Max-Suppress™ 120-GCU 120-S
454-Liter Fast Response CAC
(A Compressed Air Catalyst Unit)

OPERATIONS, TRAINING, & MAINTENANCE MANUAL

RVSD, 2019

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CHAPTER 1

INTRODUCTION

1-1. MANUFACTURER:

A. FireStopper International Limited (hereinafter FireStopper®)
info@firestopperintl.com

1-2. The ***FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER Fast Response CAC*** is designed for use in all fire class events when used in conjunction with all FireStopper® branded fire suppression liquid products.

1-3. LIMITED WARRANTY:

WARRANTY, DISCLAIMERS, LIMITATIONS OF REMEDIES AND WARNINGS

FireStopper® warrants its products as provided herein only to Buyers who buy directly from FireStopper® solely for resale or for commercial or industrial use in the ordinary course of each Buyer's business, and FireStopper® makes no written warranty to any purchaser who purchases for personal, family or household use and authorizes no person to make any such written warranty on its behalf. No employee or agent of FireStopper® is authorized to vary the terms of this Warranty. FireStopper® warrants its extinguisher products to be free from defect in material & workmanship for a period of (20) twenty-years from date of manufacture while in use on land applications, and (10) ten-years while in use on offshore applications (on stainless steel models only). On any other models, a 1-year limited warranty period applies. During the warranty period, any such defects will be repaired or replaced at the discretion of FireStopper®. The original seals must be in place or the warranty is void. This warranty does not cover defects resulting from tampering, modification, alteration, abuse, and misuse, exposure to corrosive conditions, or improper installation and or maintenance. Any pressure gage and wearable parts are expressly excluded. ***This warranty shall be void if any other product than the recommended FireStopper® fire suppressants is used in conjunction with this system.***

ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF FITNESS FOR PURPOSE AND MERCHANTABILITY, ARE LIMITED TO THE TIME PERIODS STATED ABOVE, AND IN NO EVENT WILL FIRESTOPPER® OR ANY OF ITS AFFILIATES, DISTRIBUTORS, AGENTS OR EMPLOYEES, BE LIABLE TO INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND. <u>IMPORTANT NOTICE TO PURCHASER:</u> ANY ALTERATION TO THE ORIGINAL FORMULA, EXCEPT FOR ITS INTENDED END USE, SHALL VOID ANY AND ALL WARRANTIES OF PRODUCT.

The following is made in lieu of all warranties, expressed or implied, including the implied warranties of merchantability and fitness for purpose: Sellers and manufacturer's only obligations shall be to replace such quantity of the product proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and user will assume all risk and liability whatsoever in connection therewith.

NEITHER SELLER NOR MANUFACTURER SHALL BE LIABLE IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE DIRECT, INCIDENTAL, OR CONSEQUENTIAL, ARISING OUT OF THE USE OF OR THE INABILITY TO USE THE PRODUCT.

Original owner shall be authorized only by issuance of an RA (Returned Authorization) by FireStopper®, freight prepaid to a location specified by FireStopper® authorized personnel, to return any such warranted product, and that product will be repaired or replaced at FireStopper®'s own discretion if a defect is found to exist. *Any claims of defect or failure to performance under this Warranty must be made within (30) thirty-days after failure or defect is discovered. The liabilities are limited solely and exclusively to repair or replacement as provided herein and exclude all consequential or other damages of any kind whatsoever, whether any claim is based upon theories of contract, negligence or tort, and without any limitation, and shall not include shipping charges, labor, installation, loss of product, or any other losses or expenses incurred in the operation or installation of any repaired or replaced materials and products.* FireStopper® assumes no liability for damages resulting from normal ware, tampering, improper installation, misuse or neglect, or the effects of internal or external corrosion. FireStopper® does not warrant any aspect of product installation, modification or manufacturing carried out by parties other than FireStopper®. Purchaser hereby indemnifies FireStopper® for any loss, cost, or expense to which Purchaser may expose FireStopper® as a result of any such activities.

WARNING: Some FireStopper® products may be under pressure and shall require special handling and compliance to Governmental or DOT regulations, State and local laws, and any other applicable standards. FireStopper® is not responsible for ensuring the compliance of others, and does not warrant the compliance of other, with any law or regulation pertaining to the use or charging of the cylinder product it manufactures. This warranty may be supplemented or changed in whole or in part from time to time. The applicable Warranty is the Warranty in effect at the time of shipment.

9. LIMITATION OF LIABILITY. FireStopper® total liability on any claim arising out of this contract shall not exceed the price allocated to the product or part, which gives rise to such claim. In no event shall FireStopper® be liable for any incidental or consequential damages including, but not limited to, damages for loss of revenue, cost of capital, loss of contents, claims of customers for service/business interruptions or failure of supply, and costs and expenses incurred in connection with labor, overhead, transportation, installation or removal of products or substitute facilities or supply sources.

10. CHANGES OR CANCELLATION. FireStopper® cannot accept cancellations or change orders after portions of the manufacturing have initiated. Charges for cancellations or changed orders during processing will be pro-rated to the selling price. Prior to the return of any product, written approval from FireStopper® for credit or replacement must be obtained. Returned products must be sent back in their original packaging, freight prepaid, and is subject to a handling charge. Additional charges will be made if the products are damaged, obsolete or in an unsalable condition.

11. OTHER. (a) FireStopper® accepts no responsibility to Buyer, or to any person claiming by or through Buyer, for compliance with any statute, governmental rule or regulation made applicable to this contract by reason of Buyer's intended use of the products unless FireStopper® has received from Buyer prior timely written notification of such statute, rule or

regulation and has accepted the same by a separate signed by and authorizes representative of FireStopper®.

(b) FireStopper® may forthwith cancel this contract of any portion hereof, if any of the following events occur: insolvency of Buyer; the initiation of a case by or against Buyer under chapter of the Bankruptcy Code, as amended; the failure of Buyer to give adequate assurance; the appointment of a receiver or trustee to Buyer or for all or part of Buyer's property; or the termination of business operations by Buyer.

(c) FireStopper® forbearance or failure to enforce any of these conditions to exercise any right occurring from any default of Buyer shall not affect, impair or waive FireStopper® rights if such default continues, or if any subsequent default of Buyer's occurs.

(d) All orders are subject to acceptance at FireStopper® offices. Any contract hereunder shall be construed in accordance with the laws of the State of California.

(e) The provisions herein constitute the entire agreement between Buyer and FireStopper®, and no terms or conditions other than those stated herein and agreement or understanding, oral or written in any way purporting to modify these conditions shall be binding on FireStopper® unless hereafter made in writing and signed by FireStopper® authorizes representative.

Acceptance of the products sold hereunder shall constitute assent to these terms and conditions and FireStopper® herby objects to and rejects any and all additional or different terms proposed by Buyer, whether contained in Buyers purchasing or shipping release forms, if any, made prior and with reference hereto are merged herein. Any proposed additions, modifications, deletions, or changes not in separate writings signed by FireStopper® are rejected without further action of FireStopper®.

1-4. **WARNINGS, CAUTIONS, & NOTES**: Are used to emphasize important and critical instructions and are used for the following conditions:

A. **WARNING**: An operating procedure, practice, etc., which if not correctly followed could result in personal injury or loss of life.

B. **CAUTION**: An operating procedure, practice, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment.

C. **NOTE**: An operating procedure, condition, etc., which it is essential to highlight.

1-5. **MANUAL CHANGES AND REPRODUCTION**:

A. MANUAL CHANGES:

(1) This manual and the associated updates will be posted on the FireStopper® web site.

(2) Users can help improve this manual by providing any errors, or inconsistencies, to the manufacturer. All corrections submitted should

reference the appropriate Chapter/Paragraph (if applicable) and the name and contact (phone, e-mail, fax, etc) for the person submitting the information.

B. REPRODUCTION: Reproduction of training information, illustrations, and checklists in this manual is authorized.

CHAPTER 2

SYSTEM DESCRIPTION

2-1. GENERAL INFORMATION: The FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER Fast Response CAC Compressed Air Catalyst fire suppression system uses compressed air to propel fire-fighting foam. Thousands of tight radius bubbles quickly cool and smother a fire by providing a thick vapor-sealing blanket of foam that virtually eliminates re-ignition. The foam will adhere to horizontal and vertical surfaces. This system allows the operator to seal a fuel spill and flammable vapors with foam thus reducing or eliminating a potential fire. The 454-liter (120-gallon) system produces @ 20x expansion approximately 9080-liters (2400-gallons) of finished foam. It can take approximately 5-6 minutes, in the full open position, to fully discharge the 9080-liters (2400-gallons) of finished foam through the 1.5" nozzle. The system will discharge the foam approximately 26-29-m (85'-95') in a no wind condition allowing fire-fighting personnel without protective clothing to avoid thermal injuries. The operator can easily service the system. Trained personnel can accomplish all maintenance except the hydrostatic pressure testing of the Air Cylinders, Premix Tank, and the Discharge Hose.

2-2. SPECIFICATIONS:

A. Height: approx. 1016-mm (40") Width: 1200.15-mm (4.25) Length: 2387.6-mm (94")
B. Loaded Weight: approx. 887-kg (1956 lbs.) Empty Weight: 452-kg (996 lbs.)
C. Premix Tank: 454-liter (120-gallon) 304-Stainless Steel
D. Plumbing: Stainless Steel
E. Finished Foam Capacity: Approx. 9085-liter (2400-gallons)
F. Nozzles:
    a. 1" FireStopper®/Akron SaberJet pistol grip style
    b. 1.5" FireStopper®/Akron SaberJet pistol grip style
G. Finished Foam Discharge Rate:
    a. 1" hose approx. 250-300 gpm (approx. 946-1325-lpm),
    b. 1.5" hose approx. 450 gpm (approx. 2082-lpm)
H. Discharge Duration:
    a. 1" discharge hose approx. 9-min.
    b. 1.5" discharge hose approx. 5-6 min.
I. Foam Discharge Distance:
    a. 1" booster line approx. 65-75' (approx. 20-23-m) in a zero-wind conditions
    b. 1.5" flat lay hose approx. 85-95' (approx. 26-29-m) zero-wind cond.
J. Air Cylinder (Industrial): Two (2) 8.49-m^3 155-bars (300 ft^3 2250 psi)
K. Operating Pressure: 10.34-11.37-Bars (150-165 psi)

L. Regulator: Adjustable pressure 0-400 psi (0-27.6-bars)
    a. Dispensing Hose: 100-ft (approx. 30-m) /1" rubber booster and (approx. 30-m) 1.5" 100-ft. collapsible hose (UL Listed).

2-3. TRANSPORTING:

The FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER Fast Response CAC Unit should be thoroughly secured when transporting in trailers and vehicles. The towing eye was designed exclusively to handle all ground towing and external lift operations. Other sections of the system should not be used for these purposes. Utilize the frame when re-positioning the system. Do not push on any of the components (i.e. gauges, regulators etc.) when moving the system.

2-4. SYSTEM COMPONENTS:

1. **WATER/CHEMICAL FILL VALVE** is located below the Premix Tank Refill Port and allows solutions to enter the Premix Tank. The valve should be open (parallel to the supply line) to fill the Premix Tank and closed (in the perpendicular position) at all other times.

2. **AIR CYLINDER REGULATOR** adjusts the airflow from the Air Cylinders for the system. The regulator incorporates a check valve, which will when the system is pressurized, maintain a 0-27.6-bars (0-400 psi) system operating pressure and has been set to an operational pressure of 10.34-11.37-Bars (150-165psi). The regulator's operational temperature range is -40ºC to 71.1ºC (-40 to 160ºF).

3. **AIR CYLINDER VALVES** are located on the Air Cylinder. An internal over pressure relief valve opens and vents the Air Cylinder if the internal pressure reaches 4000 psi. An air pressure-indicating gauge is mounted on the main control panel.

4. **FOAM CHARGE VALVE** fills the discharge hose with pressurized foam when placed in the open position. The valve should be positioned in the full open position (handle is in line with the hose) for all operations and closed (handle is perpendicular to the hose) at all other times.

5. **FOAM DISCHARGE HOSE** Please see ***Specifications*** above.

6. **FOAM DISCHARGE NOZZLE** has a 3-position pistol grip hand activated lever (pictured). Forward is closed and aft is full open, additionally, the unit has an easy to use 3-position-twist pattern choice.

7. **PREMIX TANK** in 304-stainless steel has a capacity of 454-liter (120-gallon) and meet or exceeds ASME requirements. The Serial number for the system is stamped on a data plate on the tank. Mounted to the tank are the Foam Charge Valve, Foam Discharge Valve, Foam Discharge Hose, Pressure Vent Valve, Water/Chemical Fill Valve, Refill Port, and Pressure Relief Valve. The tank pressure normal operating range is 6.9-11.7-Bars (150-165 psi). A manual drain valve is located in the bottom of the tank.

8. **PREMIX TANK REFILL PORT** is located on the Tank Fill Valve. It is threaded to accept a funnel for adding foaming agent and water. A standard water hose can be attached to the Premix Tank Refill Port to facilitate the refilling process. The port has a one way check valve and a dust cap to keep foreign objects from entering the system.

9. **AIR CYLINDERS** Please see ***Specifications*** above.

10. **PRESSURE VENT VALVE** is located on top of the Premix Tank. The valve is used in the foam refill process and to depressurize the system after use. The valve is closed when it is perpendicular to the Premix Tank and is open when parallel with the Premix Tank.

11. **PRESSURE RELIEF VALVE** is located on the tee on the fill port fitting on the Pressure Vent Valve. The static pressure in the PREMIX TANK may increase during warm weather if the unit is left in the direct sunlight. When the system is pressurized for operation, the Premix Tank pressure may exceed 13.8-Bars (200-psi); Test Pressure: 41.4-Bars (600-psi); Burst Pressure: 82.7-Bars (1200-psi). The Pressure Relief Valve will open and vent any excess pressure if needed. While venting suppressant may discharge, however, the function or the operation of the system will not be affected.

12. **OPERATION SYSTEM PRESSURE GAUGE:** Shows the System operating pressure in the PREMIX TANK. Normal use pressure should read 6.9-11.7-Bars (150-165 psi).

13. **HIGH PRESSURE AIR CYLINDER GAUGE:** Used to test the Air Cylinder Pressure. When testing the Air Cylinder Pressures this gauge should read between 138-172-Bars (2000-2500 psi). Note: one cylinder can discharge the full tank through one line. If both lines are in use, both cylinders will discharge.

14. **FILL PORT:** A 50.8-mm (1.5") port located directly below refill port, comes with a threaded stainless steel cap.

CHAPTER 3

OPERATING INSTRUCTIONS

3-1. **INITIAL SETUP**: The FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC users should turn on the Air Cylinder handles and verify there is 138-172-Bars (2000-2500-psi) pressure. The Air Cylinders should be refilled if the cylinder pressure is less than 138-Bars (2000-psi). The 454-liter (120-gallon) Premix Tank must be filled prior to use. This unit is designed for use in conjunction with FireStopper® fire suppressants only. ***The use of any other fire suppressant products shall void any warrantee represented in this document and/or by***

FireStopper®.

3-2 USABLE FOAM SOLUTION PRODUCTS:

A. The FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC can use any type of AFFF fire suppression foam chemical solution. Recommended fire suppressants:

1. ***FireStopper® PFE-FR FFC is an ECO-Safe, all fire class, A-B-C-D-F (A-B-C-D-K) effective fire suppressant product exclusively available on FireStopper® Branded Products. Additionally, this product is Non-Toxic, Non-Irritant, Non-Aggressive, and approved for use on onshore and off shore applications. Tested and rated to EN3-7 and UL711, ULC, NFPA10. Freeze recistant to -30ºC in portable fire extinguishers & freeze recistant to -73.4ºC in its factory sealed contaner.***

2. ***FireStopper® XL FFC Concentrate is an ECO-Safe, all fire class A-B-C-D-F (A-B-C-D-K) effective fire suppressant product. This product is the only foam concentrate in the world certified under EN1568-3 certified to be used at 6% and 3%. also, this product is Non-Toxic, Non-Irritant, Non-Aggressive, and approved for use on onshore and off shore applications. Additional certification ICAO Level-B, , ULC/ULI62***

3. ***FireStopper® XL "PLUS" FFC Concentrate is an ECO-Safe, all fire class, A-B-C-D-F (A-B-C-D-K) effective fire suppressant product. This product is the only foam concentrate in the world certified under EN1568-3 at 6%, 3%, 1% -1-A, as needed. Additionally, this product is Non-Toxic, Non-Irritant, Non-Aggressive, and approved for use on onshore and off shore applications. Additionally certified ICAO Level B at 3%; and IMO, US Navy: Milspec/QPL, ULC/ULI62***

4. **** If this unit is tasked for wildfire/forest fire application, FireStopper® AB40002 FFC an ECO-Safe, all fire class effective concentrate A-B-C-D-F (A-B-C-D-K) and is the recommended use product. This product is designed for use additionally as a pretreatment product on structures in the line of fire, Certification: EN1568, ICAO-B, EN3-7, ULC/ULI62***

B. The end user should determine the ideal percentage of concentrate used for the particular need. This usage shall also be determined according to the FireStopper® product of choice.

Since this unit is classified as an emergency first response portable system, limited to a maximum of 454-liter cycle, the maximum fire suppressant application should always be employed. Therefore regardless of the product of choice in the concentrate form, the end user shall determine the best usable

ratio of concentrate to water (please follow all usage instructions for any of the FireStopper® suppressant).

3-3. SYSTEM DEPRESSURIZATION

CAUTION

Ensure the Premix Tank is depressurized and the Air Cylinders are closed before conducting any maintenance on the system.

A. Close the Air Cylinder Valves.

B. Close the Foam Charge Valve (if open).

C. Open the Pressure Vent Valve slowly to relieve the Premix Tank and gauge pressures.

D. Close the Pressure Vent Valve.

3-4. PREVENTATIVE MAINTENANCE CHECKS & SERVICES (PMCS)

A. Recommendation: the PMCS CHECKLIST should be completed every month.

B. Personnel completing the PMCS should become thoroughly familiar with the operation and maintenance of FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC system and the information in this manual.

C. Recommendation: a tag should be maintained on each unit that indicates the date and the initials of the individual completing the PMCS, the type of FireStopper® recommended product in the Premix Tank, and the location of the MSDS for an emergency situation.

FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC

PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

CHECKLIST

DATE COMPLETED_____

NAME _____ **SIGNATURE**_____

_____ 1. Conduct a visual inspection of the system for chaffing lines, loose lines, dirt, corrosion or damage.

_____ 2. Check to ensure tamper seals are installed on the Air Cylinder Valves, the Foam Charge Valve, and the Water/Chemical Fill Valve and Pressure Vent Valve.

A. Turn on one air cylinder and note pressure. Close the air cylinder and check the pressure on the remaining air cylinder.

(1) Conduct a leak check if either Air Cylinder pressure is below 138-Bars (2000-psi):

(a) Turn on Air Cylinder(s) with broken seal.
(b) Spray a light soap solution on all airlines and fittings.
(c) Tighten fittings, or replace leaking component.

(2) Remove, recharge, and reinstall Air Cylinders

(3) Reapply tamper seals

B. Check the Premix Tank level if both the Air Cylinder Valve and the Foam Charge Valve tamper seals is broken.

(1) Open the Water/Chemical and Pressure Vent Valves.
(2)
(3) Fill up the Premix Tank if low.
(4) Close the Water/Chemical Valves.
(5) Reapply tamper seals

_____ 3.

_____ 4. Note any other problems:

_____

_____

_____

_____

_____

_____

_____

3-5. NORMAL OPERATING INSTRUCTIONS

WARNING

The FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC discharges foam solution at a high pressure. A sudden pressure surge could cause the operator to lose control of the hose if the nozzle and hose are not held securely when the Foam Discharge Nozzle is opened. Open the nozzle slowly to the full open position.

All FireStopper® products are Non-Toxic, Non-Irritant, Non-aggressive and environmentally *ECO-Safe*. In the abundance of care, please consult the foam manufacturer's MSDS for the proper precautions and treatments if the foam is sprayed into the facial area (eyes, nose, and mouth).

NOTE

It is recommended that the air cylinders normally be left in the closed position.

A. Ensure the Foam Discharge Nozzle is in the closed (forward) position.

B. Open one Air Cylinder by turning the valve counter clockwise.

C. Extend the hose.

D. Turn on the Foam Charge Valve slowly to the full open position (handle should be in line with the hose).

E. Aim the Nozzle at the base of the fire and open the Foam Discharge Valve slowly (rear position).

F. Shoot the system in 5 to 10-second bursts across the base of the fire or directly on objects that are on fire. Move the nozzle slowly to build up a layer of foam over the fire surface.

3-6. COLD WEATHER OPERATIONS

A. It is recommended that the FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC system be equipped with the Arctic Regulator, Arctic Discharge Hose, Protective Cover and the ***FIRESTOPPER® PFE-FR FFC*** when extreme cold weather conditions are anticipated.

B. The operator of this unit should familiarize themselves with the operation of this System in the weather conditions this system will be tasked to perform. FireStopper® recommends scheduled training sessions on the handling and operating of this system and any other life saving systems.

3-7. EMERGENCY PROCEDURES

A. LOOSE HOSE

WARNING

Do not attempt to catch a runaway hose.

(1) Move to the unit and close the Foam Charge Valve immediately (valve handle should be perpendicular to the hose).

(2) Close the Foam Discharge Nozzle (valve handle is full forward).

IF CONTINUING TO FIGHT THE FIRE:

(3) Open Foam Charge Valve slowly.

(4) Hold the hose securely and open the Foam Discharge Nozzle slowly (valve handle should be full aft).

B. NO FOAM DISCHARGE

(1) Close the Foam Discharge Nozzle (move the handle full forward).

(2) Close the Foam Charge Valve.

(3) Open the backup Air Cylinder Valve.

(4) Open Foam Charge Valve slowly (valve handle should be in line with the hose).

(5) Hold the hose securely and open the Foam Discharge Nozzle (valve handle is full aft) slowly.

C. SHUT DOWN PROCEDURES

(1) Close the Foam Discharge Nozzle.

(2) Close the Foam Charge Valve.

(3) Close the Air Cylinder Valve.

(4) Open the Foam Discharge Nozzle to depressurize the hose. Close the valve when all of the foam has been expended from the hose.

(5) Open the Pressure Vent Valve slowly until all pressure is relieved.

(6) Secure the fire hose.

3-8 AVIATION REFUELING OPERATIONS

A. Helicopter hot refuel operations are by nature hazardous. An accidental fuel spill during refueling can result in catastrophic damage to the aircraft and possible injury or loss of life to the refuel/aircraft crew. The FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC provides the user a standoff distance ability along with the ability to prevent fires by covering up flammable liquids, sealing vapors, and cooling the surface.

B. The following techniques will help prevent catastrophic affects of accidents and reduce the overall risk of aviation refueling operations. These are offered as a guideline, and are not a substitute for certified Fire training:

(1) FIREGUARDS: The protective cover (if utilized) should be removed from the unit and the hose are moved to the fireguard position. Fireguards should stand just outside the rotor disc in clear view of the pilot or co-pilot on the side of the aircraft the refueling nozzle is located on. This position allows the fire guard the best view to monitor the refuel operation, alert the crew to any problem, and quickly react to a fire or fuel spill situation while remaining well clear of the affected area. Priorities should be given to the crew, the fuel spill, and the main fire areas.

(2) IN THE EVENT A FIRE OCCURS: The safety of the re-fueler and aircraft crew is the number one priority. Fuel burning in the vicinity of the aircrew should be extinguished first. Open the Foam Discharge Nozzle fully and sweep the foam stream across the base of the flames starting at the leading edge and moving slowly to the rear. Use short 5-10 second bursts checking the effectiveness of the foam between bursts. Once the fuel on the ground has been extinguished, begin foaming any remaining portion of the aircraft that is burning.

(3) IF FUEL HAS BEEN SPILLED ON THE GROUND AND THE AIRCRAFT: Foam the aircraft first by positioning the Foam Discharge Nozzle to the full open position in order to get the maximum foam possible on the aircraft. Fuel spilled in the vicinity of the engine, exhaust, or the intake should be foamed immediately to prevent ignition. Once the aircraft has been foamed, the fuel on the ground should be covered with a blanket of foam. Monitor the crew egress and

reapply foam to any areas where the foam blanket has been compromised. This action can be accomplished in approximately 20 seconds by a trained fireguard. Quick action on the part of the fireguard is critical to prevent a fuel spill from becoming a fuel fire.

3-9. FUEL SPILL PROCEDURES:

A. The hazard of fuel spills can be reduced by applying a blanket of foam on top of the fuel to seal vapors and reduce the chance of combustion.

B. Cover any personnel who have been drenched with fuel with foam to prevent combustion.

WARNING

Do not hit the spilled fuel directly with an unrestricted flow of foam or with the Nozzle in the full open position. This action could spread the fuel creating a greater hazard and cause injury to refuel personnel. The operator should be positioned a minimum of 9-12-m (30-40 ft.) from the fire to maximize the effectiveness of the system. Personnel exposed to foam should follow the instructions listed in the foam manufacturer's Material Safety Data Sheet (MSDS).

CHAPTER 4

TRAINING

4-1. TRAINING PROGRAM

A. Training on the FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC system should be conducted at least annually for all operators.

B. Maintainers should complete initial training and refresher training as required.

C. Trainers should be thoroughly familiar with the system, fire behavior, hazard identification, and basic fire fighting skills.

D. Operator training should be conducted using a "hands-on" approach in a live fire scenario whenever possible. Live fire training can often be accomplished through coordination with a local fire department.

4-2. TRAINING AIDS: Any FireStopper® concentrate at .02% can be employed as training foam provided that the training is being conducted in non-freezing environment. The training solution should be placed in the Premix Tank when it is half full of water in order to maximize the volume of solution available.

4-3. TRAINING PROGRAM OF INSTRUCTION (POI):

A. OPERATORS & MAINTAINERS

(1) Component Identification (Pages 6-7)

(2) PMCS (Pages 9-11)

(3) Normal and Cold Weather Operating Instructions (Pages 12-13)

(4) Emergency Procedures (Pages 13-14)

(5) Aviation Refueling Operations (if applicable) (Page 15)

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(7) Hands-On Operation, preferably on a live fire scenario (Page 12)

B. MAINTAINERS

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(2) Repair Parts and Special Tools (Pages 19-21)

(3) Visual Tamper Seals (Page 22-23)

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(8) Unscheduled Maintenance (Pages 30-32)

(9) Troubleshooting Procedures (Page 33)

(10) Storage and Protection (Page 34)

CHAPTER 5

MAINTENANCE

5-1. GENERAL INSTRUCTIONS

A. The FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC system was designed to be easy to operate and simple to maintain. The system has few moving parts; however, it is a vital lifesaving

piece of equipment that requires some minimal maintenance.

B. It is recommended that the monthly PMCS be accomplished.

C. It is also very important that responsible personnel be assigned the responsibility to service and maintain the system.

D. The final important task is maintaining thorough documented records of the maintenance performed. These records should include copies of the completed PMCS Checklists, the Maintenance Log, when the Premix Tank was filled and the type/mixture of foam in each unit. A MSDS sheet should be readily available for the type of foam being utilized. Recommend a tag be affixed to each unit that lists the date and initials of the individual performing the PMCS, the foam type and mixture ratio (if any), and the location of the MSDS.

5-2. TECHNICAL ASSISTANCE: The manufacturer is totally committed to providing technical assistance whenever required. Maintainers should contact the manufacturer whenever a problem arises that cannot be solved using the information in this manual or when unusual situations are encountered.

5-3. REPAIR PARTS

A. The FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC repair parts are listed in this section. All repair parts can be obtained from the manufacturer or authorize Master Distributor.

B. If the manufacturer determines that a part failed due to defects in workmanship during the warranty period, said part shall be replaced at no cost. The defective part must be identified for the manufacturer by submitting a digital photograph and the part number. Users should contact the distributor by phone, e-mail, fax.

FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC REPAIR PARTS

5-4. SPECIAL TOOLS & ACCESSORIES

A. **PRESSURE TESTER**: A hand held gauge to easily determine the amount of pressure in the Air Cylinders is available from the manufacturer or local distributors.

B. **FUNNEL**: A Two (2) Quart threaded funnel is provided with each unit to fill the Premix Tank.

5-5. VISUAL TAMPER SAFETY SEALS

A. The manufacturer recommends that visual tamper seals be applied to the Foam Charge Valve, Air Cylinder Valves, Water/Chemical Fill Valve, and the Pressure Vent Valve when positioned in the closed position. Placing tamper seals on the Water/Chemical and Pressure Vent Valves is optional. The tamper seals on the Air Cylinder and Foam Charge Valve should be a breakaway plastic or safety wire type.

B. Pressure Vent Valve, Water/Chemical Fill Valve Tamper Seals: The handles have a small hole at the end of the handle or they come pre-drilled at the factory. The hole at the end of the handle can be opened using a sharp object such as a small nail to create an open hole that a visual tamper seal can pass through.

C. Air Cylinder Valve Tamper Seals:

(1) Holes are drilled in the air cylinder valve knob at the factory.

(2) Insert a plastic tamper seal or breakaway safety wire into one hole, loop it under the Air Cylinder support frame and draw it back out the second hole. Re-install the Air Cylinder into the Air Cylinder Support.

D. Foam Charge Valve Tamper Seal: If no hole is available on the valve handle, drill a hole in the location indicated with an arrow on the image below:

NEW PART	See Revised Spare parts list
101B	FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC PROTECTIVE COVER
3	¼-INCH CHECK VALVE
11	¾-INCH FLAPPER VALVE
14	FUNNEL ADAPTER (GARDEN HOSE)
127	FUNNEL, 2-QUARTS
20/95	UL RATED HOSE (STANDARD DISCHARGE) 1” X 50’
78	¾-INCH BALL VALVE (FILL VENT)
79	¾-INCH BALL VALVE (DISCHARGE)
80	PRESSURE RELIEF VALVE
82	HIGH PRESSURE GAUGE
83	LOW PRESSURE GAUGE
96	PISTOL GRIP NOZZLE
132	PSI ALUMINUM 80-FT^3 AIR BOTTLE
80B	WHEEL
81	CASTER
18	AIR LINE ¼-INCH X 12-INCH
18A	AIR LINE ¼-INCH X 13-INCH
18B	AIR LINE ¼-INCH X 14-INCH
18C	AIR LINE ¼-INCH X 15.5-INCH
18D	AIR LINE ¼-INCH X 24-INCH
18E	AIR LINE ¼-INCH X 5-INCH
107	O-RING CYLINDER LOWER

108	O-RING CYLINDER UPPER
102	REGULATOR AQUA ADJUSTABLE
103	REGULATOR MOUNTING RING
71	CAP - NOZZLE SCREW-ON
110	CAP - TANK FILL DUST
22	PLUG - PREMIX TANK 1/4 -INCH
25	PLUG - PREMIX TANK 1/2 -INCH
123	KNOB - AIR BOTTLE RETENTION PLATE
101B	PRESSURE TESTER (FILLER ADAPTER)
109	SCUBA REGULATOR
97	FireStopper® SUPPRESSANT

5-6 Maintenance Logs

FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC MAINTENANCE LOG

PREVENTATIVE MAINTENANCE CHECKS & SERVICES (PMCS)

SCHEDULED DATE	COMPLETED DATE	SIGNATURE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC MAINTENANCE LOG

SCHEDULED MAINTENANCE

ACTION	DATE DUE	DATE COMPLETED	SIGNATURE
Check Air Cylinder Pressures	_____ (6 months)	_____	_____
Wash unit & apply WD40 or equivalent over non-painted surfaces	_____ (6 months)	_____	_____
Lubricate and recycle pressure relief valve	_____ (6 months)	_____	_____
System Operations check	_____ (6 months)	_____	_____
Air Cylinder Hydrostatic Test	_____ (12 months)	_____	_____
Premix Tank & Discharge	_____ (12 months)	_____	_____
	_____ (12 months)	_____	_____
	_____ (10 years)	_____	_____
	_____ (5 years)	_____	_____

UNSCHEDULED MAINTENANCE

ACTION	DATE COMPLETED	SIGNATURE

5-7. SERVICING UNDER NORMAL CONDITIONS

A. SYSTEM PRESSURE CHECK

(1) Ensure the Pressure Vent Valve, Water/Chemical Fill Valve, and the Foam Charge Valves are closed. Tamper seals should be applied to the Air Cylinders Valves, the Foam Charge Valve, and the Pressure Vent and Water/Chemical Fill Valves (Premix tank seals are optional on the tank valves if the large Air Cylinder retention plate that covers both valves is installed).

(2) Open one Air Cylinder and check the pressure reading on the gauge is between 138-172-Bars (2000-2500 psi). Check the pressure on the Premix Tank gauge, if installed, is between 6.9-11.7-Bars (150-165 psi). Close the Air Cylinder and open the Pressure Vent Valve to release pressure in the Premix Tank. Open the other Air Cylinder and check for an operating pressure of 138-172-Bars (2000-2500 psi). Close the Air Cylinder.

(3). Conduct a leak check if either Air Cylinder pressure is below 138-Bars (2000 psi) or if any air noise or solution leaks are detected.

(a) Spray a light soap solution on all airlines and fittings to check for leaks.

(b) Tighten leaking fittings.

(c) Contact manufacturer if regulator has a leak.

(d) Recharge and replace the Air Cylinder(s).

(4) Reapply tamper seals

B. AIR CYLINDER PRESSURE CHECK, RECHARGE, AND REPLACEMENT

CAUTION

Ensure the system is depressurized before conducting any maintenance on the system. The Air Regulator can be damaged if removal is attempted with pressure in the system. Extreme care should be used when handling and transporting the Air Cylinders. Do not fully drain the Air Cylinders, as this will allow moisture to enter the cylinders.

NOTE

(1) AIR CYLINDER PRESSURE CHECK: Check the Air Cylinder pressures for normal operating pressure 138-172-Bars (2000-2500psi).

Preferred Method: Remove the Air Cylinder yoke, apply the hand held pressure-indicating gauge, open each Air Cylinder, and note the psi reading.

Alternate Method: Turn on the Air Cylinder(s) and note pressures on Air Cylinder gauges. This method will result in the loss of 3.4 to6.9-Bars (50-100 psi) of air per cylinder, which, in turn, will require a more frequent refilling of the Air Cylinders.

Conduct a leak check if either Air Cylinder pressure is below 138-Bars (2000 psi):

(a) Turn on Air Cylinder(s) with broken seal.
(b) Spray a light soap solution on all airlines and fittings.
(c) Tighten fittings, replace O-rings, or replace leaking component.

(2) AIR CYLINDER RECHARGE

(a) Ensure the Air Cylinder Valve is closed.

(b) Depressurize the system by opening the Pressure Vent Valve.

(c) Unscrew the Air Cylinder connector.

(d) Pull out the Air Cylinder.

(e) Have the Air Cylinder filled to 138-Bars (2500 psi) by a certified technician. Either compressed air can be used in the Air Cylinders.

(f) Verify the Air Cylinder pressure using the pressure tester.

(g) Replace the Air Cylinders in the cradle.

(h) Re-connect airline to air cylinder and replace regulator.

(i) Turn on Air Cylinder and verify 6.9-11.7-Bars (2000-2500 psi) pressure if the pressure was not verified by using a pressure tester.

(j) Reapply tamper seals.

C. PREMIX TANK FILLING

CAUTION

Ensure the system is depressurized before conducting any maintenance on the system. Also ensure the Water/Chemical valve is closed prior to pressuring the system to prevent a backsplash of the solution, which might cause an injury to personnel.

(1) Close the Air Cylinder Valves.

(2) Close the Foam Charge Valve.

(3) Open the Pressure Vent Valve slowly and leave open.

(4) Open the Water/Chemical Fill Valve.

(5) Remove the Filler Port Dust Cap and install the 2 Quart Filler Funnel.

(6) Open the Water/Chemical Fill Valve and add the appropriate amount of foam agent: this unit is a first response system with a limited amount of firefighting media. The intent is to quickly control the initial fire extinguishing the event with the maximum fire suppressing power. Therefore, FireStopper® recommends the following: when using any of the FireStopper® recommended concentrate products for maximum all fire class usage A-B-C-D-F (ABCDK), ***consult the specifications for any FireStopper® products employed by the end user***, or contact any authorized FireStopper® distributor. In the alternative, fill with FireStopper® PFE-FR FFC for maximum performance.

(7) Connect a standard water hose to the Tank Refill Port. A funnel may be used if a water hose is not available or an AFFF is being used that should not be mixed with water.

(8) Add water until it flows out of the Pressure Vent Valve drain line.

(9) Close the Water/Chemical Fill and Pressure Vent Valves. Remove the water hose.

CAUTION

Failure to close the Pressure Vent Valve will cause the Premix Tank drain hose to oscillate and may cause injury to personnel.

(13) Purge the solution from the Water/Chemical fill valve to prevent freezing by waiting 5 minutes for the solution to settle, opening both tank valves, and closing the valves. An alternate method is to use air to force the solution into the tank after the foam has settled.

(14) Annotate the type of foam and mixture ratio on a self-installed waterproof label applied in a visible area on the Premix tank.

(15) Replace the dust cap on the Fill Port.

(16) Apply tamper seals on the Pressure Vent Valve and the Water/Chemical Fill Valve in the closed position

5-8. SERVICING UNDER COLD CONDITIONS

A. Fill the Premix Tank with the appropriate FireStopper® freeze resistant product (consult a FireStopper® authorized distributor or visit www.firestopperintl.com, whenever the intended use of this unit is in an environment below 0ºC (32º F).

B. The procedures outlined in Paragraph 5-9 should be used for filling the Premix Tank with the following exceptions:

(1) It is recommended that the following procedure be used to purge the Freeze Protected Foam solutions from the Water/Chemical Fill line after the Premix Tank has been filled to reduce the residual buildup:

(a) Close the Pressure Vent Valve and wait 5 minutes after filling the tank for the solution to settle.
(b)
(c) Close the Water/Chemical and Pressure Vent Valves.
(d) Wash any residual foam off the unit and place the unit in service.

5-9. SCHEDULED MAINTENANCE RECOMMENDATIONS:

A. AIR CYLINDERS

(1) Pressures to be checked at least every 6 months.
(2) An annual visual inspection be completed every 12 months
(3) A hydrostatic test to be completed every 10 years or as additionally required by local regulations.

B. CLEANING AND LUBRICATION: (Complete at least every 6 months)

(1) Wash unit with soap and water.

(3) Apply WD40 on Pressure Relief Valve and recycle.

C. PREMIX TANK:

(1) Pressurize and check for leaks every 12-months.
(2) Hydrostatic test be completed every 5-years. This test includes an internal and external visual inspection as well as pressure testing the hose and tank.

D. DISCHARGE HOSE: Hydrostatic test be completed every 5-years.

E. PERFORMANCE CHECK

The system should be pressurized and discharged once a year.
Freeze Protected Foam solutions can be reused if desired. The tank should be drained first if reusing Freeze Protected Foam

F. MANIFOLD AIR LINE PURGE PROCEDURE

When the system is discharged once a year, this procedure should be performed when the PRE-MIX tank is empty. If the PRE-MIX TANK is not empty, solution will leak from the system and will need to be replenished.

1. Open Pressure Vent Valve
2. Remove Quick Connect fitting from manifold.
3. Blow compressed air through hose for 5-seconds to ensure any residual solution is purged from airline.
4. Re-Connect Quick Connect fitting.
5. Close Pressure Vent Valve.
6. Replace air cylinders and large Air Cylinder hold-down plate.

5-10. UNSCHEDULED MAINTENANCE

A. Unscheduled maintenance will need to be performed as required. Contact the manufacturer if a malfunction cannot be corrected after employing good troubleshooting procedures.

B. The following procedures should apply to all FireStopper® MAX-SUPPRESS™ 120-GCU 454-LITER FAST RESPONSE CAC systems:

(1) REPLACE AIR REGULATOR

NOTE

The Aqua 873 Regulator is adjustable; however, the pressure is set at the factory at 150-165-psi. The adjustable control knob was removed and a non-adjusting knob was installed to preclude tampering. The adjustable control knob should be re-installed if a higher or lower pressure is desired.

REMOVAL PROCEDURE

1. Ensure air cylinder valves are closed.
2. Depressurize system by opening the pressure vent valve. Verify all pressures read 0-Bar (0-psi).
3. Remove both ¼" hose lines from both the low (300-psi) and the high (2000-psi) pressure gauges.
4. Remove both ¼" hose lines from the pressure in and out ports on the air regulator.
5. Loosen both locking nuts. Remove adjustment knob from the regulator, slide regulator back and out of ring.
6. Remove remaining hoses and fittings from the regulator and replace in the same position on the new regulator.

INSTALLATION PROCEDURE

1. Slide the regulator into the ring and attach both ¼" in and out lines using two wrenches to prevent damage to the hoses and regulator.
2. Reattach ¼" hoses to the low (300-psi) and the high (2000-psi) gauges. Tighten bolts in the ring to the regulator.
3. Re-install the non-adjusting knob.
4. Charge the system by opening air cylinder valve.
5. Check for leaks using soap and water spray.

(2) REPLACE GAUGES

CAUTION

Ensure the system is depressurized before conducting any maintenance on the system.

(a) Ensure that the Air Cylinder Valve is closed.
(b) Depressurize the system by opening the Pressure Vent Valve. Ensure all pressure gauges read 0-psi.
(c) Remove gauge using proper wrenches.
(d) Install new gauge.
(e) Charge the system by opening Air Cylinder Valve and check for leaks by squirting soap solution on connections.

(3) REPLACE PRESSURE RELIEF VALVE

(a) Located on Tee on fill port.

(b) Ensure the Premix Tank is fully depressurized.

(c) Remove defective Pressure Relief Valve and install new one.

(d) Pressurize the system and check for air stabilization and leaks.

(4) REPLACE CHECK VALVE:

(a) Remove airline from the 90 degree JIC fitting

(b) Remove 90 degree fitting from the check valve

(c) Install the 90-degree fitting into the check valve in the direction of the airflow, which is towards the Premix Tank.

5-11. TROUBLESHOOTING

A. NO PRESSURE ON GAUGES

(1) Air Cylinder Valve is not turned on.
(2) Air Cylinders are empty.
(3) Pressure indicating Gauge is inoperative.
(4) Broken or blocked airline.
(5) Air Regulator has malfunctioned.

B. FOAM DOES NOT DISCHARGE FROM HOSE

(1) Premix Tank is empty.
(2) Air Cylinder is empty.
(3) Air Cylinder is not turned on.
(4) Foam Charge Valve is off.
(5) Nozzle is in the off position.

(8) Foam solution in Premix Tank is frozen.
(9) Faulty check valve

C. AIRLINE LEAK

(1) Air hose fitting is loose or broken.
(2) Air line is blocked or broken.

D. SYSTEM IS NOT FULLY DISCHARGING

(1) Insufficient volume of air in the Air Cylinder.
(2) Foam Discharge Nozzle is not fully opening.
(3) Foam Discharge Hose has a restriction.
(4) Air Regulator has malfunctioned or is not properly adjusted
(5) The solution is frozen or near freezing.
(6) There is a blockage in the Premix Tank.
(7) Defective check valve

E. SOLUTION IS RUNNING OUT OF PREMIX TANK OVERFLOW

Pressure vent valve is open.

5-12. STORAGE AND PROTECTION

A. The end user shall determine best conditions for storage in keeping with warranty terms and conditions.

B. A PMCS should be conducted if the system has been placed in storage prior to placing the unit in an operational status.

C. It is recommended that a weatherproof protective cover be used if the unit is going to be positioned outside. Ultraviolet sunrays can cause long-term damage to the hoses, tires, and gauges if the unit is not covered. Additionally, frozen rain and snow can restrict the movement of discharge hose. A heavy-duty protective cover with reflective markings and frame securing devices is available from the manufacturer.

RECOMMENDED FireStopper® PRODUCTS FOR USE WITH THIS CAC PORTABLE SYSTEM

THIS PORTABLE SYSTEM IS DESIGNED TO OPERATE WITH ALL OF THE FireStopper® FFC PRODUTS ACCORDING TO THE END USER'S NEEDS:

- ***FireStopper® PFE-FR FFC (A PREMIX)*** – This product is designed for the highest risk to life and property where extreme low environment temperatures are present and when limited product for firefighting is available such as in restaurant kitchens where a "K" type fire is prevalent, high valued industrial complex where multiple fire class hazards are present, all Military use, transportation related applications and other high valued scenarios (please review product specifications sheet).

    - Hydrocarbon (class "B") high flammability environment
    - High flammability (class "A") environment
    - High risk flammable metal (class "D") risk
    - High risk energized fire (class "C" Electrical)

CONCENTRATES:

- ***FireStopper® XL "PLUS" FFC –*** This concentrate is the most powerful and efficient concentrate in the World. Should be used where life and high value infrastructure protection is required. Where ample water source is available for fast recharge (please review product specifications sheet).

    - Petrochemical facilities
    - Industrial complex requiring multiple fire hazard protection
    - Airports
    - Shipping
    - Offshore applications such as drilling platforms, etc.
    - All Military use

- ***FireStopper® XL FFC*** - This concentrate product is designed to provide similar application as above but where budgetary restrictions and other limitations by the end user are present (please review product specifications sheet).

- ***FireStopper® AB 40002 FFC –*** This concentrate product is designed to provide similar application as above (please review product specifications sheet). Recommended for use by municipal fire services, wild land/forest fire applications, general commercial/industrial customers where additional budgetary restrictions prevent higher risk protection products to be implemented.