

FIRE FLEX 1230

Integrated Fire Protection Systems

Standard Specifications

Self-contained
Clean Agent System
FM Approved Engineered FK-5-1-12

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System Supplied by

Control Fire Systems Ltd



PART 1 – GENERAL**1.0 Related Work in Other Sections**

- A. The work listed below shall be provided by others, or under other sections.
 - 1. Supply and install one dedicated 110VAC, 60Hz branch circuit to power the release control panel. Circuit breaker shall be well identified and locked.
 - 2. Supply and install interlock wiring & conduit for shutdown of HVAC, damper, electrical power supplies, or shunt trip breaker.

1.1 Standards & Codes

- A. The design, equipment, installation, testing and maintenance of the clean agent suppression system shall be in accordance with the applicable requirement set forth in the current edition of the following codes and standards:
 - 1. NFPA 2001 Standard on Clean Agent Fire Extinguishing Systems, 2012 edition.
 - 2. NFPA 70 National Electrical Code.
 - 3. NFPA 72 National Fire Alarm Code.
 - 4. NFPA 101 Life Safety Code
 - 5. U.S. Environmental Protection Agency, Protection of Stratospheric Ozone 59 FR 13044.
 - 6. National Building Code.
 - 7. National Fire Code
 - 8. CAN/ULC-S524 (Standard for the Installation of Fire Alarm Systems) – For Canada
 - 9. CAN/ULC-S537 (Standard for the Verification of Fire Alarm Systems) – For Canada
 - 10. Applicable local & State building codes
 - 11. Requirements of authority having jurisdiction (AHJ).
- B. The standards listed, as well as other applicable codes, standards, and good engineering practice shall be used as “minimum” design standards.

1.2 System Description

- A. Supply and install a self-contained **FireFlex® 1230**, integrated clean agent system with **engineered 1230** type as indicated, including:
 - 1. Integrated cabinet
 - 2. Clean agent suppression system
 - 3. Clean Agent Releasing Control Panel
- B. The integrated unit shall include an FM Approved SEVO clean agent system in a cabinet enclosure.
- C. Extinguishing agent shall be 1230, Dodecafluoro-2-methylpentan-3-one. trade name FK-5-1-12 fire extinguishing clean agent.

1.3 Design Requirements

- A. The **FK-5-1-12** system shall be a 500psi **engineered** type system. It shall have a minimum design of 4.5% volumetric concentration for Class A hazard and a minimum of 5.85% volumetric concentration for Class B hazard, minimum concentration for Class C hazard shall be at least 4.5% for spaces that contain electrical hazard less than 480V, at the minimum anticipated temperature with the protected area.
- B. System design shall not exceed 10% for normally occupied spaces, adjusted for maximum space temperature anticipated altitude and with provisions for room evacuation before agent release.
- C. System shall provide total flooding **FK-5-1-12** concentration in maximum 10 seconds for a 10 minutes holding time.

1.4 Submittals

- A. The fire protection contractor must prepare and submit for approval all installation drawings and hydraulic calculations as required by NFPA.
- B. Submit for approval a set of equipment data sheets which will include all technical data for **FireFlex® 1230** system.
- C. Supply a standardized Maintenance & Operation manual for the **FireFlex® 1230** system.
- D. This manual must include all necessary instructions to operate and maintain the system, and be explicit regarding the interaction between the clean agent suppression system and the controls and detection portion. Emergency procedures must form an integral part of the manual.
- E. Supply separate user manuals specific to the release control panel.

PART 2 - PRODUCTS

2.1 Clean Agent Cabinet

- A. Supply and install an integrated **FireFlex® 1230** clean agent cabinet with **FK-5-1-12** clean agent suppression system containing all hydraulic, pneumatic, fire extinguishing fluid and devices, and electrical components required for the control of an integrated clean agent system. A releasing control panel shall be integrated within the cabinet. System shall include the following:
 1. Self-contained unit in sturdy free-standing 14 gauge steel cabinet, measuring
 - 24" cabinet: 23" x 25" x 77 $\frac{1}{8}$ " (58 x 64 x 196 cm)
 - 36" cabinet: 35 $\frac{3}{4}$ " x 25" x 77 $\frac{1}{8}$ " (91 x 64 x 196 cm)
 - 46" cabinet: 46" x 25" x 77 $\frac{1}{8}$ " (117 x 64 x 196 cm)
 2. Textured rust proof coating, inside and outside, fire red, oven baked polyester powder on phosphate base (powder coated).
 3. One or two (depending on cabinet size) locked access doors to reduce front area required for opening, easily removable without tools to allow easy installation & servicing. They shall also be provided with a neoprene gasket to avoid.
- B. Integrated clean agent system
 1. SEVO 1230 clean agent storage cylinder assembly steel pressure vessel c/w pressure supervisory switch, manufactured, tested and stamped in accordance with applicable DOT and Transport Canada markings. The agent storage cylinder will be pressurized with 500 psi of nitrogen at the factory. Cylinders of 322 & 601 lbs capacity should also be provided with a liquid level indicator.
 2. Fire protection fluid (also known as FK-5-1-12). Agent shall not contain any hydro-fluorocarbons (HFCs).
 3. SEVO Discharge Valve Assembly shall be of brass construction and designed as per the pressure differential concept. It shall be complete with piston, seal, siphon tube, pressure gauge and releasing controls including electric actuator.
 4. A Pressure Supervisory Switch shall be provided on the SEVO cylinder to monitor the pressure within the cylinder should a loss of nitrogen occur. The low pressure switch is wired to a supervisory circuit to provide a Supervisory indication upon activation.
- C. Integrated release control panel
 1. Potter PFC-4410RC dual agent integrated control panel with emergency *batteries*, factory-assembled within the **FireFlex® 1230** enclosure.
 2. Field wiring terminal strips integrated with the cabinet for connection of field wiring.
- D. The clean agent cabinet assembly must be pre-assembled, pre-wired and factory tested under ISO-9001 conditions, as a **FireFlex® 1230** System, by FireFlex Systems Inc.
- E. The system shall be complete in all ways.
- F. The system shall incorporate all components required for complete system operation.

2.2 Integrated Control Panel

- A. The release control panel must be fully integrated to the **FireFlex® 1230** cabinet and installed in its own enclosure inside the cabinet, mounted at the factory.
 1. The control panel shall be FM Approved for clean agent release and in conformance to UL 864-9. Panel shall include four programmable Class B, Style B initiating zones, two class B supervisory zones, and four programmable output circuits. Onboard, menu-driven programming with pre-installed programs for ease of set-up must also be provided. The panel must be compatible with many different initiating devices including linear heat detection, smoke and heat detectors, water flow indicators, low air pressure switches, and manual pull stations.
 2. The control panel should include both an LCD Annunciator describing all system conditions (16 characters on 2 lines) and a set of red & yellow LED lamps identifying each separate alarm and trouble conditions. Easy to operate control buttons shall also be included for the operation of the panel various functions.
 3. The control panel should be pre-wired at the factory to a set of industrial grade wiring terminals used for power feed. External wiring to field devices (outside the cabinet) should also be wired by the installing contractor to the set of wiring terminals provided.
 4. A set of emergency batteries should be provided with the control panel. Batteries should be calculated to provide emergency power for 90 hours after which they shall be able to provide 10 minutes of alarm and activation of the solenoid valve(s).

2.3 Automatic & Manual Detection Devices

- A. Supply and install a complete electrical detection system including conduit, wiring, heat and/or smoke detectors, manual pull stations, abort stations and connections to auxiliary functions.
- B. Heat and/or smoke detectors should be wired on either Zones 1 or 2. Where more than the allowable quantity of detectors is required on a same detection zone, use the recommended 4-wire type detector base for that detector
- C. Manual pull stations shall be connected on Zone 4
- D. Abort stations, if installed, shall be "dead man" type and connected on Supervisory Zone 1

2.4 Notification Devices and signs

- A. Supply and install a complete notification system including Conduit, wiring, and notification devices.
- B. The NAC devices (24 Vdc bell, horn or strobe) must be compatible with the release control panel.
- C. Audible & visual pre-discharge alarms shall be provided within the protected area to give positive warning of impending discharge.

2.5 Caution & Advisory Signs

- A. Warning and instruction signs at entrance to and inside protected areas shall be provided.
- B. A manual discharge sign is required at each manual release station and clearly indicate which hazard is controlled by the station.

2.6 Sequences of operation

- A. System sequence of operation shall be pre-set at the factory and perform the following:
 - 1. Actuation of **either** detection Zone 1 or Zone 2 shall:
 - a) Energize 1st alarm signalization circuit
 - b) Transfer alarm contact
 - 2. Actuation of **both** detection Zone 1 and Zone 2 shall:
 - a) Energize 2nd alarm signalization circuit
 - b) Transfer alarm contact
 - c) Start pre-discharge delay (not to exceed 60 seconds)
 - d) System abort sequence is enabled at this time
 - 3. Actuation of manual pull station Zone 4 shall:
 - a) Energize 2nd alarm signalization circuit
 - b) Transfer alarm contact
 - c) Start pre-discharge delay (not to exceed 30 seconds)
 - d) System abort sequence is NOT available
 - 4. After completion of the pre-discharge delay shall:
 - a) Energize the electric actuator
 - b) Discharge of the clean agent
 - c) Transfer discharge contact via **optional** discharge pressure switch
 - 5. Activation of the abort circuit perform the following:
 - a) Pre-discharge timer will continue to count down until it reaches 10 seconds and then stop.
 - b) Releasing the abort release switch will allow the pre-discharge to continue its count down from 10 seconds.
 - c) If the abort release switch is again activated before the pre-discharge timer reaches 0 seconds, the timer will reset to 10 seconds and hold.
 - d) Abort does not function and has no effect on panel operation from zones programmed as Manual RELEASE.

2.7 Clean Agent System Piping,

- A. Distribution piping and fittings shall be installed in accordance with the manufacturer's requirements, NFPA 2001, and approved piping standards and guidelines. All distribution piping shall be installed by qualified individuals using accepted practices and quality procedures. All piping shall be adequately supported and anchored at all directional changes and nozzle locations
 - 1. The piping between the storage cylinders and nozzles should be the shortest route with the minimum elbows and fittings allowable. Use schedule 40 seamless ASTM A53 or A 106.
 - 2. Cast iron pipe, steel pipe conforming to ASTM A 120, or non-metallic pipe shall not be used.
 - 3. All piping shall be reamed, blown clear and swabbed with suitable solvents to remove burrs, mill varnish and cutting oils before assembly.
 - 4. All pipe threads shall be sealed with Teflon tape pipe sealant applied to the male thread only.
 - 5. Fittings shall be ASTM A-197 Malleable Iron Class 300 type.
 - 6. All piping must be rigidly supported. All supports and parts shall conform to the requirements for pressure piping ANSI B31.1 and U.L. Listed. All drops using 180 degree nozzles require back bracing in the opposite direction of the discharge.

2.8 Clean Agent Nozzles

- A. Nozzles shall be SEVO 1230 **Engineered** Nozzles. 360° (central) and 180° (sidewall) nozzles shall be installed as per the manufacturer's recommendation in the design manual.

PART 3 - EXECUTION**3.1 Installation**

- A. The installation must meet National & Local standards and be done according to all applicable laws, regulations and codes.
- B. The proper operation and coordination for the system's installation, including the clean agent system, detection system, signaling system and initial start-up are all under the responsibility of the fire protection contractor.

3.2 Training

- A. The fire protection contractor must plan and organize a training session of at least two hours for the building maintenance staff, in the presence of building owner or his representative.
- B. The training session must include the normal operation, emergency procedures and maintenance of the system.

3.3 Tests and Verifications

- A. The verification of the fire alarm system must be done in accordance with NFPA 72 requirements.
- B. The verification of the clean agent must be done in accordance with NFPA 2001 requirements.
- C. The general contractor shall be responsible for sealing and securing the protected spaces against agent loss and/or leakage during the 10-minutes "hold" period.
- D. The clean agent system piping shall be pneumatically tested in a close circuit for a period of 10 minutes at 40 psi (2.8 bars). At the end of the 10 minutes, the pressure drop shall not exceed 20% of the test pressure. The pressure test can be omitted in the case where the total piping contains no more than one change in direction fitting between the storage cylinder and the discharge nozzle, and where all piping is physically checked for tightness.
- E. A room pressurization test shall be conducted by the installing contractor in each protected space to determine the presence of openings which would affect the agent concentration levels. All testing shall be made in accordance with NFPA 2001, Annex C.
- F. If the room pressurization testing indicates that openings exist which would result in leaks and/or loss of the extinguishing agent, the installing contractor shall be responsible for coordinating the proper sealing of the protected space(s) by the general contractor, sub-contractor or agent. The installing contractor shall inspect all work to ascertain that the protected space(s) have been adequately and properly sealed.

3.4 Report & Certificate

An inspection report and a certificate must be supplied by the fire protection contractor to the engineer, owner or owner's representative at the completion of the project. All tests results shall be duly registered in a booklet to be included with the inspection report.