



1. GENERAL

1.1 INTENT OF SPECIFICATIONS

- A. This specification details the requirements for an engineered fire suppression system Model Kidde Natura. The detection & control subsystem shall consist of the AEGIS™-PHX Fire Alarm-Suppression Control Unit (FACU) utilizing conventional detectors for initiation of fire signals. These requirements combined with good engineering practices must be followed 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 materials and equipment shall be new and unused. Recycled products shall not be acceptable.

1.2 System Description

- A. The clean agent suppression system shall be a total flooding type Kidde Natura Fire Suppression System. The system shall offer Nitrogen IG-100, Argonite IG-55, IG-541 and Argon IG-01 as agent options. The system hardware and cylinders shall be rated for working pressure of 4350 psig at 70°F (300 Bar at 21°C).
- B. Agent cylinders shall comply with ISO to UN9809 and/or D.O.T requirements.
- C. Agent cylinders shall be of capacity 80 Liter and 140 Liter.
- D. The release unit shall be mounted on pilot cylinder, and it shall include solenoid for actuation, pressure gauge with low pressure contacts, manual release actuation and built-in pressure regulator to provide lower pressure for actuation line.
- E. The remaining cylinders shall be provided with removable pressure gauge with low pressure contacts.
- F. The actuation line hoses shall be of quick connect type.
- G. The low-pressure contacts at the all the gauges shall be provided with quick connect cables in a daisy chain format.
- H. It shall be possible to test the system including the release valves for the entire set of installed cylinder-valve assemblies without discharging agent during testing & commissioning and during periodical maintenance testing.
- I. The first cylinder in the cylinder bank shall function as the pilot cylinder for the balance of cylinders in that bank. Systems that utilize separate pilot cylinders for activation shall not be accepted.
- J. All system cylinders shall be equipped with flow-pressure control valve that limits the output pressure to 55-60 bar and all downstream components shall be suitably rated.
- K. All cylinders shall be equipped with pressure indicating switches that activate upon a reduction of 20% in cylinder pressure.
- L. The system shall be listed and approved by UL, ULC and FM or LPCB approvals.
- M. The system shall be compatible for use with 180 and 360 discharge nozzles, the locations of which shall be based on system configuration design and the manufacturers' agency approval documentation.
- N. The suppression system shall comply with the NFPA 2001 and FM5600 requirements to supervise the placement of electrical solenoid heads 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 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 FM approved and are therefore not acceptable. Non-compliant systems shall be removed at the installers' expense.
- O. The AEGIS™-PHX 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.
- P. The FACU shall have 5 output circuits, where each circuit shall be capable of being individually configured to perform as suppression release or notification circuit, operating independently from each other with different time delays, abort functions and notification patterns.
- Q. 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.



- R. 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 clean agent 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. FM5600: Approval Standard for Clean Agent Extinguishing System
  7. ANSI B1.20.1: Standard for Pipe Threads, General Purpose
  8. NFPA 92A: Recommended Practice for Smoke Control Systems
  9. UL 2127: Inert Gas Clean Agent Extinguishing System Units
  10. UL 268-8: Standard for Smoke Detectors for Open Areas
  11. UL 268A: Standard for Smoke Detectors for Duct Application
  12. Requirements of the Local Authority Having Jurisdiction
  13. Manufacturer's Design, Installation, Operation & Maintenance Manual
- B. The complete system shall have the following listings and approvals:
  1. Factory Mutual Global (FM)
  2. Loss Prevention Control Board (LPCB)

### 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's name and /or 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.
  2. 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.
  3. 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.
  4. 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.
  5. The Contractor shall maintain or have access to a recharging station capable of recharging the suppression system within 48hrs after discharge.

### 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 will 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, which 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. Calculation to determine the vent area required. The calculated venting area shall be equal or less than the venting area calculated for chemical clean agent system.
    - v. 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.
    - vi. Graphical presentation of the pipe network with plan, elevation and isometric view shall be part of the output printable reports.
    - vii. The flow calculations software shall provide option to select discharge time of 60 seconds for Class B and 120 seconds for Class A and Class C hazards. Discharge time of 60 seconds shall not be accepted for Class A and C in lieu of large venting areas.
    - viii. Nozzle information shall include the number of nozzles, flow rate per nozzle, nozzle nominal pipe size, nozzle type and nozzle orifice area.
    - ix. Pipe fittings information shall include a detailed list by nominal diameter and quantity.
    - x. **OPTIONAL** Due to multiple hazards being protected by a common bank of cylinders, calculations showing the above details shall be completed for every hazard connected to that common bank. The individual hazard piping shall be separated by directional valves and shall be modeled with the valve 'open' for the given hazard but 'closed' for the others. The equivalent length of the directional valve must be included in the calculations.
  - 5. Any other requirements of NFPA-2001 latest edition.
  - 6. Conduit routings shall be shown, with number of conductors, type of wire, and wire sizes indicated for each conduit segment.
  - 7. Point-to-point wiring diagram showing the termination points for all field-wiring circuits to the Fire Alarm Control Unit (FACU).
  - 8. 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.
  - 9. 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.
  - 10. 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 to determine the necessary standby battery capacity.
  - 11. Conduit routings shall be shown, with number of conductors, type of wire, and wire sizes indicated for each conduit segment.
- 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 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 suppression system, one (1) set of the calculation report (if not included in the drawings themselves), owner's manual and product data sheets shall be submitted to the end-user/owner.
  - 2. 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 manufacturer's Design, Installation, Operation and Maintenance Manual (DIOM), for the inert agent.
  - 2. Two (2) sets of As-Built drawings with As-Built Flow Calculations reports.

#### 1.7 System Exclusions

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

#### 1.8 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 required by the system manufacturer for the specific Class.
- C. In case the design concentration exceeds the Lowest Observable Adverse Effect Level (LOAEL) for the agent as published in NFPA 2001, the system shall include the following safety items:
  - Pneumatic Siren
  - Pneumatic Discharge Delay
  - Lockout Valve
  - Signage

#### 1.9 System Performance

- A. System Discharge
  - 1. The discharge time required to achieve 95% of the minimum design concentration for flame extinguishment shall not exceed 60 seconds for Class B OR 120 seconds for Class A and C (select option).
- B. Duration of Protection
  - 1. 85% of the minimum design concentration shall be maintained for the longer of 10-minutes or the time required by trained personnel to take effective emergency action.
  - 2. Room integrity shall be verified using equipment from a recognized manufacturer of test equipment and a level 1 certificate shall be provided.
- C. Nozzle performance
  - 1. 360/180-degree nozzle shall be listed to be mounted at heights up to 16 feet (4.88 m) from the floor.
  - 2. 360/180-degree nozzle shall be listed to cover an area of 35.6 ft. x 35.6 ft. (10.85 m x 10.85 m).

#### 1.10 Cylinder Locations:

- A. The agent cylinders shall be in a secure area suitable for the purpose.
- B. The flow calculation report submitted shall verify the timing performance requirement.

#### 1.11 Cylinder Assemblies

- A. The agent shall be stored in cylinders manufactured and marked in accordance with US Department of Transportation (DOT) specification or to ISO complying with UN9809 and Transport Canada (TC) specifications.
- B. The cylinder discharge valve shall be of self-regulating type to provide a controlled pressure not exceeding 60 Bar (870 psig). The valve shall be designed to shutoff when the pressure at the discharge port exceeds 60 Bar (870 psig).

- C. The cylinder pressure gauge shall be integral with the Release Unit and shall be color-coded for fast referencing of pressure readings.
  - D. All cylinders shall have a low-pressure switch to electrically signal a supervisory condition if the cylinder pressure drops to 2320 psi (160-bar) for a 200 Bar (2900 psig) system or to 240 Bar (3480 psig) for a 300 Bar (4350 psig) system. The low-pressure switch shall be equipped with dry contacts and all such contacts shall be connected using Quick Connect cables in daisy chain arrangement.
  - E. The first cylinder of the cylinder bank shall be installed with a release unit that includes solenoid, pressure gauge with integral pressure monitoring switch to function as the primary or pilot cylinder. The primary or pilot cylinder shall be listed to operate a minimum of 62 secondary cylinders of 80 L capacity or a minimum of 54 secondary cylinders of 140L capacity.
  - F. All secondary cylinders shall be actuated pneumatically through pilot actuation hose. The hoses shall be quick-connect type with steel braided hoses.
  - G. Each cylinder shall be connected through a discharge hose and manifold check valve to a prefabricated manifold.
  - H. All system cylinders shall be installed in a rack of either single row or 2 rows, but not exceeding 3 rows.
  - I. A pre-piped set of reserve cylinders with the same size and quantity as the main bank of cylinders shall be provided. A manual main-to-reserve transfer switch shall also be provided.
- 1.12 Fire Suppression Agent
- A. The cylinder shall be filled with agent, Nitrogen (IG-100) or Argonite (IG-55) or IG-541 or IG-01 (Argon) (select option).
  - B. The purity of the gases shall comply with the requirements specified in the manufacturer's manual and NFPA 2001 purity requirements. The manufacturer shall be able to provide a certificate of purity for the bulk gases and a certificate of composition and purity for each cylinder.
  - C. The cylinders shall be filled with agent at a UL and FM approved first fill facility.
- 1.13 Pipe and Fittings
- A. Distribution piping, and fittings, shall be Schedule 40 type for all sizes below 2". For pipe sizes larger than 2 1/2", Schedule 80 shall be installed. The pipes and fittings shall be in accordance with NFPA 2001, approved piping standards and the engineered fire suppression system manufacturer's requirements.
- 1.14 ACTUATION HARDWARE
- A. The primary agent cylinder shall be electrically actuated, and the secondary cylinders can be pressure actuated.
  - B. Solenoid actuators shall either be supervised for placement or shall be tamper proof to prevent removal. Removal of the electrical actuator shall generate a supervisory condition with appropriate audio and visual indication on the fire alarm 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. Non-compliant systems shall be removed at the installers' expense.
- 1.15 Nozzles
- A. System nozzles shall be made of brass.
  - B. Nozzles shall be spaced in the protected area to achieve uniform distribution of the agent.
  - C. Nozzles shall have 360-degree or 180-degree discharge patterns.
  - D. The nozzles shall be suitable to be installed in pendent or upright manner.
  - E. Nozzles shall be designed for efficient agent dispersion.
  - F. Nozzles shall be approved for use with the agent and the manufacturer's hardware.
- 1.16 [OPTIONAL] Multi Hazard System:
- A. All protected areas shall be protected by a common bank of cylinders.
  - B. Protected areas shall be separated by directional valves specifically listed for the purpose.
  - C. Directional valves shall be electrically actuated and shall also have a manual operator.
  - D. Directional Valves shall be rated to a working pressure of 3000-psig @ 70°F (200-barg @ 21°C).
  - E. Electrical solenoids on directional valves shall either be supervised for placement or shall be of non-removable tamper proof design.

**1.17 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 two 12V sealed lead-acid batteries with capacity up to 12 AH each.
- B. A battery cabinet or multiple battery cabinets shall be available to accommodate a battery capacity of 12 to 70 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 70 AH.
- D. The FACU shall provide two Auxiliary Power Output, programmable as resettable or non- resettable, rated at 2 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, in addition to a 4x40 LCD display.
- 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 7 Class A/B initiating circuits.
  - 1. Each initiating circuit shall be capable of being individually programmed as detection, supervisory, abort or manual release.
  - 2. The initiating 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.
  - 3. 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.
  - 4. The Contractor shall only utilize detectors that have been UL listed for compatibility with the FACU.
- L. Each initiating circuit programmed as Class A/B Manual Release Circuit shall comply with the following:
  - 1. The circuit shall be power-limited and shall be capable of supporting Kidde Manual Pull Stations. The release of agent after the operation of the Manual Release shall be configurable to be either instantaneous or delayed. If delayed, the time delay shall be configurable in increments of 1 second to the maximum of 3,800 seconds. The operation of the Manual Release shall override any existing Abort Station input.
  - 2. The Contractor shall only utilize Kidde Pull Stations.
- M. Each initiating circuit programmed as Class A/B Abort Circuit shall comply with the following:
  - 1. The circuit shall be power limited and shall be capable of being user-configurable to abort any of the release outputs. In applications where the AEGIS™-PHX FACU dually controls a clean agent system and a water-based system, activation of the abort circuit(s) shall not affect the release of the water-based system.
  - 2. The abort circuits shall be capable of supporting Kidde Abort Stations. When enabled, the abort circuits shall be configurable to operate in up to six modes including UL.
  - 3. The Contractor shall only utilize Kidde Abort Stations.
- N. Each initiating circuit programmed as Class A/B Supervisory Circuits shall comply with the following:



1. The supervisory circuit(s) 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. Supervisory circuits shall be configurable to allow for Supervisory input and Detection input to be cross zoned, to release the suppression system.
- O. Each output circuit configured as Class A/B Notification Appliance Circuits (NACs) shall comply with the following:
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™-PHX FACU.
- P. Each output circuit configured as Class B Agent Release Circuit shall comply with the following:
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, 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™-PHX FACU.
  4. Each circuit shall be individually configurable to provide activation power to Control Heads for 90 seconds and to Deluge Solenoids for 10 minutes, 15 minutes or On-Until-Reset.
  5. Each circuit shall be individually configurable so that release of agent in the affected area may either be instantaneous or delayed by a maximum of 3,800 seconds. The site-specific time delay shall be configurable up to the maximum allowed in steps of 1 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 password protected to prevent unauthorized access.
- T. The FACU shall communicate with its monitoring cloud using a cellular compatible gateway.

#### 1.18 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. 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 7<sup>th</sup> 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, which 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 7<sup>th</sup> 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 7<sup>th</sup> Edition.

#### 1.19 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.

Comment[Author1]: This is the first reference. If PHX is IntelliSite compatible, we should add a statement in section 1.2 letter O

#### 1.20 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.
- D. The system shall use a computer-based configuration software and provide 15 pre-defined configurations selectable at the FACU interface.

#### 1.21 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. 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.

## 2. EXECUTION

### 2.1 CLEAN AGENT FIRE SUPPRESSION 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.

### 2.2 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.

#### 2.3 SYSTEM CHECKOUT

- A. 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 Owners 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 concepts of the system to the Owners key personnel. Release of clean agent shall not be part of the training requirements.

#### 2.4 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 NFPA 2001 and the manufacturer's installation, operation and maintenance manual.