area, especially low places. Remove open flames and heating elements. Disperse gas with floor level forced air. Gas will evaporate.

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE: Operators should be familiar with CGA pamphlet P-1 Safe Handling of Compressed Gases in Containers. Do not allow cylinders to be stored in areas where heat may rise over 130°F

OTHER PRECAUTIONS: Use properly rated DOT or ASME cylinders/tanks. Do not fill cylinders if inspection date has expired. Cylinders that have been previously filled to inspection expiration date may still be shipped in accordance with CFR.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Proper recovery equipment with trained operator to be utilized.

VENTILATION: Use adequate mechanical ventilation.

RESPIRATORY PROTECTION: If non-routine use or emergency occurs or in low or closed area use Niosh/MSHA approved respirator or supplied air respirator or SCBA, as required. Use in accordance with 20 CFR 1901-134

EYE PROTECTION: Safety glasses with side shields or Chemical splash goggles.

SKIN PROTECTION: Avoid bare skin to protect against frostbite.

HAND AND FOOT PROTECTION: Rubber or Heavy leather gloves and safety shoes when handling cylinders.

WORK HYGIENIC PRACTICES: Wash hands after use and before eating or drinking.

EXPOSURE GUIDELINES:

	<u>ppm</u>	<u>mg/m3</u>
Dupont AEL	1000	
Dupont TLV-TWA:	8 and 12 hour	

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquefied Gas under pressure

APPEARANCE: Clear - colorless

ODOR: None

MOLECULAR WEIGHT: 170.03

SPECIFIC GRAVITY (H2O = 1): 1.46 g/MI

MELTING POINT @ 1 ATM: -205°F (-132°C)

BOILING POINT: 2.6°F (-16.3°C)

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES CONTINUED

EVAPORATION RATE:	Not Applicable	
VAPOR PRESSURE: (hPa/25°C 77°F)	4,547	66 PSIA @ 77°F (25°C)
CRITICAL PRESSURE:	424.7 psia	
CRITICAL TEMPERATURE:	215.1°F (101.75°C)	
VAPOR DENSITY (AIR = 1):	7.2 @ 77°F (25°C)	
LIQUID DENSITY:	86.6 lb/ft ³ @ 77°F (25°C)	
SOLUBILITY IN WATER:	260mg/L	
AUTO IGNITION TEMPERATURE:	Not Applicable	
DECOMPOSITION TEMPERATURE:	13,000°F (7000°C)	
VISCOSITY LIQUID:	.579 lb/ft-hr	

SECTION 10: STABILITY AND REACTIVITY

REACTIVITY: Strong Alkalis, alkali earth metals, fires of metal hydrides, powdered metals and powdered metal salts.

STABILITY: Stable

CONDITIONS TO AVOID (STABILITY): Avoid high heat (above 130°F (54°C)) on cylinders.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: Thermal decomposition product include hydrogen fluoride, carbonyl fluoride, carbon monoxide and carbon dioxide.

HAZARDOUS POLYMERIZATION: Not Applicable

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION:

ROUTES OF ENTRY: Inhalation: Yes Skin: No Ingestion: No

ACUTE TOXICITY: LD50-LC50 Mixture – 4 HR LC50 (RAT) > 788,696 PPM

REPRODUCTIVE/DEVELOPMENT TOXICITY: No effects

CARCINOGENICITY: Not listed as a carcinogen by NTP, IARC, or OSHA

DESCRIPTION OF SYMPTOMS: Inhalation of high concentration may lead to unconsciousness and possible death. Effects of overexposure by inhalation may include non specific discomfort, such as nausea, headache, or weakness, or temporary central nervous system depression with effects such as dizziness, headache, confusion, in coordinate, and loss of consciousness. Higher exposures by inhalation may cause temporary alteration the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation.

Individuals with pre-existing diseases of the central nervous or cardiovascular system may have increased susceptibility to the toxicity of excessive exposure.

SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: HFC227ea is not an Ozone Depleting Substance. HFC227ea is a Global Warmer and has a Global Warming Potential (GWP) of 3220.

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Send cylinder with residual gas to a halon reclamation facility for recovery and/or disposal. Contact A-Gas RemTec for reclamation or disposal.

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION

PROPER SHIPPING NAME:	Heptafluoropropane
HAZARD CLASS:	2.2, Non-Flammable Gas
UN NUMBER:	UN3296
PACKING GROUP:	Not Applicable
LABEL STATEMENT:	Class 2.2 (Non-Flammable)
BOL	UN3296, Heptafluoropropane, 2.2



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SECTION 14: TRANSPORT INFORMATION CONTINUED

Other: Avoid transport in vehicles where the load space is not separated from the driver's compartment. Ensure Vehicle driver is aware of the potential hazards of the containers and what action to take in the event of an accident or an emergency.

Prior to transporting cylinders ensure that they are firmly secured and;
 Cylinder valve is closed and not leaking
 Valve outlet cap nut or plug (if provided) is correctly connected

WATER TRANSPORTATION: Same as above

AIR TRANSPORTATION: Cargo Aircraft Only 150kg maximum net/pkg

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TSCA (TOXIC SUBSTANCE CONTROL ACT): HFC227ea is listed in the TSCA Inventory

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT): Reportable Quantity (RQ): Not Applicable

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT):

SECTIONS 302/304: Not Applicable
SECTIONS 311/312: Immediate Health: No, Pressure: Yes, Delayed Health: No, Reactivity: No, Fire: No
SECTIONS 313: Not Applicable

INTERNATIONAL REGULATIONS:

CANADIAN DSL/NDSL:

HFC227ea is on the DSL Inventory

CANADIAN WHMIS:

HFC 227ea is categorized as a Controlled Product, Hazard Class A, Compressed Gas.

EINECS LISTING (EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES):

All ingredients of HFC227ea are listed.

SECTION 16: OTHER INFORMATION

ABBREVIATIONS:

DSL – Domestic Substance List
 NDSL – Non-Domestic Substance List
 WHMIS - Workplace Hazardous Materials Information System

PREPARATION INFORMATION:

A-Gas RemTec

DATE PREPARED:

December 2012

1DISCLAIMER:

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