1. GENERAL

1.1 INTENT OF SPECIFICATIONS

This specification outlines the requirements for a total flooding clean agent fire extinguishing system comprising Kidde Fire Systems equipment employing Argonite inert gas with an ARIES™ Control Unit alarm and releasing panel. All requirements outlined in this specification must be completed in their entirety. These requirements, which are in accordance with the items listed in Section 1.3, combined with good engineering practices shall be followed in order to produce a safe and effective clean agent fire extinguishing system.

1.2 GENERAL DESCRIPTION

The clean agent fire extinguishing system shall perform as outlined in the following sub-sections.

A. Achieve a 37.9% (v/v) extinguishing concentration for Class A (Surface Type Fires) hazards.
B. Achieve a 37.9% (v/v) extinguishing concentration for Class C (Energized Electrical Equipment) hazards.
C. Within 60 seconds, the clean agent fire extinguishing system shall discharge 95% of the required suppression agent mass.
D. The clean agent fire extinguishing system shall consist of one or more Kidde Fire Systems agent cylinders and related equipment. The cylinders may be either connected to a discharge pipe arrangement separately or connected to a common manifold and discharge pipe arrangement. The agent cylinders shall be filled with 50% Nitrogen and 50% Argon to a working pressure of 2900 PSIG at 70°F (200 bar gauge at 21°C).
E. The control unit shall be listed to be compatible with SmartOne™ devices and electric actuators.
F. The Kidde Aries addressable, distributed-intelligence control unit and fire alarm/suppression system shall perform fire alarm, supervisory, and trouble event initiation; occupant notification; event annunciation; local control functions; fire extinguishing system release, and off premises transmission.
G. The system's distributed intelligence shall extend to the SmartOne automatic initiating devices on the signaling line circuit. Each automatic initiating device shall have a microprocessor capable of independently determining whether or not a fire signature at its monitored location is of sufficient magnitude to warrant the issuance of an alarm signal to the control unit.

1.3 CODES AND COMPLIANCE

A. The design, installation, testing and maintenance of the clean agent fire extinguishing system, shall be in accordance with the following 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 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, 9th ed: Control Units and Accessories for Fire Alarm Systems
   8. UL 2127: Inert Gas Clean Agent Extinguishing System Units
   9. UL 268: 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 system shall have the applicable following listings and approvals:
   1. Factory Mutual Global
   2. California State Fire Marshal (CSFM)

3. Materials and Equipment Acceptance Division of New York City (MEA)

C. The manufacturer shall meet ISO 9001 requirements for the design, production and distribution of the Argonite fire suppression system.

D. All components of the clean agent fire extinguishing system shall be the products of the same manufacturer or listed by that manufacturer as compatible with those devices, components and equipment.

1.4 SYSTEM DESIGN CRITERIA

A. A total flooding clean agent fire extinguishing system, employing Argonite inert gas, shall be installed to meet a minimum design concentration of _____% by volume in all designated spaces to be protected.

1.5 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 name of the manufacturer/supplier and manufacturer part numbers shall appear on all major components.
   4. All devices, components and equipment shall be the products of the same manufacturer/supplier.
   5. The system manufacturer/supplier shall have the ability to provide multiple suppression system arrangements to accommodate the performance criteria required by the project.
   6. All devices, components and equipment shall be listed by the standardizing agencies (FM).

B. Contractor
   1. The distributor shall be trained by the manufacturer to calculate/design, install, test and maintain the clean agent fire extinguishing system employing Argonite inert gas and shall be able to produce a certificate stating such on request.
   2. The installing contractor shall employ a person who can show proficiency at least equal to a NICET level III certification in special hazards design.
   3. The Contractor shall confirm in writing that he stocks a full complement of spare parts and offers 24-hour emergency service for all equipment being furnished.

1.6 WARRANTY

A. The manufacturer shall warrant the system from the date of shipment from the factory as follows: Kidde Engineered System products for thirty-six (36) months; Kidde Aries Control Unit for sixty (60) months; and the SmartOne devices for twenty-four (24) months.

1.7 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. Engineered Design Drawings: The Contractor shall provide all required documents that shall include the following details:

1. The factory-authorized Kidde Fire Systems Distributor shall provide all required installation drawings per NFPA 2001
2. Plan and riser drawings showing the location of the Kidde Aries Control Unit and the locations and necessary installation and mounting details of all field devices such as smoke detectors, manual-release stations and notification appliances. Conduit routings shall be shown, with number of conductors, type of wire, and wire sizes indicated for each conduit segment.
3. Point-to-point wiring diagram showing the termination points for all field-wiring circuits to the internal Kidde Aries PCB. All internal wiring and communications cabling shall be shown.
4. A primary-power calculation that details the power requirements for the Kidde Aries Control Unit 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.
5. A secondary power calculation that shows the quiescent and alarm power requirements for the Kidde Aries Control Unit 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.
6. The contractor shall submit a calculation justifying the capacity of batteries selected.

C. Flow Calculation Reports: The Contractor shall provide the following information in the flow calculation report.
   1. Customer information and project data.
   2. Enclosure information. At a minimum, enclosure information shall include minimum and adjusted design concentrations, minimum and maximum enclosure temperatures, minimum agent required and volume of enclosures, including non-permeable volume if applicable.
   3. Agent information. At a minimum, agent information shall include cylinder size and part number, quantity of cylinders, main and/or reserve cylinders, pipe take off direction and the floor loading for agent cylinder
   4. Pipe network information. At a minimum, pipe network information shall include pipe type, pipe diameter, pipe length, change in direction or elevation, pipe equivalent length and any added accessory equivalent length. In addition, the following nozzle information shall be provided; number of nozzles and identification of enclosure location, flow rate of associated nozzle, nozzle nominal size, nozzle type and nozzle orifice area
   5. Pipes and pipe fittings. A detailed list of pipes and pipe fittings used in the design of the pipe network

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. The Contractor shall submit the following:
   1. Four (4) sets of installation drawings for each installed system and one (1) set of calculation reports, owner's manuals and product data sheets.
   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. The contractor shall submit a commissioning check sheet for each installed ASD detector. The check sheet shall list all installed equipment, configurations and measured ambient conditions
   4. 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. At a minimum, the tests to be conducted shall

be per the relevant referenced codes and any additional supplemental tests required by the AHJ. Tests shall not be scheduled or conducted until the engineer of record approves the test plan.

5. 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.

E. Test Plan
   1. The distributor 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 approves the test plan

F. Installation Drawings
   1. Four (4) sets of installation drawings for each installed clean agent fire extinguishing system and one (1) set of the calculation report, 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 clean agent fire extinguishing system shall be given to the owner/end-user for use and reference.

G. Documentation: The Contractor shall submit two (2) copies the following after complete installation:
   1. Kidde Engineered System Design, Installation, Operation and Maintenance Manual.
   2. Kidde Aries Installation, Operation and Maintenance Manual.

2. SUPPRESSION SYSTEM REQUIREMENTS

2.1 GENERAL

A. The clean agent fire extinguishing system shall consist of Argonite inert gas, cylinder(s), Kidde actuation hardware and Kidde discharge nozzle(s) attached to a pipe network.

2.2 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.

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. A level 1 certification in room integrity testing, provided by a recognized manufacturer of room integrity testing equipment, is required.

C. Minimum System Design Limits
   1. Nozzles
      i. Nozzles shall be listed and approved for a maximum ceiling height of 16 feet (4.88 m) and a minimum ceiling height of 1 foot (0.31 m).
      ii. Nozzle area coverage for both 360- and 180-degree nozzles shall be a maximum of 35.6 ft. x 35.6 ft. square (10.85 m x 10.85 m).
      iii. System Nozzles shall be listed and approved for a minimum of 445 PSIG (30.6 bar gauge) nozzle pressure.

2.3 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.

2.4 ACTUATION HARDWARE

A. The agent cylinders shall be actuated in accordance with the applicable design manual.
B. The suppression panel shall be UL Listed per UL 864, 9th Edition with the interfacing electric actuators.

2.5 NOZZLES

A. Total flooding clean agent extinguishing system nozzles shall be made of brass.
B. Each nozzle shall be located in the space per the manufacturer's guidelines. Nozzles shall have a 360-degree discharge pattern.
C. Discharge nozzles shall be available in ½-in, ¾-in, 1-in and 1-½-in NPT sizes.
D. Within each nozzle size, the manufacturer shall offer multiple different orifice areas (minimum of 15).
E. Nozzles shall be FM Approved and ULC Listed for use with the manufacturer's clean agent extinguishing system employing Argonite inert gas

2.6 AGENT STORAGE CONTAINER ASSEMBLIES

A. Argonite inert gas shall be stored in containers manufactured and marked in accordance with US Department of Transportation (DOT) specification 3AA-3000 and Transport Canada (TC) specification 3AAM-229. The agent storage containers shall be conditioned to 2900 PSIG @ 70°F (200 bar gauge @ 21°C). The system manufacturer shall be able to provide US DOT documentation that the registration number marked on the agent cylinders corresponds to a manufacturing location at a US address.
    1. The agent used in Argonite cylinders shall be filled with 50% +0/-2% Argon and 50% +2%/-0% Nitrogen. The purity of the gases shall adhere to the requirements outlined by the manufacturer's manual. 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.
    2. Argonite inert gas cylinders shall be equipped with a pressure gauge to display internal pressures. The gauge shall be an integral part of the equipment and shall be color-coded for fast referencing of pressure readings.
    3. A low-pressure switch shall be provided as standard equipment on the Argonite inert gas cylinders. A decrease in pressure will cause the normally open contacts to close, indicating a trouble condition at the control panel. The low-pressure switch shall be field removable/replaceable while the container is still fully charged

2.7 OPTIONAL EQUIPMENT

A. When protecting multiple hazard areas from a single supply of Argonite inert gas, Kidde Directional Ball Valves shall be used.
    1. The Directional Ball Valves shall be rated to a working pressure of 3000-psig @ 70°F (200-barg @ 21°C).
    2. The Directional Ball Valves shall be available in ½-in through 2-in NPT sizes.
    3. A maximum pressure of 120-psig (8-barg) shall be required to actuate the Directional Ball Valves.
    4. Each Directional Ball Valve shall be fitted with a manual operator.
    5. The Directional Ball Valves shall be installed and located in the piping network per the manufacturer's guidelines and design manual

3. ELECTRICAL SYSTEM REQUIREMENTS

3.1 ELECTRICAL WORK

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 drawings.

3.2 GENERAL

A. The Kidde Aries shall be an addressable, distributed-intelligence type Control Unit. Its distributed intelligence shall extend to the SmartOne initiating devices on its Signaling Line Circuit

3.3 SYSTEM CONFIGURATION

A. Activation of the extinguishing system shall be via crossed-zoned smoke detection in the following optional combinations:
   1. Zone 1 Model PSD-7152 SmartOne Photoelectric and Zone 2 Model CPD-7052 SmartOne Ionization
B. Detection system layout shall be in accordance with NFPA72 and 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.

3.4 CONTROL PANEL

A. The control unit shall consist of a printed-circuit board (PCB), an integral display/control assembly, and terminations for all field circuits, a primary power supply and an enclosure with removable door and viewing window.
B. The PCB shall contain the main-system microprocessor, the real-time clock, the history buffers, the watchdog timer, one USB device port, and two RS-232 serial ports. It shall also provide terminations for the following field circuits:
   1. One (1) signaling line circuit (SLC)
   2. Two (2) notification appliance circuits (NACs)
   3. Two (2) combination NAC/releasing circuits (Combos)
   4. Two (2) releasing circuits
   5. Three (3) programmable relays
   6. One (1) trouble relay
   7. One (1) RS-485 communications circuit
   8. Battery charging circuit
   9. AC input power connections
C. The SLC shall serve as the hardware and software interface between the intelligent initiating and control devices and the Kidde Aries Control Unit. The SLC shall be capable of communicating with up to 255 automatic detectors, monitor modules, and control devices, in any combination, without restrictions on the numbers of each type of field device.
D. The two releasing circuits shall be capable of actuating control heads or solenoid valves. Each releasing circuit shall be independently programmable to activate any of the following configurations of extinguishing-system actuators:
   1. One (1) control head or solenoid valve
   2. The releasing circuits shall be capable of actuating Factory Mutual System classified valves (Groups A, B, D, E, G).
E. The two notification-appliance circuits (NACs) shall be independently programmable and configurable for either Class-A or -B operation.
   1. The input power to the NAC shall be filtered and regulated. The NAC shall be capable of delivering a current of up to 1.5 A @ 24 VDC to the notification appliances.

2. It shall be possible to field-configure each Class-B, Style-Y NAC to activate notification appliances with any and all of the following parameters via a personal-computer-based configuration program:
   i. Twenty-character location
   ii. Drill activation
   iii. Silenceable/non-silenceable operation
   iv. Walk-test activation
   v. Master-coded operation (60 bpm, 120 bpm, temporal per ANSI S3.41, continuous)
   vi. Cutoff delay (5, 10, 15 minutes)
   vii. Silence inhibit (1, 3, 5 minutes)
3. It shall be possible to override one master code with another depending on the state (i.e., prealarm, prerelease, release, or time-limit-cutout) of the particular suppression zone. It shall also be possible to shut off and re-activate a NAC as required by the approved system operating sequence. No supplemental equipment shall be required to perform this functionality.
4. It shall not be necessary to use external synchronization modules to synchronize the audible and visual notification signals created by any NAC
5. Terminals for connection of field conductors to the NACs shall be large enough to accommodate #12 AWG wiring
6. The basic power-supply / charger assembly shall consist of an AC to DC switching power unit. The power-supply / charger assembly shall be configurable to accept either 120 or 240 VAC input voltage, 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. Two user-configurable auxiliary-power circuits shall be provided on the PCB to power peripheral devices. The auxiliary-power circuits shall be software programmable for either continuous or interruptible power output, and shall be rated for 1.0 A at 24 VDC. It shall not be necessary to set jumpers or dip switches on the PCB to make these outputs continuous or interruptible.
7. The system shall have the ability to use an optional Intelligent Communications Module (ICM). The ICM shall be a device server that provides Internet access to the Kidde Aries Control Unit via any standard Web browser such as Internet Explorer or Netscape Navigator. The ICM shall provide the following client services:
   i. Dial-up control-unit monitoring and status reporting
   ii. Automatic event detection and reporting via e-mail
   iii. Web-browser-based
   iv. Emulated display for the control unit
   v. Access to items in the control unit's List Menu.

3.5 ANNUNCIATION

A. The following modules shall be provided for remote-event annunciation and operator control as indicated on the bid documents.
   1. Textual-Type Remote Display Control Module (RDCM)
      i. Model RDCM shall completely duplicate the display and operator-intervention capabilities of the main-control-unit display.
      ii. The RDCM shall communicate with the Kidde Aries Control Unit via RS-485 communications, and the system shall be capable of supporting with up to 15 remote displays.
      iii. The remote displays shall operate on 24 VDC power provided by the Kidde Aries power supply, or by any remote power supply that is UL Listed or FM Approved for fire alarm applications. The remote-display modules shall supervise their input-power connections.

iv. The main Kidde Aries Control Unit display or one RDCM shall be capable of being programmed as the master unit with immediate operator-intervention privileges upon the occurrence of any alarm or fault condition. The master unit shall have control for a minimum period of 30 seconds, and all other control points shall be locked out and notified of the locked-out condition if another operator attempts to intervene during the locked-out period imposed by the master control module.

B. Output Driver Modules
   1. The Model ATM-L Annunciator Driver Module shall provide the Kidde Aries Control Unit with up to 32 programmable outputs for remote LEDs, along with 6 system-level LEDs and 5 system-level functional switches.
   2. The Model ATM-R Relay Driver Module shall provide the Kidde Aries Control Unit with up to 32 programmable outputs for remote relays.
   3. The ATM-L and -R Modules shall communicate with the Kidde Aries Control Unit via the RS-485 communications circuit, with the most-remote module capable of being located up to 4,000 feet from the control unit. The ATM-Ls and ATM-Rs shall be capable of being installed in various combinations as long as the maximum number of 16 for each module type is not exceeded.
   4. Both modules shall be powered from the Kidde Aries power supply, or from an external, regulated, and power-limited power supply Listed and Approved for use with fire-protective-signaling systems, depending upon the total load of the remote outputs. A typical external power supply is Kidde P/N 77-297106-000.

3.6 DETECTORS

A. SmartOne Ionization Detector
   1. The SmartOne Ionization Detector, Model CPD-7052, shall be a microprocessor-based smoke detector. The ionization detector shall be a dual-chamber, low profile, intelligent type that senses both visible and invisible products of combustion. The sensing chamber shall permit a full 360° smoke entry.
   2. Each ionization detector shall be electronically addressable and fully field-programmable. It shall be possible to set both alert and alarm thresholds anywhere from 0.5 to 1.5% per foot obscuration in 0.1%-per-foot increments. Alarm thresholds shall be dynamically adjustable as a result of another alarm event anywhere in the system. Where permitted, each detector shall be programmable for alarm verification in periods of up to 180 seconds in 1-second increments. Each detector shall provide a real-time value of current, local obscuration level in percent-per-foot readout when requested by an operator at the control unit.
   3. It shall be possible to configure each ionization detector for non-latching operation to prevent inadvertent or spurious fire signatures from accidentally discharging a waterless extinguishing system. The control unit shall latch the alarm report, but the discharge sequence shall be interrupted if the fire signature at the detector drops below the detector's programmable alarm threshold.
   4. Detector calibration, address, alert and alarm thresholds, and drift-compensation algorithm shall be stored in each detector's non-volatile memory. Systems that store all detector parameters in the control unit (i.e., non-distributed-intelligence-to-the-device-level architecture) shall not be considered as equivalent.
   5. A detector-housing, Model DH-2000, shall be available to allow an ionization detector to monitor for the presence of combustion products in an air duct. The detector housing shall be rated for air-duct velocities ranging from 500 to 4,000 feet per minute. It shall also be possible to mount the ionization detector in an air duct with velocities ranging up to 2,000 feet per minute.

B. SmartOne Photoelectric Detector
   1. The SmartOne Photoelectric Detector, Model PSD-7252, shall be a microprocessor-based smoke detector. The photoelectric detector shall be a light scattering type, low

profile, intelligent detector that senses a broad range of smoldering and flaming-type fires. The sensing chamber shall permit a full 360° smoke entry.

2. Each photoelectric detector shall be electronically addressable and fully field-programmable. It shall be possible to set an alert threshold anywhere from 0.2 to 3.4% per foot obscuration in 0.1%-per-foot increments, and to set an alarm threshold anywhere from 0.5 to 3.5% per foot obscuration in 0.1%-per-foot increments. Alarm thresholds shall be dynamically adjustable as a result of another alarm event anywhere in the system. Where permitted, each detector shall be programmable for alarm verification in periods of up to 180 seconds in 1-second increments. Each detector shall provide a real-time value of current, local obscuration level in percent-per-foot readout when requested by an operator at the control unit.
3. It shall be possible to configure each photoelectric detector for non-latching operation to prevent inadvertent or spurious fire signatures from accidentally discharging a waterless extinguishing system. The control unit shall latch the alarm report, but the discharge sequence shall be interrupted if the fire signature at the detector drops below the detector's programmable alarm threshold
4. Detector calibration, address, alert and alarm thresholds, and drift-compensation algorithm shall be stored in each detector's non-volatile memory. Systems that store all detector parameters in the control unit (i.e., non-distributed-intelligence-to-the-device-level architecture) shall not be considered as equivalent.
5. A detector-housing, Model DH-2000, shall be available to allow a photoelectric detector to monitor for the presence of combustion products in an air duct. The detector housing shall be rated for air-duct velocities ranging from 500 to 4,000 feet per minute. It shall also be possible to mount the photoelectric detector in an air duct with velocities ranging up to 4,000 feet per minute.

C. SmartOne Thermal Detector

1. The SmartOne Thermal Detector, Model THD-7252, shall be a microprocessor-based heat detector. The thermal detector shall be a thermistor-type, low profile, intelligent detector that responds to a fixed temperature with minimal thermal lag. The sensing chamber shall permit a full 360° heat entry.
2. Each thermal detector shall be electronically addressable and fully field-programmable. It shall be possible to set both alert and alarm thresholds anywhere from 80°F to 155°F in 1°F increments. Each detector shall provide a real-time value of current, local temperature in °F readout when requested by an operator at the control unit.
3. It shall be possible to configure each thermal detector for non-latching operation to prevent inadvertent or spurious fire signatures from accidentally discharging a waterless extinguishing system. The control unit shall latch the alarm report, but the discharge sequence shall be interrupted if the fire signature at the detector drops below the detector's programmable alarm threshold.
4. Detector calibration, address, and alert and alarm thresholds shall be stored in each detector's non-volatile memory. Systems that store all detector parameters in the control unit (i.e., non-distributed-intelligence-to-the-device-level architecture) shall not be considered as equivalent.

3.7 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 Kidde Aries 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.

4. EXECUTION

4.1 SUPPRESSION SYSTEM INSTALLATION

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

4.2 ELECTRICAL SYSTEM INSTALLATION

A. The contractor shall install the system in accordance with the appropriate Kidde Fire Systems installation, operation and maintenance manual.

B. Locations of all electrical equipment, the Kidde Aries Control Unit, and all system components are subject to the approval of the architect.

C. All final-acceptance tests shall be performed in the presence of the architect and the authority having jurisdiction. 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 tests and results shall be provided to the architect, the authority having jurisdiction, and the end-user.

4.3 ROUTINE MAINTENANCE

A. Routine maintenance on equipment shall be performed as recommended by the manufacturer's installation, operation and maintenance manual, the relevant NFPA Codes and the requirements of the local Authority. The routine maintenance shall be performed by a contractor certified by Kidde Fire System and shall include:

1. Visual check of pipe network and distribution nozzles per the operation and maintenance manual.
2. Weight and pressure of the agent containers per the operation and maintenance manual.
3. Inspection of all cylinders and equipment for damage per the operation and maintenance manual.