

1. GENERAL SPECIFICATION

- 1.1 The contractor shall provide a Kidde Scorpio microprocessor based, conventional, single hazard Fire Alarm-Suppression Control Panel as described in subsequent sections of this specification to perform the following functionality:
 - A. Fire Alarm, Supervisory and Trouble event initiation
 - B. Occupant notification
 - C. Event annunciation
 - D. Safety procedures activation and required equipment interlocks
 - E. Fire Suppression System release
- 1.2 The contractor shall supply the complete Fire Alarm-Suppression Control System with components that shall include but not be limited to the following (unless prohibited by Codes and Standards referenced in Section 2):
 - A. Suppression System as described elsewhere.
 - B. Fire Alarm-Suppression Control Panel
 - C. Detection System consisting of Smoke and (or) Heat Detectors
 - D. Manual Release Stations
 - E. Abort Stations
 - F. Audio-Visual Notification Appliances
- 1.3 All of the Fire Alarm-Suppression Control System components as listed in Section 1.2 above must be manufactured and/or supplied by Kidde Fire Systems, 400 Main Street, Ashland, MA 01721, U.S.A., phone: (508) 881-2000,

URL: <http://www.kiddefiresystems.com>
- 1.4 The manufacturer shall warrant the Kidde Scorpio Fire Alarm-Suppression Control System, Fenwal Detectors and peripheral products manufactured by it for a period of eighteen (18) months from the date of shipment.
- 1.5 The manufacturer shall warrant the Kidde Scorpio Fire Alarm-Suppression Control System, Fenwal Detectors and peripheral products manufactured by it for a period of eighteen (18) months from the date of shipment.
- 1.6 The system shall be supplied and installed by a factory authorized Kidde Fire Systems distributor. The distributor shall be trained by the manufacturer to design, install, test and maintain the Kidde Scorpio Fire Alarm-Suppression system and shall be able to produce a certificate stating such on request.

- 1.7 The factory authorized Kidde Fire Systems distributor shall confirm in writing that he stocks a full complement of spare parts and offers 24-hour emergency service for all equipment being furnished.
- 1.8 All materials and equipment used for this project shall be new and unused.

2. CODES/STANDARDS COMPLIANCE

- 2.1 The design, installation, testing and maintenance of the Fire Alarm-Suppression system shall be in accordance to the following codes, standards and regulatory bodies:
 - A. NFPA12: Standard on Carbon Dioxide Extinguishing Systems
 - B. NFPA 12A: Standard on HALON 1301 Fire Extinguishing Systems
 - C. NFPA 17: Standard for Dry Chemical Extinguishing Systems
 - D. NFPA 17A: Standard for Wet Chemical Extinguishing Systems
 - E. NFPA 70: National Electrical Code
 - F. NFPA 72: National Fire Alarm Code
 - G. NFPA 75: Standard for the Protection of Electronic Computer / Data Processing Equipment
 - H. NFPA 76: Fire Protection of Telecommunications Facilities
 - I. NFPA 2001: Standard for Clean Agent Fire Extinguishing Systems
 - J. Factory Mutual Approval Guide (latest edition).
 - K. Underwriters Laboratories, Inc. listings.
 - L. Requirements of the local Authority Having Jurisdiction.
- 2.2 All of the components of the Fire Alarm-Suppression system shall be listed/approved by Underwriters Laboratories Inc (UL/cUL/ULC), Factory Mutual System (FM), California State Fire Marshal (CSFM) and Materials and Equipment Acceptance Division of New York City (MEA).
- 2.3 The manufacturer of the Fire Alarm-Suppression system shall have a minimum of 15 years experience in the design, production and distribution of fire detection, fire alarm and fire suppression systems.
- 2.4 The manufacturer of the Fire Alarm-Suppression system shall be certified to ISO 9001 for a minimum period of 5 years for the design, production and distribution of fire detection, fire alarm and fire suppression systems.

3. SYSTEM DESCRIPTION

- 3.1 The Kidde Scorpio Fire Alarm-Suppression Control Panel shall provide control for one (1) suppression zone or hazard. The Control Panel shall be of a single board design and construction and must be factory equipped with all required controls as described in subsequent sections for one suppression hazard.
- 3.2 The Kidde Scorpio Fire Alarm-Suppression Control Panel shall be listed to be compatible with Fenwal Conventional point-type Ionization and Photoelectric Detectors, Normally Open contact type Thermal Detectors and switches; Kidde Solenoid operated Control Heads and Fenwal Audio-Visual Notification Appliances.
- 3.3 All System components provided with a key-lock feature shall be keyed alike.

4. COMPONENTS – DESCRIPTION AND OPERATION

- 4.1 The Kidde Scorpio Fire Alarm-Suppression Control Panel shall consist of a Printed Circuit Board with the main microprocessor, a primary Power Supply Unit and a 24 VDC Battery backup complete with Battery Charger in an 18 gauge painted NEMA 1 steel enclosure with door. The enclosure shall be size capable of housing the Printed Circuit Board, the Power Supply Unit and a Battery of capacity 1.2 AH at 24 VDC. Enclosures intended for use in Canada shall be provided an additional steel dead-front plate.
- 4.2 The Control Panel shall operate on 120 or 240 VAC 50/60 Hz Mains Supply.
- 4.3 The battery backup system shall consist of 24 VDC, maintenance free, sealed lead acid batteries of 1.2 AH capacity such as to provide for 24 hours of Standby operation followed by 5 minutes of Alarm operation in the case of AC Mains failure. The battery charger shall be capable of providing a charging current of 0.48 Amperes.
- 4.4 The Control Panel shall supervise and control the overall system operation, including the execution of the site-specific configuration. The Printed Circuit Board shall contain the main system microprocessor and shall provide the following components and circuits:
 - A. 14 Light Emitting Diodes (LEDs) to indicate the following conditions:
 - 1. Power ON: Green
 - 2. System Trouble: Yellow
 - 3. Zone 1 Alarm: Red
 - 4. Zone 1 Trouble: Yellow
 - 5. Zone 2 Alarm: Red

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| 6. Zone 2 Trouble: | Yellow |
| 7. Manual Release Alarm: | Red |
| 8. Manual Release Trouble: | Yellow |
| 9. Abort Active: | Yellow |
| 10. Abort Trouble: | Yellow |
| 11. Supervisory ON: | Yellow |
| 12. Supervisory Trouble: | Yellow |
| 13. Signal Silenced: | Yellow |
| 14. Release Output Trouble: | Yellow |
- B. The Printed Circuit Board shall be provided Control Switches for System Reset and Signal Silence and a system buzzer to annunciate each Alarm, Supervisory or Trouble event.
- C. The Kidde Scorpio shall be provided the following Input and Output Circuits:
1. 2 Initiating Device Circuits in Style B supervision.
 - ◆ Each circuit shall allow a field wire resistance of 50 ohms per loop and shall be capable of supporting Normally Open contact-type alarm devices as well as a minimum of 15 Fenwal Conventional point-type smoke detectors in any combination. The Initiating Device Circuits shall be configurable to activate the Suppression System either on the occurrence of a first alarm or in the case of a cross-zone alarm.
 - ◆ The contractor shall only utilize Fenwal smoke detectors that have been UL listed for compatibility with the Kidde Scorpio panel.
 2. 1 Manual Release Circuit in Style B supervision.
 - ◆ The circuit shall be capable of supporting Kidde Manual Pull Stations using Normally Open contacts and shall allow a field wire resistance of 50 ohms. The release of Agent subsequent to the operation of the Manual Release shall be configurable to be either instantaneous or delayed. If delayed, the time delay shall be the same as set for the automatic release except that it shall not exceed 30 seconds. The operation of the Manual Release shall override any existing Abort Station input.
 - ◆ The contractor shall only utilize Kidde Pull Stations for the project.

3. 1 Abort Circuit in Style B supervision.
 - ◆ The circuit shall be capable of supporting Kidde Abort Stations using momentary Normally Open contacts and shall allow a field wire resistance of 50 ohms. The circuit shall be configurable to operate in one of the following three modes:
 - Abort Mode 1 per UL 864. On activation, timer holds at 10 seconds. On release, countdown continues to zero.
 - Abort Mode 2. On activation, timer resets to initial value. On release, countdown continues to zero.
 - Abort Mode 3 per IRI for cross-zoned systems. Shall be similar to Abort Mode 1. Activation must be during pre-release.
 - ◆ The contractor shall only utilize Kidde Abort Stations for the project.
4. 1 Supervisory Circuit in Style B supervision.
 - ◆ The circuit shall be capable of supporting switches using Normally Open contacts and shall allow a field wire resistance of 50 ohms.
5. 1 Notification Circuit in Style Y supervision.
 - ◆ The circuit shall be capable of supporting Fenwal 24 VDC Audio-Visual Notification appliances and shall provide 0.5 Amperes of notification power at 24 VDC. When configured for cross-zone operation, the Notification Circuit shall pulse on First Alarm and provide a steady output on cross-zone.
 - ◆ The contractor shall only utilize Fenwal Alarm Signals for the project.
6. 1 Agent Release Circuit in Style Y supervision.
 - ◆ The Agent Release Circuit shall be capable of operating either 1 or 2 Kidde 24 VDC Control Heads.
 - ◆ The contractor shall only utilize the following release devices that have been UL listed for compatibility with the Kidde Scorpio panel:
 - Kidde 24 VDC Control Head P/N 890181
 - Kidde 24 VDC Control Head P/N 899175
 - Kidde 24 VDC Control Head P/N 48650001

- ◆ The circuit design shall be such that no additional module(s) are required to be wired between the Kidde Scorpio terminals and the Release Devices listed above for proper operation of the Suppression System. The circuit shall be capable of being isolated to enable system maintenance.
 - ◆ The circuit shall provide activation power to Control Heads for 90 seconds.
 - ◆ The circuit shall be configurable so that release of agent in the affected area may either be instantaneous or delayed by a maximum of 30 seconds. The site-specific time delay shall be configurable up to the maximum allowed in steps of 10 seconds.
7. 1 System Alarm Relay.
- ◆ The Alarm Relay shall be normally de-energized and shall have Form-C contacts rated 2 Amps at 250 VAC / 30 VDC. The relay shall be latching and shall transfer on any alarm in the system.
8. 1 System Trouble Relay.
- ◆ The Trouble Relay shall be normally energized and shall have Form-C contacts rated 2 Amps at 250 VAC / 30 VDC. The relay shall be non-latching and shall transfer on any trouble in the system.
9. 1 System Programmable Alarm Relay.
- ◆ The Programmable Alarm Relay shall be normally de-energized and shall have Form-C contacts rated 2 Amps at 250 VAC / 30 VDC. The contacts shall be programmable to transfer and latch on any one of the following conditions:
 - A System Agent Pre-Release condition
 - A System Agent Release condition
10. 1 Auxiliary Power Supply Circuit.
- ◆ When used in conjunction with the Alarm Relays, the auxiliary Power Supply Circuit shall supply unsupervised power up to 0.25 Amps at 24 VDC. This supply may be used for up to one additional Notification Appliance provided it is installed in the same room with all its wiring in conduit.
11. All Input and Outputs shall be provided appropriate numbers of terminals of capacity suitable for 18 to 12 AWG wiring.

4.5 Kidde Scorpio Control Panel System Diagnostics

- A. The Kidde Scorpio Control Panel shall be provided a diagnostic feature to enable the determination of the following trouble conditions:
 - 1. AC Fault
 - 2. Ground Fault
 - 3. Battery Fault
 - 4. Signal Circuit Open
 - 5. Signal Circuit Short
- B. The Kidde Scorpio Control Panel shall be provided a Lamp Test feature to test the operation of all LEDs on the Printed Circuit Board.

4.6 Fenwal CPD-7051 Ionization Detectors

- A. The Ionization Detector shall be a dual chamber, low profile, conventional type that senses both visible and invisible products of combustion.
- B. The sensing chamber shall permit a full 360° smoke entry.
- C. The Detector shall mount to a twist-to-lock base, Model 2WB.
- D. The Detector shall be suitable for open-air velocities up to 2,000 fpm and shall have a nominal sensitivity of 1.3% obscuration per foot. It shall be possible to perform a sensitivity check on the detector without the need for generating smoke.
- E. The strength of the Americium 241 radioactive source shall not exceed 0.7 microcurie. Detectors with higher radioactive strengths shall not be acceptable.
- F. The Detector shall be provided a response LED. This LED shall flash to indicate power and shall light up steady with full brilliance on alarm.
- G. All field wire connections shall be made to the base through the use of a clamping plate and screw.

4.7 Fenwal PSD-7155, PSD-7155P and PSD-7156 Photoelectric Detectors

- A. The Photoelectric Detector shall be a light-scattering, low profile, conventional type that senses a broad range of smoldering and flaming-type fires.
- B. The sensing chamber shall permit a full 360° smoke entry.
- C. The Detector shall mount to a twist-to-lock base, Model 2WB.

- D. The PSD-7155 and PSD-7156 detectors shall be suitable for open-air velocities up to 300 fpm and shall have a nominal sensitivity of 1.47 to 3.75% obscuration per foot. The PSD-7155P Detector shall be suitable for open air velocities up to 4,000 fpm and shall have a nominal sensitivity of 0.83 to 2.00% obscuration per foot. It shall be possible to perform a sensitivity check on the detector without the need for generating smoke.
- E. The Detector shall be provided a response LED. This LED shall flash to indicate power and shall light up steady with full brilliance on alarm.
- F. The PSD-7156 Detector shall include a thermister heat detector with 135°F (57°C) set point which operates independent of the smoke detector operation.
- G. All field wire connections shall be made to the base through the use of a clamping plate and screw.

4.8 Typical Sequence of Operation

- A. Activation of the extinguishing system shall be via crossed-zoned smoke detection. One half of the crossed-zoned smoke detection system shall consist of PSD-7155, PSD-7156 or PSD-7155P Photoelectric Detectors and the other half of CPD-7051 Ionization Detectors.
- B. Photoelectric Detectors shall be used as the primary pre-alarm detection system because they are more likely to alarm during the pre-combustion or early stages of the fire development. Ionization Detectors shall be utilized primarily as a fire-confirmation detector to ensure the presence of a flame before the extinguishing system is discharged. Ionization Detectors are small-particle detectors and are more likely to respond to flaming fires. All of the gaseous extinguishing agents are only effective on flaming fires, and must not be discharged during the incipient or smoldering stages of a fire.
- C. Spot-type detectors from each half of the crossed-zoned detection system shall be alternated throughout the protected area. It shall require the activation of at least one detector from each of the two crossed-zoned detector groupings to trigger the automatic release of the extinguishing system.
- D. Systems that use multi-criteria detectors that cannot be programmed to respond to the various stages of fire development, or systems that do not use different smoke detection principles to confirm the presence of a flaming fire, shall not be considered as equivalent or as meeting the intent of this specification.

- E. Activation of any smoke detector in the suppression zone shall:
 - 1. Cause a pre-alarm condition
 - 2. Create an audible and visible indication on the control unit display
 - 3. Display the zone of the detector in alarm
 - 4. Activate audible notification appliances (e.g., bells) in the affected area
 - 5. Perform any necessary control functions such as HVAC equipment shutdown and activate any safety procedures such as closing doors
- F. Activation of a smoke detector from each of the two crossed zones shall:
 - 1. Cause a pre-release condition
 - 2. Create an audible and visible indication on the control unit display
 - 3. Display the zones of the detectors in alarm
 - 4. Initiate a programmable time delay
 - 5. Activate audible and visual notification appliances (e.g., horns and strobes) in the affected area
 - 6. Perform any necessary control functions such as the closure of dampers and activate any safety procedures such as closing doors.
- G. The system shall, upon expiration of the time delay,
 - 1. Cause a release condition and energize the control head to discharge the extinguishing agent into the protected area
 - 2. Continue to activate the audible and visual notification appliances (i.e., strobes) in the affected area
 - 3. Perform any necessary control functions such as the emergency power off of all electrical equipment except for lighting and circuits required for life safety.
- H. The extinguishing system shall be capable of manual activation by Dual Action Manual Release Stations. Operation of a Manual Release Station shall cause all alarm and shutdown devices to operate as if the system had operated automatically and shall cause an immediate activation of the fire extinguishing system. Operation of a Manual Release Station shall override the operation of all Abort switches.

- I. Abort Stations shall, when operated, interrupt the countdown delay for the activation of the extinguishing system and prevent the operation of any alarms and control functions associated with the discharge of the extinguishing agent. The abort switches shall be momentary, dead-man type devices that require a constant force to remain engaged and active. Manual Release Stations shall override the operation of any Abort Station. Abort Station shall be configured for operation according to the requirements of the authority having jurisdiction.

4.9 General Electrical Materials

- A. All electrical enclosures, raceways, and conduits shall be provided and installed in accordance with applicable codes and intended use, and shall contain only those electrical circuits associated with the fire detection and control system. No circuit or circuits that are unrelated to the fire- suppression system shall be routed through the enclosures, raceways, and conduits dedicated to the fire suppression system.
- B. All conductors shall be enclosed in rigid or thin walled, steel conduit unless open wiring is permitted by the local electrical code.
- C. Any conduit or raceway exposed to dampness or other similar conditions shall be properly sealed and installed to prevent moisture entrapment. Provisions for draining and drying shall be employed as required.
- D. All wiring shall be of the proper size to conduct the circuit current, but shall not be smaller than #18 AWG unless permitted by the local electrical code. Wire that has scrapes, nicks, gouges, or crushed insulation shall not be used. The manufacturer's minimum wire-bending radii shall be observed in all enclosures, raceways, and conduits. Aluminum wire shall not be used.
- E. Splicing of circuits shall be kept to a minimum, and is only permitted in an electrical box suitable for the purpose. Appropriate hardware shall be used to make the wire splices. Wires that are spliced together shall have the same color insulation.
- F. White colored wire shall be used exclusively for the identification of the neutral conductor of an alternating-current circuit. Green colored wire shall be used exclusively for the identification of the earth-ground conductor of an AC or DC circuit.
- G. Appropriate color-coding shall be utilized for all other field wiring.
- H. All electrical circuits shall be numerically tagged with suitable markings at each terminal point. All circuits shall correspond with the installation drawings.

5. SUBMITTALS

- 5.1 The factory-authorized Kidde Fire Systems Distributor shall provide the following drawings and documentation, acceptable to the local AHJ, for approval prior to starting any work on the project:
- A. Installation and Electrical layouts drawn to the scale depicting the locations and mounting details of the all equipment
 - B. Details of Auxiliary functions required such as equipment shutdown, door holders, etc.
 - C. The complete point-to-point conduit routing plan.
 - D. Internal Wiring Diagrams for the Kidde Scorpio showing the power supply requirements and all field wire terminations.
 - E. Calculations performed in accordance with the Manufacturers recommendations to justify the capacities of all standby batteries used on the system.
 - F. A document detailing the sequence of system operations and outputs provided on the receipt of individual system activation inputs.
- 5.2 The contractor shall submit a test plan that describes how the system shall be tested. This shall include a step-by-step description of all tests and shall indicate type and location of test apparatus to be used. Tests shall not be scheduled or conducted until the engineer of record approves the test plan.
- 5.3 The contractor shall submit Ten (10) copies of shop drawings and product data sheets.
- 5.4 The contractor shall submit Five (5) copies of the Kidde Scorpio Design, Installation, Operation and Maintenance Manual after complete installation.

6. SYSTEM INSTALLATION, COMMISSIONING AND MAINTENANCE

- 6.1 The contractor shall install the system in accordance with the manufacturer's installation, operation and maintenance manual.
- 6.2 The contractor shall be certified and trained by the manufacturer on design, installation, operation and maintenance of the Kidde Scorpio Fire Alarm-Suppression Control System. The certification must be valid throughout the completion time period for the project.
- 6.3 The contractor shall record all equipment, tests and system configurations in a format approved by the manufacturer and/or the local Authority Having Jurisdiction. A copy of the commissioning results shall be provided to the end-user.

- 6.4 The Kidde Scorpio System shall be maintained as recommended by the manufacturer's Design, Installation, Operation and Maintenance Manual, the relevant NFPA Codes and the requirements of the local Authority Having Jurisdiction.