

1. GENERAL

1.1 INTENT OF SPECIFICATIONS

- A. This specification details the requirements for an engineered clean agent / waterless fire suppression system Model Kidde ECS-500 using Fluoro-K Fire Suppression Agent. The detection & control subsystem shall consist of the AEGIS 2.0 Suppression Fire Alarm Control Unit (FACU) utilizing conventional detectors for initiation of fire signals. These requirements, combined with good engineering practices must be followed in order to produce a safe and effective fire protection and suppression system.
- B. All system components shall be manufactured and/or supplied by Kidde Fire Systems, 400 Main Street, Ashland, MA 01721, USA; Phone (508) 881-2000; URL: [http:// www.kiddefiresystems.com](http://www.kiddefiresystems.com)
- C. All agent, materials and equipment shall be new and unused. Recycled or reclaimed products shall not be acceptable

1.2 System Description

- A. The clean agent suppression system shall be a total flooding type Kidde ECS-500 using Fluoro-K Fire Suppression Agent.
- B. The system hardware shall consist of Fluoro-K Agent in Cylinder(s) super-pressurized with Nitrogen to 500 psig at 70F (34.5 bar at 21C) and discharged into the affected area using discharge nozzle(s) attached to a pipe network.
- C. The suppression system shall comply with the NFPA 2001 (latest edition), UL 2166 and FM5600 requirements to supervise the placement of electrical solenoid on cylinder valves and selector/directional valves. Removal of the electrical actuator shall generate a supervisory condition with appropriate audio and visual indication on the fire alarm-suppression control unit. Systems that do neither supervise for placement of solenoids nor feature tamper proof hardware that prevent the removal of the system solenoids are not UL listed and FM approved and are not acceptable.
- D. The AEGIS 2.0 Conventional Suppression Fire Alarm Control Unit (FACU) unit shall perform fire alarm, supervisory, and trouble event initiation; occupant notification; event annunciation; local control functions; fire extinguishing system release, [OPTIONAL] and off premises transmission.
- E. The FACU shall have dual release capabilities, where each release circuit shall be capable of complete independent operation with different time delays and abort functions.
- F. FACUs intended for suppression release function shall feature release circuits protected against inadvertent activation by a Triple Failure Redundancy (Triple-R™) safeguard system that shall require the microprocessor to issue two commands of opposite polarity via two separate signaling channels, combined with a signal from the FACU's watchdog timer confirming proper microprocessor operation, prior to activation. FACUs featuring release circuits that are not similarly protected or those that use simple notification appliance circuits to control agent release shall not be accepted as equal.
- G. Suppression System FACUs shall be monitored remotely in real-time with event notification pushed to web and phone apps for use by plant personnel and service provider.

1.3 CODES AND COMPLIANCE

- A. The design, installation, testing and maintenance of the integrated fire suppression system shall be in accordance with the following applicable codes, standards and regulatory bodies:
 1. NFPA 2001: Clean Agent Fire Extinguishing Systems
 2. NFPA 70: National Electrical Code (NEC)
 3. NFPA 72: National Fire Alarm and Signaling Code
 4. NFPA 75: Protection of Electronic Computer/Data Process Equipment
 5. NFPA 76: Fire Protection for Telecommunications Systems
 6. NFPA 92A: Recommended Practice for Smoke Control Systems
 7. UL 864-10: Control Units and Accessories for Fire Alarm Systems
 8. UL 2166: Halocarbon Clean Agent Extinguishing System Units
 9. UL 268-8: Standard for Smoke Detectors for Open Areas
 10. UL 268A: Standard for Smoke Detectors for Duct Application
 11. ANSI B1.20.1: Standard for Pipe Threads, General Purpose
 12. Factory Mutual
 13. Requirements of the Local Authority Having Jurisdiction
 14. Manufacturer's Design, Installation, Operation & Maintenance Manual
- B. The complete fire-alarm suppression system shall have the applicable following listings and approvals:

1. Underwriters Laboratories, Inc. (UL)
2. Factory Mutual Global (FM)

1.4 QUALIFICATIONS

A. Manufacturer

1. The manufacturer/supplier of the system hardware and components shall have a minimum of fifteen (15) years' experience in the design and manufacture of systems of similar type.
2. The manufacturer/supplier of the systems shall be certified to ISO 9001 for a minimum period of five (5) years for the design, production and distribution of fire detection, fire alarm and fire suppression systems.
3. The manufacturer/supplier name and part number shall appear on all major components.
4. All equipment shall be provided by the same manufacturer / supplier.

B. Contractor

1. The system shall be supplied and installed by a factory authorized, Kidde Fire Systems distributor. The Contractor shall be trained by the manufacturer to calculate/design, install, test and maintain the system and shall be able to produce a certificate stating such on request.
2. The Contractor shall employ a person who can show proficiency at least equal to a NICET level III or IV certification in special hazards design.
3. The Contractor shall confirm in writing that they stock a full complement of spare parts and offer 24-hour emergency service for all equipment being furnished.

1.5 WARRANTY

- A. The manufacturer shall warrant the system equipment for 36-months from the date of shipment from the factory
- B. The contractor shall warrant the installation for 12-months from time of customer acceptance or commissioning

1.6 SUBMITTALS

- A. The architect will review all submittals for conformance to the drawings and specifications. The contractor shall be required to resubmit any materials, with appropriate modifications, that are found to be in non-conformance with the requirements of the drawings and these specifications after review by the architect. Approval of the submittals by the architect shall not relieve the Contractor of their responsibility to meet the requirements of the drawings and specifications.
- B. The contractor shall submit the manufacturers' product technical data and catalog cut sheets for each component or device used in the system
- C. Engineered Design Drawings: The Contractor's NICET-III or IV certified designer shall design the system and provide documents that shall include but are not limited to the following details:
 1. Plan, elevation and isometric drawings showing the location, installation and mounting details of the agent cylinders, valves, nozzles and other accessories.
 2. Design calculations for enclosure volume, agent quantity based on required design concentration for each hazard area.
 3. Dimensions, weights and loads of equipment assemblies, components, method of field assembly, clearance requirements, mounting and bracing practices, etc
 4. Flow Calculation Reports showing the following:
 - i. Customer information and project data
 - ii. Hazard information shall include the minimum design concentration and adjusted design concentration, minimum and maximum enclosure ambient temperature, minimum agent required, volume of enclosures and any corresponding non-permeable volume.
 - iii. Cylinder information shall include total agent required, cylinder capacity, cylinder part number, cylinder quantities (both main and reserve), agent fill amount per cylinder and floor loading per cylinder.
 - iv. Pipe network information shall include pipe type, pipe diameter, pipe length, change in elevation, pipe equivalent length and the equivalent length of any added accessory.
 - v. Nozzle information shall include the number of nozzles, flow rate per nozzle, nozzle nominal pipe size, nozzle type and nozzle orifice area.
 - vi. Pipe fittings information shall include a detailed list by nominal diameter and quantity.
 - vii. Pressure venting area required, calculated on the basis of enclosure strength as per NFPA-2001 requirements.

5. Any other requirements of NFPA-2001 latest edition.
 6. Plan and riser drawings showing the location of the FACU and the locations and necessary installation and mounting details of all field devices such as smoke detectors, manual-release stations and notification appliances.
 7. A primary-power calculation that details the power requirements for the FACU and all field devices such as smoke detectors, notification appliances and releasing solenoids. Include the required capacity of the main AC power-line feed from the commercial power and light company.
 8. A secondary power calculation that shows the quiescent and alarm power requirements for the FACU and all field devices. Include the periods of time for which the quiescent and alarm power requirements shall be supported in order to determine the necessary standby battery capacity.
 9. Conduit routings shall be shown, with number of conductors, type of wire, and wire sizes indicated for each conduit segment.
 10. Point-to-point wiring diagram showing the termination points for all field-wiring circuits to the internal PCB. All internal wiring and communications cabling shall be shown.
 11. Any other requirements of the latest edition of the relevant NFPA codes.
 12. A complete component and equipment list with model numbers and Kidde part numbers.
 13. Product information sheets for each item of equipment.
 14. A document describing the sequence of operation and system functionality.
 15. A detailed matrix of all the initiating points, control modules, and field circuits that identifies the labeling of all components and shows the relationships and activation sequences among the various initiating points and the control modules and / or field circuits
- D. Commissioning Equipment List: The Contractor shall provide a commissioning equipment list for each installed system. The equipment list shall identify all installed equipment and configurations.
- E. Test Plan: The Contractor shall submit a test plan that describes how the system equipment and room integrity 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. At a minimum, the tests to be conducted shall be per NFPA 2001 and NFPA72 and any additional supplemental tests required by the AHJ. Tests shall not be scheduled nor conducted until the engineer of record or end user's representative approves the test plan.
- F. The Contractor shall submit the following Installation drawings
1. Four (4) sets of installation drawings for each installed clean agent fire extinguishing system and one (1) set of calculation reports, owner's manuals and product data sheets shall be submitted to the end-user/owner.
 2. A description of system functionality and a detailed matrix of all the initiating points, control modules, and field circuits that identifies the labeling of all components and shows the relationships and activation sequences among the various initiating points and the control modules and/or field circuits.
 3. Upon completion of installation and commissioning acceptance, two (2) sets of "As-Built" installation drawings and One (1) set of the calculation report for each installed system shall be submitted to the owner/end-user.
- G. The Contractor shall submit the following Manuals after complete installation
1. Two (2) copies of the ECS-500 Fluoro-K Design, Installation, Operation and Maintenance Manual.
 2. Two (2) copies of the FACU Installation, Operation and Maintenance Manual

2. PRODUCT REQUIREMENTS

2.1 System Exclusions

Room sealing requirements shall be communicated and coordinated between the suppression system contractor and the project's main General Contractor and all sub-contractors.

2.2 Agent Concentration Requirements

- A. The system shall be designed to suppress Class A / B / C (select option) fires.
- B. The agent design concentration achieved shall be as per NFPA 2001 latest edition.
- C. In no case shall the design concentrations exceed the Lowest Observed Adverse Effects Level (LOAEL) for the agent as published in NFPA 2001

- 2.3 System Performance
- A. System Discharge
 - 1. The discharge time required to achieve 95% of the minimum design concentration for flame extinguishment shall not exceed 10 seconds.
 - B. Duration of Protection
 - 1. 85% of the minimum design concentration shall be maintained for 10-minutes or a sufficiently longer period of time to allow effective emergency action by trained personnel.
 - C. Nozzle performance
 - 1. Both 180-degree and 360-degree nozzles shall be listed to be mounted at heights up to 16 feet (4.87 m) from the floor.
 - 2. Both 180-degree and 360-degree nozzles shall be listed to cover an area of 35.6 ft x 35.6 ft (10.9 m x 10.9 m).
- 2.4 Cylinder Locations:
- A. The agent and nitrogen driver cylinders shall be suitable for being located up to 180 ft of equivalent length from the top of the riser to the first tee in the protected area.
 - B. The system shall deliver 95% of its contents within 10 seconds of the start of the discharge.
 - C. The flow calculation report submitted shall verify this performance requirement.
 - D. The inability to meet the design requirements and selected cylinder locations by any system will be considered as not meeting the intent of the specification.
- 2.5 Cylinder Assemblies
- A. The Fluoro-K agent shall be stored in cylinders manufactured and marked in accordance with US Department of Transportation (DOT) specification 4BW-500 and Transport Canada (TC) specification 4BW-M34. The agent cylinders shall be conditioned to 500 PSIG @ 70°F (34.5 bar gauge @ 21°C).
 - B. The system manufacturer shall provide US DOT documentation proving that the registration number marked on the agent cylinders corresponds to a USA based manufacturing location.
 - C. The Fluoro-K agent cylinders shall comply with the following:
 - 1. Cylinders of capacity 100 lbs and above (125 to 1100 lb.) shall be equipped with a permanent integral liquid level indicator (LLI) to enable the owner's representative measure the weight of agent in each individual cylinder without having to physically move or lift the cylinders. Systems without integral LLIs shall not be considered as equal.
 - 2. The cylinders shall have a pressure gauge to indicate the actual container pressure
 - 3. The cylinders shall have a low-pressure switch to electrically signal a supervisory condition if the cylinder pressure drop below 425 psi
- 2.6 Fire Suppression Agent
- A. The Fire Suppression Agent used shall be Kidde Fluoro-K™
 - B. The Fluoro-K agent shall have a Class A Minimum Design Concentration of 4.5%, Class B Minimum Design Concentration of 5.85% and Class C Minimum Design Concentration of 4.52%
 - C. The Fire Suppression OEM shall provide documentary evidence including actual test results proving the purity of the agent as per NFPA 2001 latest edition. Agents without such evidence shall not be accepted
 - D. The Fire Suppression OEM shall provide documents evidencing the combined listing by UL of the Agent, Cylinder-Valve Assembly and associated delivery system hardware. Products without such evidence shall not be accepted
 - E. The cylinders shall be filled with the Fluoro-K agent at a UL-listed and FM approved First Fill facility
 - F. The cylinders shall be refilled exclusively with Fluoro-K in case of discharge and no alternate agent shall be used.
 - G. In order to ensure that the replacement agent used in case of a discharge matches the agent originally filled, the vendor shall guarantee in writing the commitment to use the same agent for refill.
 - H. At the time of refilling, the vendor shall provide documents evidencing the use of the same agent originally filled for the initial installation.
- 2.7 Pipe and Fittings
- A. Distribution piping, and fittings, shall be installed in accordance with NFPA 2001, approved piping standards and the engineered fire suppression system manufacturer's requirements.

2.8 ACTUATION HARDWARE

- A. The primary agent cylinders shall be electrically actuated, and the secondary cylinders can be pressure actuated.
- B. While in the stand-by condition, actuators attached to the cylinder valve shall not be exposed to the cylinder's internal pressure so as to avoid introducing additional leak paths or accidental discharges.
- C. Solenoid actuators shall not require replacement after each actuation.
- D. Solenoid actuators shall be supervised for placement. Removal of any electrical actuator shall generate a supervisory condition with appropriate audio and visual indication on the fire alarm control unit. Systems that neither supervise for placement of solenoids nor feature tamper proof hardware that prevent the removal of the system solenoids are not UL listed and FM approved and are not acceptable.
- E. The Fire Alarm-Suppression Control Unit (FACU) shall be UL Listed and FM Approved compatible with the electric actuators.

2.9 Nozzles

- A. System nozzles shall be made of brass / stainless steel (select option).
- B. Nozzles shall be spaced in the protected area to achieve uniform distribution of the agent.
- C. Nozzles shall have 180-degree and 360-degree discharge patterns.
- D. The manufacturers' nozzles shall be designed for efficient agent dispersion.
- E. Nozzles shall be UL Listed and FM Approved for use with the agent and the manufacturer's hardware.

2.10 Fire Alarm Control Unit (FACU):

- A. The FACU shall consist of a single Printed Circuit Board with the main microprocessor and an integral operator interface Module, a primary Power Supply Unit, a 24 VDC Battery backup complete with Battery Charger, in an 18 gauge painted NEMA 1 steel enclosure with door. The FACU enclosure size shall be capable of housing a Battery of capacity 12 AH at 24 VDC.
- B. A battery cabinet or multiple battery cabinets shall be available to accommodate a battery capacity of 17 to 68 AH at 24 VDC.
- C. The power-supply / charger assembly shall be field configurable to accept either 120 or 240 VAC input voltage, 50/60Hz, and shall provide 5.4 A at 24 VDC of filtered and regulated power to operate the system and charge the system's standby battery. The charger assembly shall be capable of charging batteries of capacities up to 68 AH.
- D. The FACU shall provide Auxiliary Power Output rated at 1 Amp total at 24 VDC for external use.
- E. The battery backup system shall consist of 24 VDC, maintenance free, sealed lead acid batteries of capacity appropriately sized, through battery calculations to provide for 24 hours (90 hours for FM applications) of Standby operation followed by 5 minutes (10 minutes for FM) of Alarm operation in case of AC Mains failure. The battery charger shall be capable of charging a fully discharged battery within 48 hours.
- F. The FACU shall supervise and control the overall system operation, including the execution of the site-specific configuration. Its printed circuit board shall contain the hazard-specific input and output circuits.
- G. The operator interface shall provide a digital countdown timer to indicate the time remaining prior to an impending suppression system release. Panels that do not display releasing countdown shall not be acceptable.
- H. The operator interface module shall provide Light Emitting Diodes (LED) to indicate Power ON, Alarm, Pre-Release, Releasing, Post-Release, Trouble, Supervisory and Signal Silenced.
- I. All access to the Menu System shall be password protected.
- J. A system buzzer shall annunciate each Alarm, Supervisory, or Trouble event.
- K. The FACU shall provide 3 Class A/B Detection Initiating Device Circuits.
 - 1. The Initiating Device Circuits shall all be power limited and shall be field-configurable in either style of supervision without the use of any converter boards, wiring jumpers, or dip switches. Panels that require the use of Class A/Class B converter boards shall not be permitted.
 - 2. Each circuit shall be capable of supporting Normally Open contact-type alarm devices as well as a minimum of 15 model KC2 series Conventional point-type smoke detectors.
 - 3. The Contractor shall only utilize detectors that have been UL listed for compatibility with the FACU.
- L. The FACU shall be provided 1 Class A/B Manual Release Circuit
 - 1. The circuit shall be power limited and shall be capable of supporting Kidde Manual Pull Stations. 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 10 seconds, 20 seconds, or 30 seconds. The operation of the Manual Release shall override any existing Abort Station input.
2. The Contractor shall only utilize Kidde Pull Stations.
- M. The FACU shall provide 1 Class A/B Abort Circuit.
1. The circuit shall be power limited and shall be capable of being user-configurable to abort either a single release output, or both. In applications where the AEGIS 2.0 FACU dually controls a clean agent system and a water-based system, activation of the abort circuit shall not affect the release of the water based system.
 2. The abort circuit shall be capable of supporting Kidde Abort Stations. When enabled, the abort circuit shall be configurable to operate in up to six modes including UL and disabled.
 3. The Contractor shall only utilize Kidde Abort Stations.
- N. The FACU shall provide 2 Class A/B Supervisory Circuits.
1. The supervisory circuit shall be field-configurable in either style of supervision without the use of any converter boards, wiring jumpers, or dip switches. Panels that require the use of Class A/Class B converter boards shall not be permitted.
 2. Each circuit shall be power limited.
 3. The supervisory circuit shall be configurable to allow for Supervisory input and Detection input to be cross zoned, to release the suppression system.
- O. The FACU shall provide 3 Class A/B Notification Appliance Circuits (NACs).
1. The NACs shall be field-configurable in either style of supervision without the use of any converter boards, wiring jumpers, or dip switches. Panels that require the use of Class A/Class B converter boards shall not be permitted.
 2. Each NAC circuit shall be capable of delivering an output of 1.5 Amps at 24 VDC.
 3. All circuits shall be individually programmable and configurable to activate on one or more of the conditions of General Alarm, First Alarm, Waterflow, Pre-Discharge, and Discharge.
 4. In the event of the occurrence of any of the above conditions, the circuits shall be configurable to generate the sound pattern of:
 - i. Silent
 - ii. Pulse at 60 beats per minute Silenceable or Non-Silenceable
 - iii. Pulse at 120 beats per minute Silenceable or Non-Silenceable
 - iv. Temporal Silenceable or Non-Silenceable
 - v. Steady Silenceable or Non-Silenceable
 5. Three or more notification appliances in the same line of sight shall be synchronized.
 6. It shall be possible to configure more than one circuit to activate for the same alarm condition
 7. It shall be possible to override one master code (tone) with another depending on the state (i.e., first alarm, prerelease, or release) of the particular suppression zone. No supplemental equipment shall be required to perform this functionality.
 8. The Contractor shall only utilize 24 VDC Notification Appliances that have been UL listed and are compatible with the AEGIS 2.0 FACU.
- P. The FACU shall provide 2 Class B Agent Release Circuits
1. The releasing circuits shall be protected against inadvertent activation by a Triple-Failure-Redundancy safeguard system. This system shall require the main microprocessor to issue two release commands of opposite polarity (one "High" and one "Low" and via separate signaling channels, combined with a signal from the FACU's watchdog timer confirming proper microprocessor operation, in order to activate a release circuit. Traditional signal circuits that activate on a single "high" or a single "low" command from the microprocessor shall not meet the intent of the spec.
 2. It shall be possible to configure each release circuit for activation based on the following configuration criteria of inputs:
 - i. Manual Release
 - ii. Single zone
 - iii. Crossed zone
 3. The Contractor shall only utilize release devices that have been UL listed/FM approved for compatibility with the AEGIS 2.0 FACU.
 4. The circuit shall be configurable so as to provide activation power to Control Heads for 90 seconds and to Deluge Solenoids for 10 minutes, 15 minutes or On-Until-Reset.

5. The circuit shall be configurable so that release of agent in the affected area may either be instantaneous or delayed by a maximum of 60 seconds. The site-specific time delay shall be configurable up to the maximum allowed in steps of 10 seconds.
- Q. The FACU shall provide 3 Independently Programmable Relays.
 1. The Programmable Relays shall be normally de-energized and shall have Form-C contacts rated 3 Amps at 120 VAC / 30 VDC.
 2. The contacts shall be programmable to transfer and latch on any one of the following conditions:
 - i. General Alarm Condition
 - ii. First Alarm Condition
 - iii. Pre-Discharge Condition
 - iv. Discharge Condition
 - v. Waterflow Input
 - vi. Manual Release
 - vii. Global Abort Input
 - viii. Global Supervisory Input
- R. The FACU shall provide 1 System Trouble Relay.
 1. The Trouble Relay shall be normally energized and shall have Form-C contacts rated 3 Amps at 120 VAC / 30 VDC.
 2. The relay shall be non-latching and shall transfer on any trouble in the system.
- S. All Input and Outputs shall be provided appropriate numbers of terminals of capacity suitable for 18 to 12 AWG wiring.
 1. The FACU Menu System shall only be accessible from the user interface keypad. It shall be pass code protected to prevent unauthorized access
- T. The FACU shall communicate with its monitoring cloud using a cellular compatible gateway.

2.11 SPOT DETECTORS

- A. Model KC2-OS-CD Multi-Criteria Photoelectric Smoke Detector
 1. The Photoelectric Detector shall be a two-wire, light-scattering, low profile, conventional type that senses a broad range of smoldering and flaming-type fires.
 2. The Detector shall be able to monitor its own sensitivity and operational status and shall use an advanced multi-wave photoelectric sensing chamber to discriminate between smoke from a fire and nuisance smoke from non-fire sources before signaling an Alarm condition.
 3. The sensing chamber shall permit a full 360-degree smoke entry and shall contain a field replaceable optical chamber.
 4. The Detector shall mount to a twist-to-lock, vandal resistant base, Models KC2-SB/-SB4 or KC2-RB/-RB4.
 5. D. The Detector shall be suitable for open air velocities up to 4000 fpm and shall have a nominal sensitivity range of 0.5 to 4.36% obscuration per foot.
 6. E. The Detector shall permit a sensitivity check without the need for generating smoke and shall be able to automatically adjust its sensitivity to compensate for environmental changes.
 7. F. The Detector shall permit a remote sensitivity check without removing it from service and without interrupting its operability.
 8. G. The Detector shall provide a status LED. This LED shall flash green to indicate normal operation and shall light up steady red on alarm.
 9. The Detector shall be listed as per UL-268 7th Edition.
- B. Model KC2-OSH-CD Multi-Criteria Photoelectric Smoke and Heat Combination Detector
 1. The Photoelectric Detector shall be a two-wire, low profile, conventional type photoelectric smoke detector combined with a rate-of-rise and fixed-temperature heat sensor, that senses a broad range of smoldering and flaming-type fires.
 2. The Detector shall be able to monitor its own sensitivity and operational status and shall use an advanced multi-wave photoelectric sensing chamber to discriminate between smoke from a fire and nuisance smoke from non-fire sources before signaling an Alarm condition. The rate-of-rise heat sensor shall be able to detect temperature change rates of 15 °F/min. The fixed-temperature heat sensor shall detect fire when the air temperature near the detector exceeds the alarm point of 135 °F (nominal).
 3. The sensing chamber shall permit a full 360-degree smoke entry and shall contain a field replaceable optical chamber.

4. The Detector shall mount to a twist-to-lock, vandal resistant base, Models KC2-SB/-SB4 or KC2-RB/-RB4.
 5. The Detector shall be suitable for open air velocities up to 4000 fpm and shall have a nominal sensitivity range of 0.5 to 4.36% obscuration per foot.
 6. The Detector shall permit a sensitivity check without the need for generating smoke and shall be able to automatically adjust its sensitivity to compensate for environmental changes.
 7. The Detector shall permit a remote sensitivity check without removing it from service and without interrupting its operability.
 8. The Detector shall provide a status LED. This LED shall flash green to indicate normal operation and shall light up steady red on alarm.
 9. The Detector shall be listed as per UL-268 7th Edition.
- C. Model KC2-H-CD Dual Rate-of-Rise and Fixed-Temperature Heat Detector
1. The Heat Detector shall be a two-wire, low profile, conventional heat detector with a rate-of-rise and fixed-temperature heat sensor.
 2. The Detector shall be able to monitor its own operational status. The rate-of-rise heat sensor shall be able to detect temperature change rates of 15 °F/min. The fixed-temperature heat sensor shall detect fire when the air temperature near the detector exceeds the alarm point of 135 °F (nominal).
 3. The Detector shall mount to a twist-to-lock, vandal resistant base, Models KC2-SB/-SB4 or KC2-RB/-RB4.
 4. The Detector shall have alarm points of 135 ±6 °F for the fixed-temperature sensor and 15 °F/min for the rate-of-rise sensor.
 5. The Detector shall have a Response Time Index evaluated by FM as “Quick”.
 6. The Detector shall permit a remote status check without removing it from service and without interrupting its operability.
 7. The Detector shall provide a status LED. This LED shall flash green to indicate normal operation and shall light up steady red on alarm.
 8. The Detector shall have a listed maximum spacing of 50 ft. per UL.
 9. The Detector shall be listed as per UL-268 7th Edition.

2.12 REMOTE MONITORING

- A. The web and mobile applications shall be password protected and the same login credentials shall be used for both.
- B. The mobile application shall be iOS and Android compatible.
- C. The web portal dashboard shall provide an overview of the state of systems at first glance.
- D. Alarms have higher priority than other events. For a system with an Alarm event, the dashboard shall prioritize and report the Alarm state.
- E. Subsequent events for a system in Alarm shall be captured while the primary state of the system remains in Alarm until Normal.
- F. On receipt of any event at the cloud monitoring platform, an e-mail shall be transmitted to all addresses on record and a notification to the mobile application.

2.13 SYSTEM CONFIGURATION

- A. Activation of the suppression system shall be via crossed-zoned smoke detection.
- B. The system shall have the ability to define single or multiple detectors into detection groups to support cross zoning applications.
- C. It shall require the activation of at least one detector from each of the two crossed-zoned detector groups to trigger the automatic release of the suppression system.

2.14 CONDUCTORS AND CONDUITS

- A. All conductors shall be enclosed in rigid or thin-walled, steel conduit unless open wiring is permitted by the local electrical code.
- B. 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.
- C. 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. Wiring for the signaling line circuit shall be in accordance with the FACU Installation, Operation, and Maintenance Manual. 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.

3. EXECUTION

3.1 CLEAN AGENT FIRE EXTINGUISHING SYSTEM INSTALLATION

- A. The system shall be supplied and installed by a factory-authorized, Kidde Fire Systems Distributor. The Distributor shall be trained and certified by Kidde Fire Systems to design, install and maintain the Kidde fire suppression system. The distributor shall install the system in accordance with the manufacturer's design, installation, operation and maintenance manual.

3.2 ELECTRICAL SYSTEM INSTALLATION

- 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 alarm or suppression system shall be routed through the enclosures, raceways, and conduits dedicated to the fire alarm or suppression system.
- B. 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.
- C. 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. Appropriate color-coding shall be utilized for all other field wiring.
- D. All electrical circuits shall be numerically tagged with suitable markings at each terminal point. All circuits shall correspond with the installation draw.

3.3 BLOWER DOOR FAN TEST

- A. As required by NFPA 2001 section 5.6, a blower door fan test shall be performed. A minimum concentration of 85% of the design concentration shall be held at the highest level of combustibles for a minimum period of 10 minutes or for a time period to allow for response by trained personnel.

3.4 SYSTEM CHECKOUT

- A. The entire system shall be checked out, inspected, and functionally tested by factory authorized and trained personnel.
- B. Inspection shall be performed in the presence of the owner's representative, engineer or architect's representative, insuring authority, and/or the local AHJ (Authority Having Jurisdiction)
- C. Prior to final acceptance, the contractor shall provide operational and safety training in all aspects of the system to the owner's key personnel. Release of clean agent shall not be part of the training requirements

3.5 ROUTINE MAINTENANCE

- A. Routine maintenance on equipment shall be performed by a certified Kidde Fire System Distributor, in accordance with the most current version of the relevant NFPA standards and the manufacturer's installation, operation and maintenance manual.