FK-5-1-12

Model NFG and NFD Fire Suppression Systems

Installation, Operation, and Maintenance Manual

This manual is an integral part of the system approval. The suppression system must be installed and maintained in accordance with all listed requirements.

U.S. Coast Guard Approved
162.029/248/0

FM Approved
3045557

Read and comply with these instructions, warnings, and limitations before installing.
Suitable for use on:

NFG 25-100 Models:	20°F (-7°C) to 130°F (54°C)
NFD 101-825 Models:	20°F (-7°C) to 130°F (54°C)
NFD 826-1800 Models:	32°F (0°C) to 130°F (54°C)

Always maintain this manual
nearby for operator reference.

Manual PN: 123-330, Rev. F
Printed in the USA.

Warnings

WARNING

CONCENTRATED AGENT AND BY-PRODUCT OF APPLICATION TO FIRE ARE TOXIC. AVOID BREATHING OF FUMES OR PROLONGED EXPOSURE. ACCIDENTAL DISCHARGE DURING HANDLING OR INSTALLATION MAY CAUSE SERIOUS INJURY. BEFORE ATTEMPTING TO INSTALL THIS DEVICE, READ AND COMPLY WITH INSTRUCTIONS, WARNINGS, AND LIMITATIONS CONTAINED IN THIS MANUAL. DO NOT LIFT, CARRY OR HANDLE BY THE SENSOR VALVE / DETECTOR. THE SENSOR VALVE / DETECTOR IS VISUALLY DESCRIBED IN FIGURE 12 OF THIS MANUAL. DO NOT DROP. KEEP AWAY FROM HEAT. KEEP AWAY FROM CHILDREN.

A SAFETY DATA SHEET (SDS) IS INCLUDED IN THIS MANUAL.

WARNING

PRIOR TO PERFORMING MAINTENANCE WITHIN THE PROTECTED COMPARTMENT, ALWAYS INSTALL THE SAFETY PIN INTO THE SUPPRESSION SYSTEM TRIGGER ASSEMBLY TO AVOID ACCIDENTAL DISCHARGE.

UPON COMPLETION OF MAINTENANCE, REMOVE THE SAFETY PIN FROM TRIGGER ASSEMBLY, AND STORE THE SAFETY PIN IN THE HOLE OF THE RELEASE BRACKET BEHIND THE ACTUATOR LEVER AS A BACK-STOP IN FARTHEST HOLE FROM CABLE/HOOK ASSEMBLY.

Installation Manuals currently available in English, German, Italian, and Spanish. Other languages available from your local distributor.

Installation Handbücher momentan verfügbar auf Englisch, Deutsch, Italiener, und Spanisch. Andere Sprachen, die verfügbar sind von Ihrem örtlichen Verteiler.

Manuales de la instalación actualmente disponible en inglés, alemán, italiano, y español. Otros idiomas disponibles de su distribuidor local.

Manuali di installazione attualmente disponibile in inglese, tedesco, italiano e spagnolo. Le altre lingue disponibili dal suo distributore locale

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Application

FK-5-1-12 (1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(Trifluoromethyl)-3- Pentanone), the extinguishing agent used in all Sea-Fire NFG and NFD series fire suppression systems, is a suitable EPA accepted alternate replacement for Halon. FK-5-1-12 is an electrically nonconductive and residue free extinguishing agent that requires no cleanup. FK-5-1-12 is also referred to as dodecaflouro-2-methylpentan-3-one, which is a fluoroketone.

These features and the versatility of design make the NFG and NFD series fire suppression system models ideal for a broad range of applications. These applications would include marine, commercial, and industrial use where electrical or flammable liquids are the likely source of fire.

Sea-Fire NFG and NFD series have passed a rigid testing program and carry Factory Mutual (FM Approvals) and United States Coast Guard (USCG) approvals for fire suppression applications in marine pleasure craft, un-inspected vessels, and Subchapter "T" inspected vessels, subject to the approval of the Local Officer in Charge, Marine Inspection (OCMI). This would include many applications such as **unoccupied** engine and generator rooms, electrical compartments, paint, and flammable storage lockers.

FK-5-1-12 extinguishing agent is offered commercially by several chemical manufacturers. Sea-Fire systems contain FK-5-1-12 product only from manufacturers that are listed and approved by FM Approvals (FM).

Sea-Fire Marine offers all models compliant to applicable European Directives. Systems will be shipped as requested.

- For orders requested compliant to Pressure Equipment Directive (PED) a Declaration of Conformance (DOC) shall be included.

Sea-Fire Marine is pursuing the United Kingdom Pressure Equipment (Safety) Regulations (PESR) 2016 approval. Due to the unpredictable nature of the UK PESR being required for our application, throughout this manual the references to PESR or UKCA marking are intended as future options and are not a declaration that systems have this approval.

European and UK Markings:

- PED - Pressure Equipment Directive 2014/68/EU – CE mark
- PESR - Pressure Equipment (Safety) Regulation 2016 – UKCA mark

Limitations

Sea-Fire NFG and NFD model series FK-5-1-12 automatic fire suppression systems are designed and tested to extinguish Class B (flammable liquid) fires in enclosed compartments only.

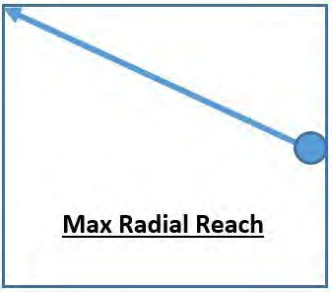
The Maximum (Max) area of coverage is based on the Minimum (Min) height box footprint.

Table 1: Installations have the following enclosure limitations (feet)

Model	Minimum height [ft]	Maximum height [ft]	Max. Area of coverage [ft^2]	Max. Radial Reach [ft]
NFG 25-75	2	6	37.5	8.7
NFG 76-100	2	14	100.0	14.1
NFD 101-825	2	14	412.5	28.7
NFD 826-1800	2	14	1024	35.8

Table 2: Installations have the following enclosure limitations (meters)

Model	Minimum height [m]	Maximum height [m]	Max. Area of coverage [m^2]	Max. Radial Reach [m]
NFG 25-75	0.61	1.8	3.5	2.6
NFG 76-100	0.61	4.3	9.3	4.3
NFD 101-825	0.61	4.3	38.3	8.8
NFD 826-1800	0.61	4.3	95.1	10.9



Enclosure permeability and agent hold time:

The enclosure must be sufficiently sealed to retain the suppression agent for a period of at least 15 minutes (Reference NFPA 2001, Sect 9.8.5). Any openings (doors or hatches) will allow discharging agent to escape and will seriously affect the ability of the agent to extinguish the fire.

Enclosure pressure relief:

The discharge of extinguishing agent creates both a negative pressure when first discharged and subsequently a positive pressure in the enclosure. For proper function of the extinguishing agent and to avoid structural damage to the enclosure, these pressure variations must be controlled. These pressures can be relieved via a room pressure relief device. One guide to determine the required pressure relief device is the FSSA Guide "Estimating Enclosure Pressure and Pressure Relief Vent Area for Applications Using Clean Agent Fire Extinguishing Systems." (www.fssa.net)

Ambient temperature:

Sea-Fire NFG and NFD model series fire extinguishers are designed and tested to operate in the following temperature ranges:

NFG 25-100 Models:	20°F (-7°C) to 130°F (54°C)
NFD 101-825 Models:	20°F (-7°C) to 130°F (54°C)
NFD 826-1800 Models:	32°F (0°C) to 130°F (54°C)

Additional information is provided about the temperature effects on the extinguishing agent pressure in the System Maintenance Section of this manual.

Sea-Fire NFG and NFD suppression systems are designed to induce a minimum atmospheric concentration of 5.85% within the protected compartment. This is equivalent to a 30% safety factor on a 4.5% Minimum Extinguishing Concentration (MEC). In addition to gasoline and diesel fuel, other flammable liquids with MEC values equal to or below 4.5% for FK-5-1-12 may be protected by Sea-Fire NFG and NFD systems.

The specification tables in this manual list the minimum and maximum approved compartment volume (size) allowable for each model (per NFPA 2001, UL 2166, FM 5600*). Volume can be determined by multiplying the compartment's **length x width x height which equals the volume in ft³ or m³ (L x W x H = V).**

*NFPA 2001: Standard on Clean Agent Fire Extinguishing Systems; UL 2166: Halocarbon Clean Agent Extinguishing System Units; FM 5600: Approval Standard for Clean Agent Extinguishing Systems

Models described in this manual are stock available in 25 ft³ (0.7 m³) intervals. Systems are available in 1 ft³ (0.03 m³) intervals if desired. Exact calculations and/or measurements of the protected space should be accomplished if ordering these models. The Specification Table shows the area of protection range available for ordering within each basic model. For simplicity, throughout this manual, only the stock sizes will be noted.

NFG and NFD systems are designed for only one Cylinder (single nozzle) to protect the entire space. Using two Cylinders to achieve combined coverage is not acceptable.

 **CAUTION:**

NEVER INSTALL A UNIT WITH A VOLUME RATING LESS THAN THE GROSS VOLUME OF THE COMPARTMENT TO BE PROTECTED. DO NOT DEDUCT FOR ENGINES, REMOVABLE TANKS OR OTHER EQUIPMENT.

Exception: If the boat manufacturer has placed a permanently affixed label in the engine compartment specifying the gross volume less the volume of permanently installed tankage, then this volume may be used to determine the proper size suppression system. Check the Specification Table for proper application before making installation.

System Operations

Sea-Fire units described in this manual are automatically actuated by a temperature sensitive UL listed glass bulb tested in accordance with *UL 199. These bulbs are manufactured and tested to be activated at a minimum temperature.

- 200°F (93°C) when immersed in a liquid bath or approximately 250°F (121°C) when tested using an air bath.
- 175°F (79°C) when immersed in a liquid bath or approximately 225°F (104°C) when tested using an air bath.

The actual activation temperature of the bulb in a fire scenario is influenced by numerous factors including air velocity, rate of temperature rise, air flow, location, etc. The discharge temperature ranges (approximate) are shown in the Specification Table 5 and 6, and on the label attached to each unit.

These systems have been tested to United States Coast Guard (USCG), UL 2166 and FM 5600 requirements for Automatic Extinguisher Unit Automatic Operation Fire Tests.

* UL 199: Standard for Safety of Automatic Sprinklers for Fire Protection Service.

Discharge Temperature Ranges (approximate):
NFG 25 – 75: 200 - 250°F (93 - 121 °C)
NFG 76 – 100: 175 - 225°F (79 - 107°C)
NFD 101 – 1800: 175 - 225°F (79 - 107°C)

CAUTION:

IN CASE OF SUPPRESSION SYSTEM DISCHARGE, DO NOT IMMEDIATELY OPEN THE PROTECTED COMPARTMENT. THE PROTECTED SPACE MUST BE KEPT CLOSED FOR AT LEAST 15 MINUTES TO ALLOW THE FIRE TO BE EXTINGUISHED AND SURFACES TO COOL SUFFICIENTLY TO PREVENT REFLASH. STOP BLOWERS AND SECURE HATCHES. HAVE A PORTABLE EXTINGUISHER AVAILABLE AND USE CARE WHEN OPENING COMPARTMENT.

CAUTION:

AVOID BREATHING FIRE RELATED FUMES OR VAPOR.

After a system discharge, one must observe all warnings before entering the hazard area. Integrity must be maintained to prevent the migration of products of decomposition to adjacent areas outside of the protected space.

Only trained personnel with Self Contained Breathing Apparatus (SCBA) and protection gear shall enter the space prior to ventilating for 15 minutes. When ventilating the protected space of products of combustion, care should be taken to allow smoke, decomposition products, etc., to clear the vessel, away from personnel, muster stations, embarkation areas, etc. Upon arriving in port, qualified fire suppression system maintenance personnel must perform post-fire maintenance.

Note: It is important to retain the designed vapor concentration within the compartment to ensure a complete fire outage. Upon discharge, engine(s) and all powered ventilation (blowers) must be shut down.

Supervisory Pressure Switch

- Sea-Fire NFG and NFD series suppression systems are equipped with a factory installed pressure switch which is intended for Cylinder pressure monitoring and supervision and may also be used to control other electrical functions (engine shutdown, air exchange equipment etc.).
- When using the pressure switch as an electrical disconnect for any equipment shutdown function, a means of overriding (bypassing, shunting) the pressure switch must be provided to return the affected equipment to an operational mode after suppression system discharge has occurred.
- The pressure switch is a single pole single throw (SPST) type that is normally closed (NC) with the system in the charged condition. Discharge or loss of system pressure will release the contacts to an open state thereby cutting off any electrical current flow.

NEVER USE THE PRESSURE SWITCH FOR ELECTRICAL LOADS OVER ITS RATED CAPACITY.

Switch Specifications

4.0 A at 12 VDC
2.0 A at 28 VDC
For applications requiring larger load capacities, contact the factory.

System Status Indicator Light Operation

All Sea-Fire pre-engineered fire suppression systems approved for marine applications are packaged with an indicator light and faceplate. USCG approval requires that the indicator light must be installed for system supervision and operator awareness at each helmsman's station. The basic light and panel, unless replaced by an upgraded Sea-Fire Display Panel must be installed. When properly installed, activation of electrical power to the system will illuminate the light indicating normal charge condition. System discharge or loss of pressure will immediately turn off the indicator light.

If the indicator light is not lit when power is applied, check for the following conditions:

1. Check the pressure indicator gauge for proper range.
2. Check the fuse and indicator light and replace if defective (lamp replacements available from factory).
3. Check for loose electrical connections.
4. Remove and weigh the system Cylinder as described in the **System Maintenance Section** of this manual.

Table 3: Light Kit Available Options

Part No.	Description
130-117	12 VDC Green Light
130-118	24 VDC Green Light
130-394	12 VDC Green LED
130-395	24 VDC Green LED

Pressure Relief Assembly (Burst Disk)

All models are protected from over pressure of system.

NFG Models 25 – 100 and NFD Models 101 – 825 are protected by the design of the glass bulb temperature / pressure relationship. Sea-Fire Marine maintains a Department of Transportation (DOT) Special Permit, DOT-SP-11598 for these models.

NFD Models 826 – 1800 have a definite purpose Pressure Relief Device (PRD) designed and manufactured per CGA S-1.1 installed on the manifold. Do not remove or perform any maintenance on this device. Removing or loosening this device will cause the contents under pressure to escape. Only Sea-Fire provided PRDs are authorized for use with these systems.

Interaction with Engines, Generators and Powered Ventilation (Blowers)

Sea-Fire offers optional engine interrupt systems which will automatically shut down engines, generators, and powered ventilation upon discharge of the fire suppression system. They are available with 4, 6, or 8 control circuits and operate between 9 – 32 VDC. Shutdown may be accomplished by interruption of the electrical circuit between the ignition switch and the engine coils.

It is the responsibility of the system designer / installer to comply with the following instructions on Diesel and Gasoline Engines / Generators.

Diesel Engines or Generators, Powered Ventilation (Blowers)

USCG and American Boat and Yacht Council (ABYC) – Standard A-4, Fire Fighting Equipment (Section A-4.7.3.3) both require the following:

> The system shall be designed and installed so that the engine(s), generator(s), and blower(s) located in the protected space shut down automatically and after discharge the minimum required design concentration (5.85 % FK-5-1-12) must remain.

Gasoline Engines or Generators

It is optional to automatically shut down gasoline engines and generators, but it is highly recommended. In the case of engine compartment fire, you must still manually shut down engine(s) or generator(s) before manual discharge, or immediately after automatic discharge of the fire suppression system.

Relationship to Portable Fire Extinguishers

Sea-Fire pre-engineered systems shall be considered as supplementary to the number of portable fire extinguishers required on-board and are designed and intended for enclosed unoccupied compartment installations that are not subject to direct weather or water.

Manual Discharge Capability

US Coast Guard approval requires the installation of manual discharge capability on all systems installed in compartments of 1,000 ft^3 and larger. Sea-Fire offers manual discharge cables for this purpose. Models with manual cable connections are designated as "M" following the system size. "M" designates manual/automatic. "A" alone designates automatic only.

Table 4: Cable Assembly Part Numbers

Part Number	Description
136-0###	Cable Assembly, SMAC, XXX ft: Bidirectional Pull with Manual / Auto Face Plate
136-2###	Cable Assembly, SMAC, XXX ft: Bidirectional Pull with Manual / Auto Face Plate and Fire-Resistant Sleeve

Only Sea-Fire cables are authorized for use with Sea-Fire suppression systems. Sea-Fire cables are offered in lengths from 1 ft to 100 ft (0.3 m to 30.5 m).

Installation

READ THE ENTIRE INSTRUCTION MANUAL AND CYLINDER NAMEPLATE PRIOR TO INSTALLATION.

These installation instructions are intended to cover most normal installations. Additional technical or application information can be obtained by contacting:

Sea-Fire Marine - USA
9351 G Philadelphia Rd.
Baltimore, Maryland
Tel: (410) 687-5500
Website: www.Sea-Fire.com

or

Sea-Fire Europe, LTD
Unit D2
Discovery, Voyager Park
Portfield Rd.
Portsmouth, Hants
PO3 5FN, United Kingdom
Tel: +44(0)2392679666
Website: www.Sea-Fire.co.uk

Only one system (Cylinder) may be used to protect a compartment. If more than one suppression system is used to achieve the required amount of agent concentration, there is no guarantee that several suppression systems will actuate simultaneously as each suppression system operates independently. Several suppression systems may be used only if each independent suppression system can protect the entire volume of the compartment.

CAUTION:

1. **DO NOT INSTALL IN AN AREA DESIGNATED FOR OCCUPANCY.**
2. **ACCIDENTAL DISCHARGE MAY CAUSE SERIOUS INJURY.**
3. **HANDLE THE CYLINDER WITH EXTREME CARE.**
4. **WEAR EYE PROTECTION.**
5. **DO NOT LIFT OR CARRY THE CYLINDER BY THE MANIFOLD OR ACTUATOR COMPONENTS.**
6. **DO NOT ATTEMPT TO LOOSEN OR REMOVE ANY SUPPRESSION SYSTEM COMPONENTS.**

I. Cylinder Installation

Step 1 Carefully remove Cylinder from carton and visually check for damage in shipment.

Step 2 Loosen the mounting Bracket Cylinder holding straps and remove the Cylinder from the bracket. Although the Sensor Valve / Detector is protected, care should be exercised to avoid striking the Sensor Valve / Detector.

- For models with a bolted-on valve guard, remove the guard once the cylinder is at its final location.

Step 3 Best practices:

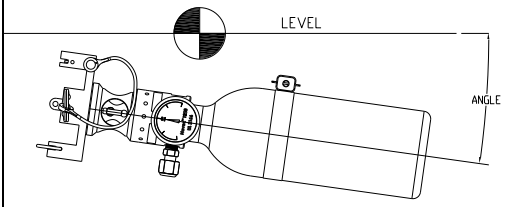
Do Place Unit:	Do Not Place Unit:
a. As high as possible, no more than 3 feet below the ceiling, on compartment bulkhead for mounting. b. With detector head near the area in which a fire is most likely to occur. This would be on the fuel line side of the engine, near the carburetor, or fuel pump. c. At the centerline of the bulkhead wall (left to right). d. Against the forward bulkhead. e. Vertical or horizontal as described per model. f. Between the engines when two engines are to be protected. g. Avoiding immediate obstructions to the discharge orifices.	a. Near a fresh air or ventilation duct supply opening. b. Near an access door. c. Underside or inside of an access door or panel. d. Extremely close to the turbocharger or exhaust system. e. Where an accumulation of standing water could block sensor or cause corrosion. f. On the underside of a cover or compartment hatch that could be thrown clear due to possible explosion. g. On a ceiling. h. Too close to a room corner or large obstruction.

WARNING:
FAILURE TO FOLLOW THESE INSTALLATION INSTRUCTIONS MAY RESULT IN SYSTEM FAILURE.

Step 4 To ensure that the Cylinder is operational, both the weight and pressure indicator must conform to the Cylinder specification as shown on the nameplate. Weigh the Cylinder (less the Bracket) on an accurate calibrated scale before installing. Record the date and weight on the tag provided for this purpose.

Wall Mounting

Models NFG 25 - 100 and NFD 101 – 825 may be installed vertically or horizontally with the following angular / off-set limitations. Vertical installation is recommended for optimum performance. The off-set is defined as the distance below the level line from the end of the Bracket. The discharge orifice spray pattern must be oriented away from the wall and towards the room.

Models NFG 25 - 100 • Vertical installation. • Horizontal with a minimum 8° angle or 1” (25.4mm) offset below level. **Models NFD 101 - 200** • Vertical installation. • Horizontal with a minimum 5° angle or 1/2” (12.7mm) offset below level. **Models NFD 201 - 825** • Vertical installation. • Horizontal with a minimum 2.5° angle or 1/2” (12.7mm) offset below level.	 **Figure 1: Horizontal Mounting**
Models NFD 826 – 1800 • Vertical Installation Only	

WARNING:

WHEN INSTALLING CYLINDER IN HORIZONTAL POSITION, THE ACTUATOR (TOP OF CYLINDER) MUST NEVER BE LOWER THAN THE BOTTOM OF THE CYLINDER OR PROPER DISCHARGE OF AGENT WILL NOT OCCUR (SEE Figure 1 ABOVE).

Step 5 Locate the Bracket in the desired position (Vertical - Sensor Valve / Detector Head up, or horizontal (Figure 1). Ensure the bulkhead or mounting surface is solid enough to hold the weight of the unit. Fasteners are not included. Use medium strength (Grade 5, Property Class 8.8) or better grade material.

- For bracket PN: 130-249 and PN 130-805 (small holes) the minimum fastener size is 1/4” (M6) diameter.
- For all other bracket assembly part numbers the minimum size fastener is 5/16” (M8) diameter [recommend 3/8” (M10) diameter].

Four (4) fasteners must be utilized for each bracket. See Table 5 for the quantity and hole sizes for each respective Bracket.

Using the Bracket as a template, mark and drill holes in the bulkhead and install the Bracket ensuring that all fasteners are thoroughly tight.

Step 6 Carefully attach the Cylinder to the Bracket. The Sensor Valve / Detector Head should point towards the engine or the center of the compartment. The nameplate and gauge should be visible. Tighten the bracket straps so that the Cylinder body is firmly and securely held in place by its bracket (worm drive clamps must be torqued to 75-85 in-lb, (6-7 ft-lb)). Ensure that the 180° discharge orifices do not face the wall.

Depending on the model, the Bracket Strap will be one of 2 different types:

- Screw drive coil, Philips / hex drive ---------- NFG 25 – 100 and NFD 101 - 825
- Two-piece bracket / saddle assembly -------- NFD models 826 - 1800

Table 5: Brackets

Model	Assembly	Mounting Holes (Qty x Dia)		Model	Assembly	Mounting Holes (Qty x Dia)
NFD 101 - 200	130-250	4 x .39" (9.9 mm)		NFG 25	130-249	2 x 0.29" (7.2 mm)
NFD 201 - 300	130-251					
NFD 301 - 400	130-252			NFG 26 - 75	130-775	4 x 0.39" (9.9 mm) and 4 x 0.22" (7.1 mm)
NFD 401 - 525	130-253					
NFD 526 - 675	130-254					
NFD 676 - 825	130-777	6" x 0.39" (9.9 mm)		NFG 76 - 100	130-805	
NFD 826 - 1800	130-009	13 x 7/16" (10.7 mm)				

II. Cable Assembly Installation

CAUTION:

TO AVOID KINKING OF CABLE, DO NOT PUSH CABLE TO RETRACT THE CORE.

CAUTION:

TO PREVENT ACCIDENTAL DISCHARGE DURING CABLE INSTALLATION, VERIFY THAT THE MANUAL DISCHARGE LEVER SAFETY PIN IS PROPERLY INSTALLED (SEE FIGURE 8).

Step 1 Select the proper location for remote pull station.

a. Manual discharge release pull stations should never be installed in the protected compartment.

b. Locate discharge pull handle at the helm station with full view and easy access by the operator.

c. The area selected must be structurally secure and provide at least 12" (305 mm) of clearance at the rear of the panel to facilitate cable hardware.

Step 2 Install the cable along the routing between cable ends.

a. Do not install the cable in an area where the possibility of physical abuse is likely. Where practical, follow the same cable path as installed by the boat manufacturer (if a replacement cable).

b. Route the cable to allow it to lie in its most natural state. The cumulative bend in the cable run must never exceed 720°. This is equivalent to eight right (90°) angles. Use extreme care when bending cable to avoid kinking. Never form a bend with a radius of less than 5" (127 mm). Selection of the correct size Sea-Fire cable length will reduce excess cable coil.

c. Position the cable in its routing, but do not secure currently. Steps 3A thru 3F must be completed prior to securing cable in its final location.

- Do not connect cable to the Cylinder currently.

NOTE:

The cable may be installed from either direction using the existing Bi-Directional hardware installed on the system.

Fire Resistant Sleeve, PN: 138-2XX to protect cables from short term exposure up to 500°F (260°C) is available. Contact the factory or an authorized distributor for additional information.

Step 3 Mounting cable faceplate and release T-Handle.

Confirm the faceplate supplied with cable and/or the Cylinder Assembly. The faceplate heading should be "MANUAL/AUTOMATIC" (See Figure 2).

Figure 2: Manual / Automatic Systems Use Faceplate 124-026

a. Using the manual discharge faceplate (Figure 2) as a template, mark and drill a 13/32" (10.4 mm) hole.

b. Remove the protective backing from the faceplate. While aligning the holes, place even pressure upon the faceplate. To ensure a good bond, the temperature should be more than 50°F (10°C).

c. Following the diagram in Figure 3, install the jam nut and lock washer on the cable end-outer. Screw the jam nut to the end of the threads. Insert the cable end through the panel and faceplate hole. Pull the cable end-inner (threaded shaft) out to its fullest travel. Install ferrule by screwing onto the cable end-outer until it bottoms out. Use pliers on the back side, holding the cable end-outer while turning the ferrule. Use pliers with rubber tips or another non-scratching grip. Do not over tighten.

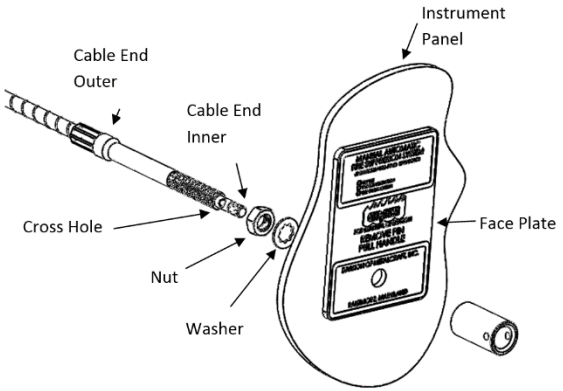


Figure 3: Faceplate Installation

d. Pull the cable end-inner (threaded shaft) out to its fullest travel and slide the rubber O-Ring over the threads on the shaft. Hold the cable end-inner from rotating by using the safety pin in the cross hole or by using needle nose pliers. Install the T-Handle on the cable end-inner, screwing it on until it bottoms out. Do not over tighten. Remove the safety pin from the cable end-inner.

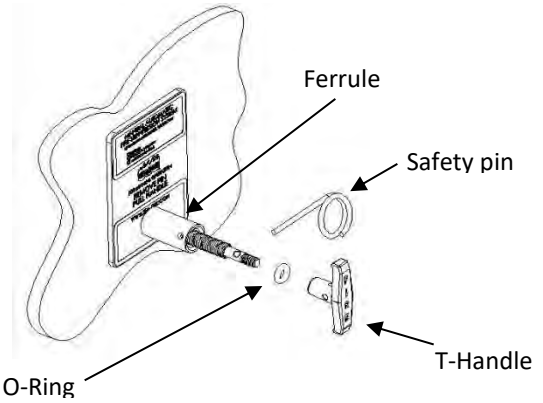


Figure 4: T-Handle Installation

e. Pull on the Cylinder (S-Hook) end of the cable to retract the handle into the Ferrule. It may be necessary to softly push on the T-Handle at the same time to seat the O-Ring. Align the cross holes in the T-Handle and ferrule and insert the safety pin through both items so that the end of the safety pin shows out the far side of the Ferrule.

CAUTION:

THE SAFETY PIN MUST BE THROUGH THE RED T-HANDLE AND NOT THE CABLE END-INNER, REFERENCE FIGURE 5.

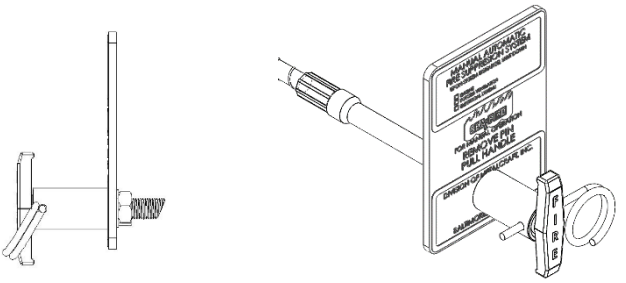


Figure 5: Safety Pin

Leave the safety pin inserted through the T-Handle / Ferrule, but do not install the red safety seal at this time.

f. Turn the T-Handle / Ferrule so that the word "**FIRE"** is vertical or oriented as needed.

Note: This action will result in the entire cable rotating along its length.

g. Ensure that the cable can rotate and remain in a natural state.

h. Tighten the jam nut behind the instrument panel to lock in the position and orientation of the T-Handle / Ferrule.

Step 4 Securing cable in place.

a. Secure the cable along its length.

i. Nylon cable ties should be used for cable securing. Fasten and support the cable on straight runs only. Do not secure at locations where cable bends.

ii. At the Cylinder/actuator S-Hook end:

a) The cable should have a minimum straight length of 6" (15 cm) before making any bends. The cable should be secured on a straight run before making a bend.

b) The cable should be secured within 6" to 18" (15 cm – 46 cm) of the Cylinder. Some flexibility will be needed to move the cable for servicing the Cylinder.

CAUTION:

FAILURE TO FOLLOW THESE INSTRUCTIONS MAY PLACE UNDUE PRESSURE ON THE HAIRPIN COTTER PIN, CAUSING IT TO MALFUNCTION.

iii. Do not install cables with other wiring. Do not use tie wire around the cables.

b. Temporarily remove the safety pin and test the cable operation. **Never push cable.** Pull the cable from the Cylinder (S-Hook) end, then, pull the T-Handle and repeat. The cable must move freely without friction or binding. Reinstall the safety pin and confirm that the release handle is now locked in place.

CAUTION:

ACCIDENTAL DISCHARGE DURING HANDLING OR INSTALLATION MAY CAUSE SERIOUS INJURY. DO NOT REMOVE FACTORY INSTALLED SAFETY (PULL) PIN FROM CYLINDER SENSOR VALVE / DETECTOR UNTIL INSTALLATION IS COMPLETED AND CHECKED.

Step 5 Installation Verification and Test Requirement.

Specification / Regulation

- USCG – Navigation and Vessel Inspection (NVIC 6-72, Section V, Page 71) requires a maximum of 40 lb of force required at the T-Handle (pull station) to activate system discharge.
- UL 2166 – Standard for Clean Agents, Section 42 requires a pull station shall not require a pull of more than 178 N (40 lbf).
- NFPA 2001, Section 4.3 requires “Manual Controls shall not require a pull force of more than 40 lb (178 N) nor a movement of 14 inches.
- Sea-Fire: minimum of 10 lb of force required at the S-Hook (extinguisher) to activate system discharge.

Test Procedure

CAUTION:

DO NOT PUSH THE (FIRE) T-Handle while installing the Cable Assembly to avoid kinking the cable core. Pull the S-Hook at the opposite end to retract the T-Handle.

After the initial routing of the Cable Assembly is completed:

a. Attach a scale (PN: 128-212 Cable Test Fixture) to the S-Hook (Cylinder end) in place of the Cylinder Release assembly.

b. Attach a scale (PN: 128-092 Digital Scale) to the T-Handle (pull station) end of the cable assembly. A Testing Hook, PN: 128-115 is available to facilitate attaching the scale. (Scales available from Sea-Fire or others may be used)

c. Pull on the T-Handle scale, monitoring the displayed force, until 10 lb (4.5 kg) is shown on the S-Hook (Cylinder end) scale.

d. Ensure that the required force at the T-Handle (pull station) does not exceed 40 lb (18.2 kg) to achieve 10 lb (4.5 kg).

i. If less than 40 lb (at the pull station) of force achieves the 10 lb (at the Cylinder), complete the cable assembly installation per Step 6.

ii. If greater than 40 lb of force was exerted to achieve 10 lb, the cable routing must be inspected and likely changed. Repeat the inspection until less than 40 lb achieves that 10 lb (at the Cylinder).

e. Remove both scales. Pull on the S-Hook at the Cylinder to retract the cable.

f. Reinstall safety pin and confirm that release handle is now locked in place.

g. Attach the tamper resistant round plastic tie to the safety pin by passing the tie through the safety pin ring and around the cable assembly. Insert the end of the tie into cable end and pull up snug. The tie provides a means of deterring accidental discharge and determining if manual actuation has occurred.

CAUTION:

DO NOT USE NYLON CABLE TIES IN PLACE OF THE TAMPER RESISTANT TIE FOR SAFETY PIN.

Note: Limit the quantity and tightness of tie downs to avoid restriction. A maximum of 720° in turns, and no less than 5" (127 mm) of radius per turn should be utilized.

Step 6 Connecting the cable assembly to the Cylinder (Figure 7).

Note: The cable may be installed from either direction using the existing Bi-Directional hardware installed on the system.

a. Confirm that the Cylinder is mounted in its bracket, the cable pull handle end is installed and the cable is correctly routed to the Cylinder.

b. Insert the S-Hook (Figure 6-A) into the actuator lever from the front side (over top of the 2 mounting screws in the Release Bracket (Figure 7-B). After the S-Hook is connected to the lever, align the groove in the cable end-outer (Figure 6-B) with the slot in the Release Bracket assembly (Figure 7-C).

c. Insert the Hairpin Cotter Pin provided with the cable into the release bracket, over top of the cable end (Figure 7-D).

- There may be a slight bend (bump) in the cable between where it is attached to the actuator lever and where the cable end - outer is clipped into the Release Bracket. This is normal.

CAUTION:

THERE SHOULD NOT BE TENSION IN THE CABLE PULLING ON THE LEVER. TENSION ON THE LEVER CAN CAUSE THE CYLINDER TO DISCHARGE WHEN THE SAFETY PIN IS REMOVED.

d. With Step c successfully complete, use care to remove the factory installed safety pin from the actuator assembly (Figure 7-E).

e. Store the safety pin in the hole of the Release Bracket behind the actuator lever as a back-stop in the farthest hole from the cable / hook assembly (Figure 7-F).

f. Ensure the safety pin is completely installed through the Bracket.

WARNING:

DO NOT INSTALL THE SAFETY PIN BETWEEN THE LEVER AND THE CABLE. THIS WILL PREVENT THE CABLE FROM ACTUATING THE SYSTEM.

g. The fire suppression system extinguisher is now fully operational.

CAUTION:

ALWAYS INSTALL SAFETY PIN IN CYLINDER ACTUATOR LEVER [Figure 7-A] WHEN PERFORMING SERVICE OR MAINTENANCE ON THE SYSTEM. BE SURE TO REMOVE THE SAFETY PIN FROM THE ACTUATOR LEVER UPON COMPLETION OF SERVICING.

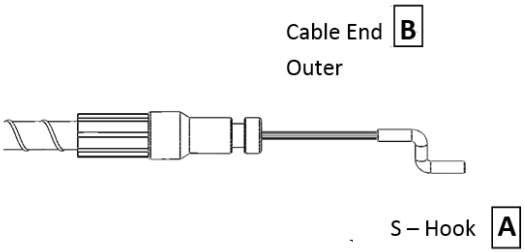


Figure 6: SMAC Cable S-Hook End

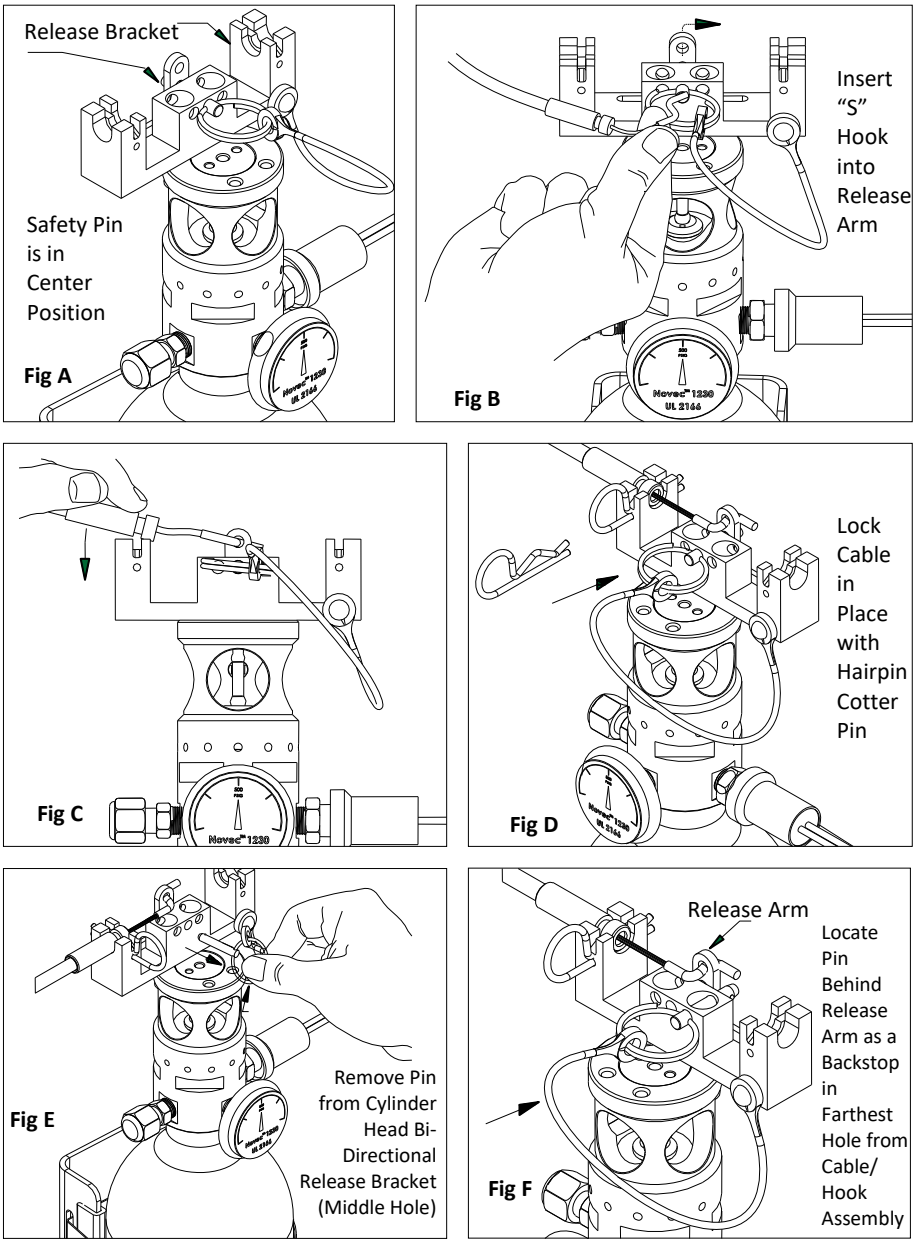


Figure 7: Bi-Directional Release Bracket Cable Connection

Reminder: Always install the safety pin in the Cylinder actuator lever (Figure 7-A) when performing service or maintenance on the system. Be sure to remove the safety pin from the actuator lever upon completion of servicing.

III. System Status Indicator Light Installation

Supplies, which are not included with your Sea-Fire system and should be at hand before the indicator light installation, are as follows:

1. 5A in-line fuse and holder
2. Sufficient length of insulated minimum 16 AWG stranded wire
3. Crimp on wire connectors
4. Crimp pliers, hand tools

Select a location at the helm on or near a console that is in full view of the helmsman. The location selected must have access for electrical wiring. Remove the adhesive protective cover from the back of the indicator faceplate and attach. For proper adhesion, the surface must be clean and dry, and the temperature must be above 50°F (10°C). Use the preformed faceplate hole as a template and carefully drill a 5/16" (8 mm) hole. Insert the indicator light wire (see Figure 8).

CAUTION:

PRIOR TO WIRING THE INDICATOR LIGHT, TURN OFF ELECTRICAL POWER BY SWITCHING OFF THE CIRCUIT BREAKER, REMOVING THE FUSE OR DISCONNECTING THE POSITIVE BATTERY TERMINAL. FAILURE TO DISCONNECT ELECTRICAL POWER WHILE MAKING AN ELECTRICAL CONNECTION CAN RESULT IN INJURY FROM FIRE OR ELECTRICAL BURNS.

The standard indicator light is rated for 12 VDC (contact factory for other voltages). Wire in accordance with the American Boat and Yacht Council (ABYC), Standard E-9, Direct Current Electrical System on Boats, copies of which may be obtained from ABYC, Edgewater, MD, USA, 21037, +1 (410) 956-1050.

Attach one wire lead from the in-line fuse (C) to the ignition terminal on the starter switch. Connect the other lead from the in-line fuse to the indicator light (D). Connect remaining indicator lead (E) to one of the Sea-Fire Cylinder pressure switch connector wires (F). Connect the remaining Cylinder pressure switch lead (G) to common ground, which may be the negative battery buss at the control panel, or directly to the engine block (see Figure 8).

NOTE:

The 12 VDC + 24 VDC bulbs do not have polarity. If installing LED light kits, proper polarity must be maintained. The supervisory pressure switch does not have polarity.

CAUTION:

ELECTRICAL SYSTEMS VARY FROM VESSEL AND THESE DIRECTIONS MAY NOT BE APPLICABLE FOR YOUR INSTALLATION. SHOULD YOU HAVE ANY DOUBTS OF SAFELY ACCOMPLISHING THIS INSTALLATION, CONTACT A QUALIFIED MARINE ELECTRICIAN OR SEA-FIRE MARINE USA AT (410) 687-5500 FOR TECHNICAL ASSISTANCE.

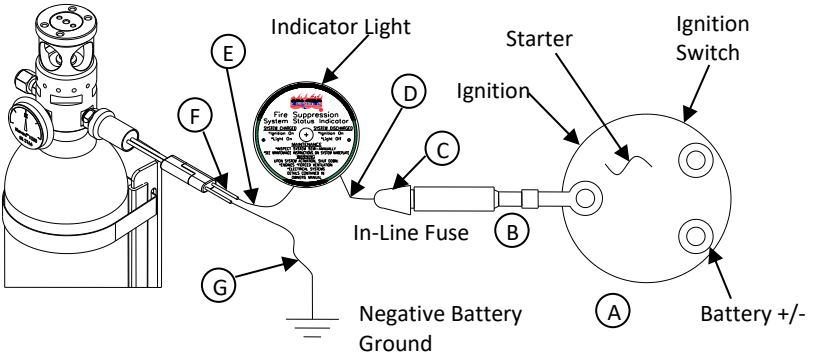


Figure 8: Indicator Light Installation

Installation Requirements

- Cylinder, cables, and supervisory electrical wiring shall be located so that they will not be subject to the temperature outside the system's designed operating range as listed on page 6.
- The Cylinders installed within the protected space may be mounted in the horizontal or vertical position as indicated on page 14.
- The Remote Pull Station (release device) when installed, shall be visibly labeled using the nameplates supplied with each SMAC remote cable assembly. If multiple systems are installed on a vessel, the installer must label and differentiate the respective Pull Stations.
- The nameplate showing how to discharge the system shall be installed in a readable orientation as part of the release device.
- The location of the Cylinder with nozzle discharge shall ensure effective extinguishing of fires within the protected space. Refer to page 5 for more detailed guidance.
- For systems described in this manual, the M/A models with installed remote pull cables are capable of being released from a primary control station (the main steering position). Refer to page 14 for details on where the primary pull station should be installed.
- If the main steering position is more than 16 ft (5 m) away from the space to be protected, means of local activation shall be provided close to such a space. Sea-Fire PN: 131-1005 SMAC Dual Pull / Single Discharge Assemblies are available to provide a second pull station installed locally.
- Ventilation openings serving the protected space shall be provided with means of closure operable from outside the protected space. Refer to page 10 for additional details on engine interruption devices offered by Sea-Fire.
- All Sea-Fire systems are designed so that in no case shall the gas be used at a concentration above its lowest-observed-adverse-effect level (LOAEL). The installer must choose and install the appropriate stock model as listed in Table 3 and 4.
- RINA classed vessels require that there be an alarm sounded 20-30 seconds prior to system discharge to continue while the system is discharging. It is the boat builder's responsibility to ensure that this requirement is satisfied.
- Sea-Fire suppression systems are designed and built for vessels certified in accordance with *Directive 2013/53/EU: Recreational Craft* and installed in compliance with the requirements contained within *ISO 9094: Small Craft Fire Protection*. For such vessels, it is the boat builders' responsibility to ensure compliance with the following:
  - If the installation area is to contain more than one suppression Cylinder, each Cylinder must be capable of protecting the space alone (Per 7.6.2.5 of ISO 9094).
  - Cylinders located in the protected space or in any automatic discharge configuration must be equipped with some form of visual indication of discharge outside of the protected space (Per 7.6.2.6 of ISO 9094).

System Maintenance / Inspection

Cylinder Inspection / Cylinder Testing

The following instructions are according to applicable regulatory agencies. These regulations change periodically and may be different from rules in place when this system and manual were shipped. Confirm requirements with Sea-Fire, local authorities having jurisdiction or applicable agency. All inspections must be performed by an authorized/Qualified inspector (Current RIN for DOT) and other requirements per local authorities as applicable.

Note – all references to DOT cylinders include Transport Canada (TC) approval per the US and Canada Reciprocity Agreement.

Assembly Manufacture Date versus Cylinder Manufacture Date:
The Sea-Fire Cylinder Assembly **MANUFACTURE DATE** is listed on the specification label, described in the next section. This indicates the fill action and final assembly date. This is not the Cylinder manufactured date and has no impact on the Cylinder requalification interval.

The Cylinder's **MANUFACTURE DATE** is stamped in the Cylinder on the head or foot ring. This date is in Month/Year (MM/YY) format.

NFPA 2001 – Clean Agent Fire Extinguisher Systems:

All models, all Cylinders:

- This inspection is above and beyond 49CFR or international requirements. It must be performed regardless of cylinder requalification interval.
- If more than 5 years has elapsed since the date of the last test and inspection, the cylinder shall not be recharged without retesting. This testing shall follow standard 49 CFR requirements (explained in the next section).
- Cylinders continuously in service without discharging shall be given a complete external visual inspection every 5 years or more frequently if required.
  - For steel cylinders, the visual inspection shall be in accordance with *CGA C-6, Standard for Visual Inspection of Steel Compressed Gas Cylinders*, Section: Low pressure cylinders exempt from pressure testing.
  - For aluminum cylinders, the visual inspection shall be in accordance with *CGA C-6.1, Standard for Visual Inspection of High Pressure Aluminum Alloy Compressed Gas Cylinders.*

US Department of Transportation (DOT) and USCG Applications

Models NFG 25 – 100 (DOT)
These units are built with triple approved DOT 39 NRC/CE/UKCA cylinders. These are non-refillable and non-reusable. Systems with these cylinders are NOT serviceable and therefore have NO periodic inspection requirements. Systems with these cylinders, per 49 CFR requirements, are clearly marked, "Federal law forbids

transportation if re-filled – penalty up to $500,000 fine and 5 years imprisonment (49 U.S.C. 5124).

Models NFD 101 – 825 (DOT)

- These units are built with DOT 3AL Cylinders.
- The periodic inspection interval for DOT 3AL cylinders filled as a Fire suppression system with the agent as supplied is 12 years from the date stamped on the Cylinder.
  - However, a cylinder filled before re-qualification becomes due may remain in service without testing until it is emptied for any reason [Reference 49 CFR 180.205 (c)].
- For DOT 3AL Cylinders, visual inspections are not authorized to replace hydrostatic testing.
- The only test method for DOT 3AL Cylinders is the water jacket or direct expansion test method which yields a subsequent test requirement after 12 years.
- Correlation to NFPA 2001 (5 year) requirement. In both standards, if the Cylinder is not already empty, it does not need to be emptied solely for inspection purposes. If the Cylinder has more than 5 years of service, and has been emptied for whatever reason, it needs to be inspected per NFPA 2001 guidelines listed above.

NFD Models 826 – 1800 (DOT)

These units are built with DOT 4BW welded steel Cylinders and are reusable / re-fillable. They must be periodically tested and re-qualified.

- The periodic inspection interval for DOT 4BW Cylinders filled as a Fire suppression system with the agent as supplied is 12 years from the date stamped on the cylinder.
  - However, a cylinder filled before re-qualification becomes due may remain in service without testing until it is emptied for any reason [Reference 49 CFR 180.205 (c)].
- Applicable test methods for DOT 4BW welded steel Cylinders are:
  - a visual inspection in accordance with CGA C-6 which yields a subsequent test requirement after 5 years.
  - by Proof Pressure Test which yields a subsequent test requirement after 7 years
  - a Volumetric Expansion test using the Water Jacket Method which yields a subsequent test requirement after 12 years.
- Correlation to NFPA 2001 (5 year) requirement. In both standards, if the Cylinder is not already empty, it does not need to be emptied solely for inspection purposes. If the Cylinder has more than 5 years of service, and has been emptied for whatever reason, it needs to be inspected per NFPA 2001 guidelines listed above.

<u>European Applications</u>

For systems compliant to European Directives (EC) and United Kingdom (UK) regulations, specific cylinders may be used that are different from those used on DOT

approved systems. International requirements need to be followed as well as other requirements according to the local authorities having jurisdiction (AHJ).

Models NFG 25 – 100 (CE/UKCA)
These systems are "CE" and "UKCA" marked in accordance with the Pressure Equipment Directive (PED) 2014/68/EU and the Pressure Equipment (Safety) Regulation 2016. They are built to technical specifications ISO 11118. These cylinders are NOT refillable. Systems with these cylinders are NOT serviceable and therefore have NO periodic inspection requirements. (Reference ISO 11118). Models with these Cylinders, per European Agreement Governing the International Carriage of Dangerous Goods by Road (ADR) requirements, are clearly marked, "DO NOT REFILL".

Models NFD 101 – 825 (CE/UKCA)
These systems are built with seamless aluminum Cylinders as described below, are "CE" marked in accordance with the Pressure Equipment Directive (PED) 2014/68/EU and "UKCA" marked in accordance with the Pressure Equipment (Safety) Regulation 2016. They ARE reusable / re-fillable and MUST be periodically tested and re-qualified.

These cylinders built to technical standard ISO 7866.

- Systems with CE/UKCA or π marked cylinders built to ISO standard 7866 are to be maintained in accordance with ISO 18119:2018, *Gas Cylinders – Seamless Steel and Seamless aluminum-allow gas cylinders and tubes - Periodic Inspection and Testing.*
- The periodic inspection interval for cylinders built to European directives and maintained in accordance with those directives in the European community, is 10 years from the manufacture date hard stamped into the Cylinder.
    - **Exception for aluminum cylinders:** Provided the Cylinder has not been subjected to abusive and abnormal conditions such as being involved in an accident, heat exposure or other severe conditions that would render it unsafe, there is no requirement for the user to return a Cylinder before the contents have been used even though the periodic inspection and testing interval has lapsed. [Reference ISO 18119:2018, Section 5 – Intervals between periodic inspections and tests]
- TPED Directive 2010/35/EU also has requirements for periodic inspection.

Models NFD 826 – 1800 (CE/UKCA)
These systems are built with welded steel Cylinders as described below and are either π/Rho marked in accordance with the Transportable Pressure Equipment Directive (TPED) / Transportable Pressure Equipment Regulations (UK) or "CE/UKCA" marked in accordance with the Pressure Equipment Directive (PED) 2014/68/EU and the Pressure equipment (Safety) Regulation. They ARE reusable / re-fillable and MUST be periodically tested and re-qualified.

- These units have welded steel Cylinders built to technical standard EN 13322-1. The Cylinders need to be maintained in accordance with BS EN 1803.
- The periodic inspection interval for Cylinders built to European directives and maintained in accordance with those directives in the European community, is 10 years from the manufacture date hard stamped into the Cylinder.
- TPED Directive 2010/35/EU also has requirements for periodic inspection.

WARNING:

DO NOT ATTEMPT TO DISASSEMBLE ANY PART OR COMPONENT OF THE EXTINGUISHER. THIS UNIT IS PRESSURIZED AND SERIOUS INJURY COULD RESULT. CONTACT THE FACTORY OR AN AUTHORIZED DEALER FOR SERVICE INFORMATION.

Agent Weight Inspection

Weigh the Cylinder to ensure ample extinguisher agent (every 6 months, minimum). All fire suppression systems containing liquefied gas require periodic weighing to ensure a fully charged unit. Pressure gauges indicate the ability to discharge the agent but not the quantity of the extinguishing agent. The Cylinder (less the Bracket) must be weighed on at least a semi-annual basis and be replaced immediately if the gross weight has decreased by the quantity noted on the Specification Label (See Figure 9).

An Inspection Tag is supplied on every new Cylinder for recording this inspection.

The Specification Label identifies the Model Type, Work Order Number, Discharge Temperature Range, Agent Weight, Maximum Volume Protected, Gross Weight, and Manufacturer Date.

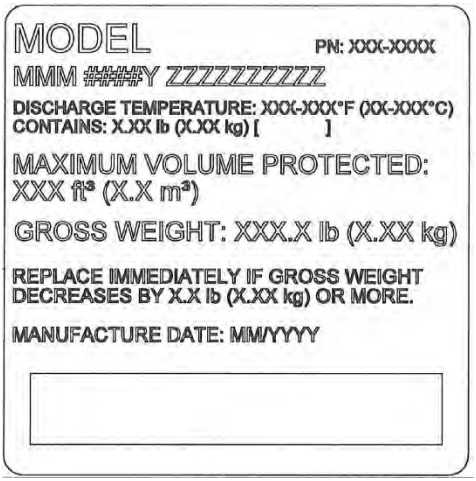


Figure 9: Specification Label

Pressure Gauge Inspection

Frequently check gauge for proper pressure, (every 6 months, minimum).

Reading the Pressure Gauge (Inspection)

The green section of the gauge is designed to show proper filling and pressurization at 70°F (21°C). Per applicable design standards, this is defined as ± 10% of nominal fill pressure.

Sea-Fire systems are rated for operating temperatures from 0°F (-17°C) or 20°F (-7°C) up to 130°F (54°C). Note: This is storage and ambient operating temperature.

The red section of the gauge, above and below the green section, indicate the acceptable pressure readings for temperatures above and below 70°F (21°C). The table located on the included tags show the pressure of the system at corresponding temperatures.

To inspect a unit when the ambient temperature is other than 70°F (21°C), measure the ambient temperature and find the corresponding nominal pressure in the table. Read the tip of the yellow pointer and determine what the internal pressure is by counting the division lines and adding or subtracting for each line segment from the black centerline marked, 500 psi (34.3 bar).

- The green center section ranges from 450 to 550 psi.
- The red section to the right of center ranges from 551 to 575 psi.
- The red section to the left of center ranges from 412 to 450 psi.

Compare the actual reading to the reference table on the tag attached to the cylinder. The pressures should be within ± 20 psi (1 bar) of each other (one segment).

- Note: this allowance considers allowing for gauge manufacturing tolerance, temperature reading accuracy and the ability to precisely see the pointer location.
- If the yellow pointer is in either the white zone on the gauge, to the left "REPLACE" or to the right "OVERCHARGE", the unit is likely not functional and may require replacement.
- If time and serviceability permits, a suspect unit may be verified by stabilizing the temperature of the unit at 70°F (21°C) for a minimum of 4 hours and reading the pressure gauge at that point.

Pressure vs. Temperature Graphs

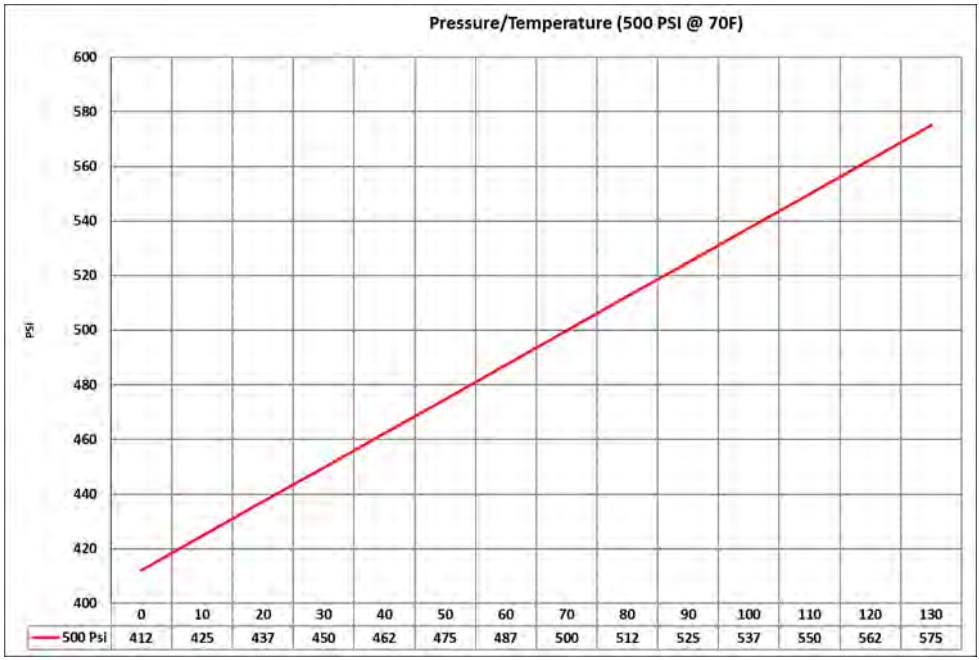


Figure 10: FK-5-1-12 Pressure vs. Temperature, 500 psi at 70°F

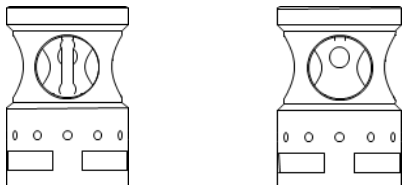
System Status Indicator Light Inspection

Before operating the vessel, visually check to ensure green indicator light or alternate display is operational, indicating that the pressure in the cylinder is in the normal range.

Glass Bulb (Temperature Sensor) Inspection

Never paint or obstruct the Cylinder manifold or the Sensor Valve / Detector, as this will adversely affect its operating characteristic.

Check for the presence of the glass bulb. Figure 11 shows two states: Charged (Intact) and Discharged (Activated).



Charged (Bulb Intact) Discharged (Bulb missing)

Figure 11: Glass Bulb Inspection

Cable Inspection

Manual activation cables should be checked for proper operation every 6 months while Cylinder inspection is being performed. Cable runs should be visually checked to ensure no damage has been done to the cable. (No excessive wear or pinching exists).

Take the safety pin out of the 'backstop' position in the release Bracket and place into center hole, securing release arm. Disengage the S-Hook from the release arm, remove the pin from the fire release handle, and test the cable for smooth operation. Re-assemble in reverse order (see Figure 7).

Specification Tables

Table 6: NFG - Automatic and Manual/Automatic Fire Suppression Systems

NFG Model		Volume of Protection		Minimum FK-5-1-12		Maximum FK-5-1-12		Cylinder Diameter (Nominal)		Installation Dimension Requirements					
Auto Only	Manual Auto	ft^3	m^3	lb	kg	Lb	kg	in	mm	W		H		D	
		Range	Range							in	mm	in	mm	in	mm
25A	25M	17 - 25	0.48 - .70	0.9	0.4	1.3	0.6	3.1	78	5	127	13.5	343	4.8	122
50A	50M	26 - 50	0.70 - 1.4	1.3	0.6	2.7	1.2	3.8	97	5	127	19.3	490	5.4	138
75A	75M	51 – 75	1.4 – 2.1	2.7	1.2	4.0	1.8								
100A	100M	76 – 100	2.1 – 2.8	4.0	1.8	5.4	2.4	4.2	107	5	127	19.5	495	5.6	142

Operating Temperature Range: 20°F to 130°F (-7°C to 54°C)

Discharge Temperature Range: NFG 25-75: 200 to 250°F (93 to 121°C)
NFG 76-100: 175 to 225°F (79 to 107°C)

- All NFG Models are approved for vertical or horizontal mounting.
- All NFG Models are available with multiple approved Cylinders, DOT/CE/UKCA.
- All NFG Models are non-refillable (non-serviceable)
- All NFG M Models meet the ABYC A-4, Fire Fighting Equipment Standard, which dictates that fixed fire extinguishing systems shall be capable of both Automatic and Manual operation.
- NFG and NFD systems are designed for only one Cylinder (single nozzle) to protect the entire space. Using two Cylinders to achieve combined coverage is not acceptable.

Abbreviations:

ft^3 = Cubic Feet	kg = Kilograms	in = Inches
m^3 = Cubic Meters	lb = Pounds	mm = Millimeters

Table 7A: NFD - Automatic and Manual/Automatic Fire Suppression Systems

NFD Model		Volume of Protection		Minimum FK-5-1-12		Maximum FK-5-1-12		Cylinder Diameter (Nominal)		Installation Dimension Requirements					
Auto Only	Manual Auto	ft^3	m^3	lb	kg	Lb	kg	in	mm	W		H		D	
		Range	Range							in	mm	in	mm	in	mm
125A	125M	101 - 125	2.8 – 3.5	5.4	2.4	6.7	3.0	5.4	138	6.1	154	21.2	538	6.6	168
150A	150M	126 – 150	3.5 - 4.2	6.7	3.0	8.1	3.7								
175A	175M	151 – 175	4.2 - 5.0	8.1	3.7	9.4	4.3								
200A	200M	176 - 200	5.0 - 5.7	9.4	4.3	10.7	4.9								
225A	225M	201 - 225	5.7 - 6.4	10.8	4.9	12.1	5.5	7.0	178	7.8	199	20.4	518	8.6	218
250A	250M	226 - 250	6.4 - 7.1	12.1	5.5	13.4	6.1								
275A	275M	251 - 275	7.1 - 7.8	13.4	6.1	14.8	6.7								
300A	300M	276 - 300	7.8 - 8.5	14.8	6.7	16.1	7.3								
325A	325M	301 - 325	8.5 - 9.2	16.1	7.3	17.5	7.9	7.0	178	7.8	199	24.9	633	8.4	214
350A	350M	326 - 350	9.2 - 9.9	17.5	7.9	18.8	8.5								
375A	375M	351 - 375	9.9 - 10.6	18.8	8.5	20.1	9.1								
400A	400M	376 - 400	10.6 - 11.3	20.1	9.1	21.5	9.7								
425A	425M	401 - 425	11.4 - 12.0	21.5	9.7	22.8	10.4	7.0	178	7.8	199	29.1	738	8.4	214
450A	450M	426 - 450	12.1 - 12.7	22.8	10.4	24.2	11.0								
475A	475M	451 - 475	12.8 - 13.5	24.2	11.0	25.5	11.6								
500A	500M	476 - 500	13.5 - 14.2	25.5	11.6	26.9	12.2								
525A	525M	501 - 525	14.2 - 14.9	26.9	12.2	28.2	12.8								
550A	550M	526 - 550	14.9 - 15.6	28.2	12.8	29.5	13.4	8.0	203	8.6	218	29.3	743	9.4	239
575A	575M	551 - 575	15.6 - 16.3	29.5	13.4	30.9	14.0								
600A	600M	576 - 600	16.3 - 17.0	30.9	14.0	32.2	14.6								
625A	625M	601 - 625	17.0 - 17.7	32.2	14.6	33.6	15.2								
650A	650M	626 - 650	17.7 - 18.4	33.6	15.2	34.9	15.8								
675A	675M	651 - 675	18.4 - 19.1	34.9	15.8	36.3	16.4								
700A	700M	676 - 700	19.1 - 19.8	36.3	16.4	37.6	17.1	8.0	203	8.6	218	34.2	868	9.4	239
725A	725M	701 - 725	19.9 - 20.5	37.6	17.1	38.9	17.7								
750A	750M	726 - 750	20.6 - 21.2	38.9	17.7	40.3	18.3								
775A	775M	751 - 775	21.3 - 21.9	40.3	18.3	41.6	18.9								
800A	800M	776 - 800	22.0 - 22.7	41.6	18.9	43.0	19.5								
825A	825M	801 - 825	22.7 - 23.4	43.0	19.5	44.3	20.1								

(Continued on next page)

Operating Temperature Range: NFD 101-825: 20°F to 130°F (-7°C to 54°C)
NFD 826-1800: 32°F to 130°F (0°C to 54°C)

Discharge Temperature Range: NFD 101-1800: 175 to 225°F (79 to 107°C)

- Models NFD 101 through NFD 825 are approved for vertical or horizontal mounting.
- Models NFD 826 through NFD 1800 are for vertical mounting only.
- All NFD Models are refillable.
- NFD Models are offered in either US DOT, CE/UKCA or all 3.
- US Coast Guard approval requires that the installation of manual discharge capability on all systems installed in compartments of 1,000 ft^3 (28.3 m^3) and larger.
- All NFD M Models meet the ABYC A-4, Fire Fighting Equipment Standard, which dictates that fixed fire extinguishing systems shall be capable of both Automatic and Manual operation.
- NFG and NFD systems are designed for only one Cylinder (single nozzle) to protect the entire space. Using two Cylinders to achieve combined coverage is not acceptable.

Table 7B: NFD Automatic and Manual/Automatic Fire Suppression Systems

NFD Model		Volume of Protection		Minimum FK-5-1-12		Maximum FK-5-1-12		Cylinder Diameter (Nominal)		Installation Dimension Requirements					
	Manual Auto	ft^3	m^3	lb	kg	Lb	kg	in	mm	W		H		D	
		Range	Range							in	mm	in	mm	in	mm
	850M	826 - 850	23.4 - 24.1	44.3	20.1	45.7	20.7								
	875M	851 - 875	24.1 - 24.8	45.7	20.7	47.0	21.3								
	900M	876 - 900	24.8 - 25.5	47.0	21.3	48.3	21.9								
	925M	901 - 925	25.5 - 26.2	48.3	21.9	49.7	22.5								
	950M	926 - 950	26.2 - 26.9	49.7	22.5	51.0	23.1								
	975M	951 - 975	26.9 - 27.6	51.0	23.1	52.4	23.8								
	1000M	976 - 1000	27.6 - 28.3	52.4	23.8	53.7	24.4								
	1025M	1001 - 1025	28.3 - 29.0	53.7	24.4	55.0	25.0								
	1050M	1026 - 1050	29.1 - 29.7	55.0	24.9	56.4	25.6	10	254	16.6	422	31.4	797	11.5	291
	1075M	1051 - 1075	29.8 - 30.4	56.4	25.6	57.7	26.2								
	1100M	1076 - 1100	30.5 - 31.1	57.7	26.2	59.1	26.8								
	1125M	1101 - 1125	31.2 - 31.9	59.1	26.8	60.4	27.4								
	1150M	1126 - 1150	31.9 - 32.6	60.4	27.4	61.8	28.0								
	1175M	1151 - 1175	32.6 - 33.3	61.8	28.0	63.1	28.6								
	1200M	1176 - 1200	33.3 - 34.0	63.1	28.6	64.4	29.2								
	1225M	1201 - 1225	34.0 - 34.7	64.4	29.2	65.8	29.8								
	1250M	1226 - 1250	34.7 - 35.4	65.8	29.8	67.1	30.4								
	1275M	1251 - 1275	35.4 - 36.1	67.1	30.4	68.5	31.1								
	1300M	1276 - 1300	36.1 - 36.8	68.5	31.1	69.8	31.7								
	1325M	1301 - 1325	36.8 - 37.5	69.8	31.7	71.2	32.3								
	1350M	1326 - 1350	37.5 - 38.2	71.2	32.3	72.5	32.9								
	1375M	1351 - 1375	38.3 - 38.9	72.5	32.9	73.8	33.5								
	1400M	1376 - 1400	39.0 - 39.6	73.9	33.5	75.2	34.1								
	1425M	1401 - 1425	39.8 - 40.4	75.2	34.1	76.5	34.7								
	1450M	1426 - 1450	40.4 - 41.1	76.5	34.7	77.9	35.3								
	1475M	1451 - 1475	41.1 - 41.8	77.9	35.3	79.2	35.9								
	1500M	1476 - 1500	41.8 - 42.5	79.2	35.9	80.6	36.5								
	1525M	1501 – 1525	42.5 – 43.2	80.6	36.5	81.9	37.1								
	1550M	1526 – 1550	43.2 – 43.9	81.9	37.1	83.2	37.8	10	254	16.6	422	41.4	1052	11.5	291
	1575M	1551 – 1575	43.9 – 44.6	83.2	37.8	84.6	38.4								
	1600M	1576 – 1600	44.6 – 45.3	84.6	38.4	85.9	39.0								
	1625M	1601 – 1625	45.3 – 46.0	85.9	39.0	87.3	39.6								
	1650M	1626 – 1650	46.0 – 46.7	87.3	39.6	88.6	40.2								
	1675M	1651 – 1675	46.7 – 47.4	88.6	40.2	89.9	40.8								
	1700M	1676 – 1700	47.5 – 48.1	89.9	40.8	91.3	41.4								
	1725M	1701 – 1725	48.2 – 48.8	91.3	41.4	92.6	42.0								
	1750M	1726 – 1750	48.9 – 49.6	92.6	42.0	94.0	42.6								
	1775M	1751 – 1775	49.6 – 50.3	94.0	42.6	95.3	43.2								
	1800M	1776 – 1800	50.3 – 51.0	95.3	43.2	96.7	43.8								

Two Year NFG and NFD Series Limited Warranty

We warrant to the original retail purchaser, the NFD and NFG suppression systems for a period of two years after retail purchase against defective material and faulty workmanship. Any unit found to be defective during the warranty period will be repaired if possible or replaced free of charge if classified non-refillable (according to product label) upon the buyer's *prepaid* return of the defective unit only after receipt of an official return authorization number. Proof of retail purchase required, otherwise date of manufacture on product label will apply. This warranty gives the buyer specific legal rights which may vary by state (or country).

THE FOREGOING WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES WITH RESPECT TO THE PRODUCT, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY, OR TO ASSUME FOR SEA-FIRE MARINE ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OR INSTALLATION OF ITS PRODUCTS. REPLACEMENT OF THE PRODUCT WILL BE THE SOLE REMEDY WITH RESPECT TO ANY LOSS OR DAMAGE TO PROPERTY. BUYER IS NOT RELYING ON SELLER'S JUDGEMENT REGARDING BUYER'S PARTICULAR REQUIREMENTS AND BUYER HAS HAD AN OPPORTUNITY TO INSPECT THE PRODUCT TO BUYER'S SATISFACTION. UNAUTHORIZED SERVICE OF ANY KIND INVALIDATES ALL WARRANTY PROVISIONS.

Conditions

All Sea-Fire products are tested after manufacture and shipped in perfect working order. Damage noted upon receipt of shipment should be addressed as a shipping claim, the filing of which is the sole responsibility of the consignee for which the total compensatory award will be limited to that appropriated by the carrier. Insured freight costs are the responsibility of the consignee. Missing component parts and damage noted upon installation are typically the result of mishandling during the installation process and will not qualify for warranty coverage. Incidents of accidental discharge are not indicative of product failure - heed product warnings to avoid injury and/or costs. Damaged products should be returned for repair or replacement under an official return authorization number, with associated costs assigned a purchase order number and shipping charges prepaid. Returned products must be received in resalable condition to qualify for credit and are subject to a standard 20% (or greater based on circumstance) restocking fee. No returns will be processed without proper return authorization.

Additional Servicing

Further servicing of Sea-Fire pre-engineered systems is reserved to competent individuals who have completed training by Sea-Fire Marine personnel.

- Only Sea-Fire provided replacement parts are authorized for use in repairing these systems.
- Any inspections or actions related to cylinders must be performed by applicable by qualified/registered personnel:
    - RIN registered per US DOT requirements in the USA.
    - according to the regional or member-state requirements as applicable.
- Filling is only allowed at Sea-Fire authorized filling locations.
- Service Manual 123-349 is available to these individuals.

Out of Warranty Replacements / Recharges

Sea-Fire NFG Model Series Cylinders comply with US DOT Specification 39 and PED/PESR. These Cylinders are **not refillable**. The discharged Cylinder will be replaced with a comparable SEA-FIRE extinguisher. Contact the factory or authorized dealer for details.

Sea-Fire NFD Model Series Cylinders comply with DOT or European Specifications (TPED/ADR or PED/PESR), as detailed in the Cylinder inspection / Cylinder testing section, which allow discharged Cylinders to be **refilled** and serviced. The discharged extinguisher may be refilled if applicable or upon the buyer's *prepaid* return of the discharged system, provided it meets certain other standards for refill ability (i.e. – age and condition of Cylinder). Contact factory or authorized dealer for details.

Return to:

Sea-Fire Marine - USA
9351 G Philadelphia Rd.
Baltimore, Maryland
Tel: (410) 687-5500
Website: www.Sea-Fire.com

or

Sea-Fire Europe, LTD
Unit D2
Discovery, Voyager Park
Portfield Rd.
Portsmouth, Hants
PO3 5FN, United Kingdom
Tel: +44(0)2392679666
Website: www.Sea-Fire.co.uk

Safety Data Sheets

Safety Data Sheet

SDS #: 123-241 Revision: H

1: Identification	
Product Identifier:	Models: NFD, NFG, NMD, NMG, MN, N
Other Identification:	UN1044 Fire Extinguisher
Product use:	Fire Suppression / Extinguisher System
Manufacturer:	Sea-Fire Marine, a Division of Metalcraft, Inc. 9351 G Philadelphia Road Baltimore, Maryland 21237
Emergency Telephone Numbers:	
Sea-Fire Marine:	410-687-5500
Infotrac – North America:	1-800-535-5053
Infotrac – International:	+1 352-323-3500

2: Hazard(s) Identification	
Classification:	Gases Under Pressure Liquid Gas
Signal Word:	**Warning**
Hazard Statement:	Contains liquid and gas under pressure. Overheating and over pressurizing may cause gas release or violent cylinder bursting.
	
Appearance:	Clear Colorless Gas
Physical State:	Liquid and Gas
Odor:	Low Odor
Precautionary Statements:	Prevention – Wear gloves and eye protection. Response – Do not rub affected area. Seek immediate medical advice or attention. Storage – Store in a well ventilated place.

3: Composition / Information on Ingredients		
Chemical Name	**CAS No.**	**Weight - %**
1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(Trifluoromethyl)-3- Pentanone	756-13-8	> 99.9
Nitrogen, Compressed	7727-37-9	1

4: First Aid Measures	
Eye Contact:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms occur, consult a physician, preferably an ophthalmologist.
Skin Contact:	Wash affected area with soap and water. If signs / symptoms develop, get medical attention. Do not rub affected area.
Inhalation:	Remove from exposure and move to fresh air Immediately. If not breathing, call 911 and give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Ingestion:	Do not induce vomiting. Give victim two glasses of water. Never give anything by mouth to an unconscious person. If signs / symptoms develop, get medical attention.
Symptoms:	Under normal use conditions, airborne exposures are not expected to be significant enough to require respiratory protection.
Note to Physician:	Treat symptomatically.

5: Fire-Fighting Measures	
Suitable Extinguishing Media:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable Extinguishing Media:	Not Determined.
Specific Hazards Arising from the Chemical:	Product is not flammable and will not burn.
Protective Equipment and Precautions for Firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA / NIOSH (approved or equivalent) and full protective gear. To prevent pressure build up, water may be used to cool containers. Evacuate area and fight fire from safe distance.

6: Accidental Release Measures	
Personal Precautions:	Use personal protective equipment, as required.
For Emergency Responders:	Evacuate unprotected personnel from area. Ventilate area.
Environmental Precautions:	See Section 12 for additional Ecological Information and Section 13 for additional Disposal Considerations information.
Methods for Containment:	Prevent further leakage or spillage if safe to do so. Locate and seal the source of the leaking gas.
Methods for Clean-up:	Keep in suitable, closed containers for disposal.

7: Handling and Storage	
Advice on Safe Handling:	Handle in accordance with good industrial hygiene and safety practice. Use personal protection recommended in Section 8. Fire extinguishing cylinders are pressurized. Although unlikely, due to improper handling or storage, a cylinder could be propelled, causing bodily injury and / or property damage.
Storage Conditions:	Protect from sunlight. Store in well ventilated place.
Incompatible Materials:	None known based on information supplied.

8: Exposure Controls / Personal Protection	
Exposure Guidelines:	As supplied, this product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies. Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water.
Engineering Controls:	Ensure adequate ventilation, especially in confined areas.
Eye / Face Protection:	To avoid eye contact, use approved eye protection. Use eyewash stations and showers.
Skin and Body Protection:	Avoid prolonged or repeated skin contact. Select and use gloves and / or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and / or protective clothing manufacturer for selection of appropriate compatible materials. Gloves made from the following material(s) are recommended: Butyl Rubber.
Respiratory Protection:	Avoid breathing of vapors, mists or spray. Under normal use conditions, airborne exposures are not expected to be significant enough to require respiratory protection. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: Half face piece or full face air-purifying respirator with organic vapor cartridges. If thermal decomposition occurs, wear supplied air respiratory protection.
General Hygiene Considerations:	Handle in accordance with good industrial hygiene and safety practice.

9: Physical and Chemical Properties

Appearance:	Colorless Liquid and Gas Mixture
Physical state:	Liquid and Gas
Color:	Colorless
Odor:	Low Odor
Odor Threshold:	Not Determined
pH:	Not Determined
Melting Point / Freezing Point:	-108°C (-162.40°F)
Boiling Point / Range:	49°C [@ 760 mmHg] (120.6°F)
Flash Point:	No Flash Point
Evaporation Rate:	>1 [Ref Std: BUOAC=1]
Flammability:	**LEL** [*Details:* Nonflammable]
Upper Flammability Limits:	**UEL** [*Details:* Nonflammable]
Lower Flammability Limits:	**UEL** [*Details:* Nonflammable]
Vapor Pressure:	40.4 k Pa [@ 25°C]
Vapor Density:	11.6 [Ref Std: AIR=1]
Relative Density:	Not Determined
Specific Gravity:	1.6 [@ 68°F] [Ref Std: WATER=1]
Water Solubility:	Nil
Percent volatile:	100 %
Partition Coefficient:	Not Determined
Auto-ignition Temperature:	Not Determined
Decomposition Temperature:	Not Determined
Viscosity:	0.6 centipoise [@ 25°C]
Explosive Properties:	Not Determined
Oxidizing Properties:	Not Determined

10: Stability and Reactivity

Reactivity:	This material may be reactive with certain agents under certain conditions – see remaining headings in this section.
Chemical Stability:	Stable under normal conditions.
Possibility of Hazardous Reactions:	None under normal conditions.
Hazardous Polymerization:	Hazardous polymerization will not occur.
Conditions to Avoid:	Light. Direct sunlight and ultraviolet light for extended periods. Keep out of reach of children. Do not store above 130°F (54°C) taking into account effects of sunlight.
Incompatible Materials:	Strong bases, amines, alcohols and water.
Hazardous Decomposition Products:	Combustion or decomposition products include carbon monoxide, carbon dioxide, and hydrogen fluoride.

11: Toxicological Information	
Routes of Exposure:	Eye contact, skin contact, Inhalation.
Acute Effects of Exposure:	No known health effects. Contact with skin or eyes is not expected to result in significant irritation. May be harmful if swallowed. Inhalation LC_{50} (rat) > 10% v/v.
Chronic Effects of Exposure:	None known.
Acute Toxicity:	None known.
Chronic Toxicity:	None known.
Description of Symptoms:	None known.
Carcinogenicity:	Not listed as a carcinogen by NTP, IARC or OSHA.

12: Ecological Information (non-mandatory)	
Ecotoxicity:	This product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Aquatic Toxicity:	No data available, but not expected to be found in aquatic environments. As product is gaseous at ambient temperatures.
Persistence and Degradability:	Not determined.
Bioaccumulation:	Bioaccumulation is considered unlikely for this material, due to its gaseous state at ambient temperatures and atmospheric pressure.
Adsorption / Leaching:	Adsorption and leaching is considered unlikely for this material, due to its gaseous state at ambient temperatures and atmospheric pressure.
Other Adverse Effects:	Ozone depletion potential: None Global warming potential: 1

13: Disposal Considerations (non-mandatory)	
Disposal of Waste:	Reclaim, if feasible. For information on product return, contact Sea-Fire Marine. Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include Hydrogen Fluride. Facility must be capable of handling halogenated materials. As a disposal alternative, dispose of waste product in a facility permitted to accept chemical waste. **A Hazardous Waste Number (RCRA):** Not regulated. **Since regulations vary, consult applicable local regulations or authorities before disposal.**
Contaminated Packaging:	Disposal should be in accordance with applicable regional, national and local laws and regulations.

14: Transport Information (non-mandatory)	
DOT	
UN / ID No:	UN 1044
Proper Shipping Name:	FIRE EXTINGUISHER
Hazard Class:	2.2
IATA	
UN / ID No:	UN 1044
Proper Shipping Name:	FIRE EXTINGUISHER
Hazard Class:	2.2
IMDG	
UN / ID No:	UN 1044
Proper Shipping Name:	FIRE EXTINGUISHER
Hazard Class:	2.2

15: Regulatory Information (non-mandatory)	
TSCA: **SARA 313 Regulated Chemical(s):**	On the inventory, or in compliance with the inventory. This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting level established by SARA Title III, Section 313.
California Prop. 65:	Chemicals known to the State of California to cause cancer, birth defects or any other harm: None known.
EU Classification:	This product is not classified as dangerous according to Directive (EC) 1272/2008. Exposure Limit Values: 1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone.
TWA Limit:	150 ppm.
EINECS Status:	The component of this product has been notified to ELINCS (European List of Notified or New Chemical Substances). Certain restrictions apply. Contact your distributor for additional information.
Canadian DSL (Domestic Substances List):	All components are included in the DSL or are exempt from listing. The product also complies with the chemical notification requirements for Korea (KECI), Australia (AICS), Japan (METI), and China (CICS).

16: Other Information (non-mandatory)	
Revision Date:	02/28/2023

Data used to compile this Safety Data Sheet is industry published reference standards and other product literature.

The EU Classification is in accordance with Directive (EC) 1272/2008.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for the safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Installation Inspection Checklist

SEA-FIRE MARINE

Pre-Engineered Suppression Systems

INSTALLATION INSPECTION CHECKLIST

Inspection Date:	For Land Based Installations, fill in information as applicable.
Boat Builder:	**Dealer:**
Boat Model / Type	**Boat ID or Hull #:**

Room Name:	**Total Volume:**_____ft³

(Measure Length x Width x Height to determine volume of engine compartment)
Reminder: May only deduct permanently installed tankage located in the compartment, unless the boat builder has installed a nameplate listing the volumes of engines.

Extinguisher Model:	**Agent:** ☐ HFC227ea / ☐ FK-5-1-12

☐ Auto Only	☐ Auto / Manual	☐ Manual Only
If there is no manual pull cable bracket on the cylinder	If there is a manual pull cable bracket on the cylinder and the cable is installed	If the glass bulb is colorless w/ red piston and bracket

Suppression System Cylinder		YES	NO	N/A
Sea-Fire User's Manual available? (Manual PN is referenced on the cylinder assembly main label.) **Manual PN:** _____				
Is only one cylinder installed in protected space?				
Is the cylinder clear from obstructions?				
Is Hairpin Cotter Pin fitted at cylinder head? *(Figure 1)* N/A for 'Automatic Only' systems				
Label visible? Date of manufacture:_____ SN (Serial Number):_____				
Inspection and Warning Tags in place? *(Figure 2)* • Warning tag for S Hook (when cable is installed) • Inspection Record • Caution Tag • Pressure / Temperature Tag				
Bracket: Sea-Fire? If no, list manufacturer:				
Securely mounted to wall and clamps tight?				
Is the Distance / Height from manifold mounted within the following distance:	FG/FD/MG/MD – 11" (2.79mm)			
	NFG/NFD/NMG/NMD – 3ft (1m)			
***Is Pressure Gauge reading in the green zone?**				
When NO is checked above, provide explanation:				
***Temperature in compartment upon inspection:** ☐____°F ☐____°C				
Location of cylinder : ☐ Port /☐ Center / ☐ Starboard ☐ Forward / ☐ Center / ☐ Aft	**Cylinder orientation:** ☐ Vertical ☐ Horizontal			
Safety Pin Removed for System Activation? *(Figure 3)*	☐ Installed in storage position - left / right pull bracket ☐ Installed in far hole, opposite of pull - bi-directional cable			

*For temperatures below 60°F or above 80°F, allow pressure gauge reading per temperature / pressure adjustment.

SEA-FIRE MARINE

Pre-Engineered Suppression Systems

INSTALLATION INSPECTION CHECKLIST

Shutdown Restart System				
Model : ☐ ESRS 4 / ☐ ESRS 6 / ☐ ESRS 8 / ☐ MSRS 4 / ☐ MSRS 6 / ☐ MSRS 8 *(Figure 4)*				
Engine(s) manufacturer and type:_____	☐ Intake air from within engine room OR ☐ Outside air	Voltage:_____		
Generator manufacturer and type:_____ ☐ Intake air from within room OR ☐ Outside air		Voltage:_____		
Fans / blowers type:_____ Total air exchange (cfm) of all Fans:_____		Voltage:_____		
		YES	NO	N/A
ESRS / MSRS / Display User's Manual available?				
Is an Audible / Visual display mounted? ☐ Helm / ☐ Fly bridge OR ☐ other area:_____ PN:_____ Indicator Light:_____				
Shutdown devices connected?				
Verify High Temperature Sensor operation. Disconnect plug connector to confirm display status changes and engine(s) / ventilation does not shut down.				
Is the Pneumatic Damper Actuator's Pressure Gauge Needle centered vertically at 300 psi? Disconnect plug connector to confirm: a. Engine shutdown b. Ventilation shutdown (if installed) c. Display status indication				
Does Cylinder Pressure Switch (PS) operate? Disconnect PS connector to confirm: a. Engine shutdown b. Ventilation shutdown (if installed) c. Display status indication				
Brackets and Clamps securely mounted?				
When NO is checked above, provide explanation:				

Cable Assembly	Model:	YES	NO	N/A
User's Manual, PN: ☐ 123-132 for 135 Series or ☐ 123-138 for 136 Series, available? **If not, is System Manual listed on page 1 available?**				
Is a Red Safety Tie installed on cable release handle(s)? *(Figure 5)*				
Does vessel require a cable: a. USCG vessels where engine room volume is greater than 1,000 ft³?				
b. ABYC listed vessel?				
Fire Sleeve installed?: Fire sleeve is required for 'Manual Only' installations				
Test Cable Assembly per test procedure of manual PN listed above. Are the results lower than 40 lb (18.1 kg) on the scale?				
When NO is checked above, provide explanation:				
SMAC - _____ (length of the cable)				
Specify where the pull station is located on boat: Location 1 of cable release handle: Location 2 of cable release handle (if applicable):_____				

Installation Acceptance Signatures	
Sea-Fire Authorized Boat Builder Representative:	**Date:**
Sea-Fire Authorized Inspector / Service:	**Date:**

Hairpin Cotter Pin

Installed in Bracket
135 Series (Left / Right)

Installed in Bracket
136 Series (Bi-Directional)

Figure 1: Hairpin Cotter Pin

NMG/NMD, NFG/NFD (FK-5-1-12)
Cylinder Assembly

FG/FD, MG/MD (HFC-227ea)
Cylinder Assembly

Figure 2: Cylinder Assembly with Tags

Bi-directional Release Bracket
Installed in left far hole on right pull
Installed in right far hole on left pull

Installed in cable tie
with Left / Right Release Bracket

Figure 3: Cylinder Safety Pin in Storage Tie

4 Circuit

6 Circuit

8 Circuit

Figure 4: Shutdown Restart System (ESRS/MSRS)

Manual Only

Manual / Automatic

Figure 5: Pull Handle with Safety Pin and Tie

Work with 131-400 and 131-700 Series ESRS / MSRS Grey Relay Boxes

System Monitor and Engine Shutdown Control - Rectangle  131-460	System Monitor and Engine Shutdown Control – Round  131-461
System Monitor and Engine Shutdown Control with High Temp Sensor - Rectangle  131-462	System Monitor and Engine Shutdown Control with High Temp Sensor - Round  131-463
System Monitor and Engine Shutdown Control with Aux Zone - Rectangle  131-464	System Monitor and Engine Shutdown Control with Aux Zone - Round  131-465
System Monitor and Engine Shutdown Control with Low Pressure - Rectangle  131-466	System Monitor and Engine Shutdown Control with Low Pressure - Round  131-467

Figure 6A: Display Monitors and Part Numbers

Work with 131-200 Series ESRS Black Relay Boxes

Fire Suppression System Supervisory Panel - Rectangle  131-400	Fire Suppression System Supervisory Panel - Round  131-401
Fire System Monitor with Engine Shutdown Control - Rectangle  131-410	Fire System Monitor with Engine Shutdown Control - Round  131-411
Fire System Monitor with Engine Shutdown Control and High Temp Zone - Rectangle  131-420	Fire System Monitor with Engine Shutdown Control and High Temp Zone - Round  131-421
Fire System Monitor with Engine Shutdown Control and Auxiliary Zone - Rectangle  131-425	Fire System Monitor with Engine Shutdown Control and Auxiliary Zone - Round  131-426
Fire System Monitor with Engine Shutdown Control w/ Low Press Zone - Rectangle  131-427	Fire System Monitor with Engine Shutdown Control w/ Low Press Zone - Round  131-428

Figure 6B: Display Monitors and Part Numbers

Sea-Fire Marine - USA
9351 G Philadelphia Rd.
Baltimore, Maryland
Tel: (410) 687-5500
Website: www.Sea-Fire.com

or

Sea-Fire Europe, LTD
Unit D2
Discovery, Voyager Park
Portfield Rd.
Portsmouth, Hants
PO3 5FN, United Kingdom
Tel: +44(0)2392679666
Website: www.Sea-Fire.co.uk