

**1. GENERAL SPECIFICATION**

- 1.1 The contractor shall provide an Intelligent Linear Heat Detection System to perform the following functionality:
  - A. Fire Alarm, Supervisory and Trouble-Event Initiation
  - B. Occupant Notification
  - C. Event Zone Location Annunciation
  - D. Safety Procedures Activation and required Equipment Interlocks
  - E. Fire-Extinguishing System release, and
  - F. Off Premises Transmission.
- 1.2 The Intelligent LHS Linear Heat Detection System shall consist of a Kidde Aries control unit and LHS™ Linear Heat Sensor heat detection zones.
- 1.3 The linear heat detection zones shall consist of LHS™ Linear Heat Sensor cable – a fixed-temperature detector capable of detecting heat from a fire over its entire length.
- 1.4 The Kidde Aries control unit shall be an addressable, distributed-intelligence type control unit. Its distributed intelligence shall extend to the SmartOne® initiating devices on each signaling line circuit. Each 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 event signal to the control unit. Systems that use application-specific integrated circuits (ASICs) in the initiating devices, and rely on the control unit to analyze a stream of data from each initiating device to determine whether or not a fire signature is present at the initiating device's location, shall not be considered to be of sufficient distributed intelligence. Such systems shall not be considered as equivalent to the equipment specified herein.
- 1.5 The Intelligent LHS™ Linear Heat Sensor Detection System must be manufactured and/or supplied by Kidde Fire Systems, 400 Main Street, Ashland, MA 01721, U.S.A., phone: (508) 881-2000, URL: <http://www.kiddefiresystems.com>
- 1.6 The manufacturer shall warrant the Intelligent LHS Linear Heat Detection System manufactured by it for a period of eighteen (18) months from the date of shipment.
- 1.7 The system shall be supplied and installed by a factory authorized Kidde Fire Systems distributor. The distributor shall be trained by the manufacturer to design, install, test and maintain the Intelligent LHS™ Linear Heat Sensor Detection System and shall be able to produce a certificate stating such on request.
- 1.8 The factory authorized Kidde Fire Systems distributor shall confirm in writing that he stocks a full complement of spare parts and offers 24-hour emergency service for all

equipment being furnished.

- 1.9 All materials and equipment used for this project shall be new and unused.

## **2. CODES/STANDARDS COMPLIANCE**

- 2.1 The design, installation, testing and maintenance of the Intelligent LHS™ Linear Heat Sensor Detection System shall be in accordance to the following codes, standards and regulatory bodies:

- A. NFPA 13: Standard for the Installation of Sprinkler Systems
- B. NFPA 15: Standard for Water Spray Fixed Systems for Fire Protection
- C. NFPA 16: Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems
- D. NFPA 70: National Electrical Code
- E. NFPA 72: National Fire Alarm Code
- F. Factory Mutual Approval Guide (latest edition).
- G. Requirements of the local Authority Having Jurisdiction.

- 2.2 The Intelligent LHS™ Linear Heat Sensor Detection System shall be Factory Mutual System (FM) approved.

- 2.3 The manufacturer of the Intelligent LHS™ Linear Heat Sensor Detection System shall have a minimum of 15 years experience in the design, production and distribution of fire detection and fire alarm systems.

- 2.4 The manufacturer of the Intelligent LHS™ Linear Heat Sensor Detection System shall be certified to ISO 9001 for a minimum period of 5 years for the design, production and distribution of fire detection and fire alarm systems.

## **3. SYSTEM DESCRIPTION**

- 3.1 The Intelligent LHS™ Linear Heat Sensor Detection System shall consist of a Kidde Aries control unit and the LHS™ Linear Heat Sensor Detection zones. Each zone shall consist of a LHS™ Linear Heat Sensor Cable and its Addressable Input Module (AI). The LHS™ Linear Heat Sensor cable shall be of a fixed-temperature detector capable of detecting heat from a fire over its entire length.

## **4. COMPONENTS – DESCRIPTION AND OPERATION**

- 4.1 Basic Control Unit

- A. The control unit shall be a Kidde Aries Intelligent Control Panel. It shall consist of:

- 1. A printed-circuit board (PCB) with the main microprocessor, an integral

display/control assembly, and terminations for all field circuits

2. A primary power supply
  3. 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 communications 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.
- C. The integral display and control assembly shall provide an 80-character, backlit liquid-crystal display (LCD). The LCD shall be 2 lines by 40 characters and each SLC initiating and/or control device shall be identifiable by a label of up to 40 characters in length. The display and control assembly shall have control keys for system reset, event acknowledgement, alarm silence and multiple event scrolling, plus additional navigation keys for access to the system service and configuration menus. All user access to the system menus shall be password protected. A system buzzer shall annunciate each alarm, supervisory, or trouble event.
- D. 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. The communications protocol shall be fully digitized for speed and accuracy of data transmission. Communications protocols that are not fully digitized or that restrict the numbers and types of field devices that can be used on the signaling line circuit shall not be considered as equivalent. The signaling line circuit shall be capable of being wired in a Class-B, Style-4 manner, or in a Class-A, Style-6 or Style-7 configuration. Isolator modules shall be available for use with any of these wiring styles to prevent a short circuit fault from disabling the entire signaling line

circuit.

- E. All field devices connected to the SLC shall be electronically addressed and shall have a microprocessor with 4K of non-volatile memory. Each automatic initiating device shall be capable of independently determining whether or not a fire signature at its monitored location is of sufficient magnitude to warrant the issuance of an event signal to the control unit. The system's intelligence shall be distributed to the individual-initiating-device level. Systems that only distribute intelligence and/or processing power to the control unit circuit board level and rely on the control unit, rather than the initiating devices themselves, to determine whether or not an alarm condition exists at a specific location, or that use mechanically-operated code switches for device addressing, shall not be considered as equivalent.

#### 4.2 LHS™ Linear Heat Detection

- A. The Linear Heat Detection zone shall consist of Kidde LHS™ Linear Heat Sensor cable capable of detecting heat from a fire over its entire length and electronically addressable through a dedicated SmartOne Monitor Module, (AI).
- B. The Linear Heat Sensor cable shall consist of a twisted pair of 19AWG copper coated steel conductors covered by a temperature sensitive insulation, and protected by either a plastic braid or jacket for various environmental applications.
- C. Heat from a fire shall cause the Linear Heat Sensor Cable's special insulation to melt at a specific temperature, allowing the two conductors to short together, thus creating an alarm condition on the fire control panel.
- D. The Linear Heat Sensor cable shall be available in different operating temperatures (155°F, 185°F, 220°F, 350°F and 465°F). Operating temperature shall be elected based on the expected ambient temperature and manufacturer's recommendations.

#### 4.3 SmartOne Monitor Module (AI)

- A. The SmartOne Monitor Module, i.e., AI, shall be a microprocessor-based contact-input device that communicates with the Kidde Aries Control Unit via the signaling line circuit. The monitor module shall be a low-profile-type, intelligent device that mounts inside the electrical box that serves as the mechanical connection point for its monitored initiating device.
- B. Each monitor module shall be electronically addressable and fully field-programmable to function as any of following event-initiating device types: manual alarm, manual release, extinguishing-system abort, water-flow, supervisory, trouble, or off-normal status. Monitor modules shall be available in two models capable of monitoring either normally open or normally closed initiating-device contacts. Terminals shall be provided for the connection of an optional device-status LED.

- C. Monitor module functionality and address shall be stored in each AI's non-volatile memory. Systems that store monitor-module functionality in the control unit shall not be considered as equivalent.
- D. Monitor modules shall be sealed for use in harsh environments and ambient temperatures as low as -31°F.

#### 4.4 Mounting Hardware and Accessories

- A. The Sensor Cable shall be supported at a minimum of ten-foot intervals on straight runs and more as conditions dictate at corners and transition points to provide suitable strain relief. The Sensor cable shall be attached to supports that allow minimal movement.
- B. The Sensor Cable shall be installed with the following mounting hardware to insure proper support and adequate distance away from metal surfaces. All mounting hardware shall use a nylon cable clamp to fasten the Sensor Cable to the hardware.
  - 1. Master Clamp
  - 2. Flange Clip
  - 3. Nylon Cable Tie

#### 4.5 General Electrical Materials

- A. All electrical enclosures, raceways, and conduits shall be provided and installed in accordance with applicable codes and intended use, and shall contain only those electrical circuits associated with the fire-detection and control system. No circuit or circuits that are unrelated to the fire-suppression system shall be routed through the enclosures, raceways, and conduits dedicated to the fire-suppression system.
- B. All conductors shall be enclosed in rigid or thin-walled, steel conduit unless open wiring is permitted by the local electrical code.
- C. Any conduit or raceway exposed to dampness or other similar conditions shall be properly sealed and installed to prevent moisture entrapment. Provisions for draining and drying shall be employed as required.
- D. All wiring shall be of the proper size to conduct the circuit current, but shall not be smaller than #18 AWG unless permitted by the local electrical code. Wiring for the RX/TX signaling line circuit shall be in accordance with Kidde Fire Systems Signaling Line Circuit Wiring Recommendations. Wire that has scrapes, nicks, gouges, or crushed insulation shall not be used. The manufacturer's minimum wire-bending radii shall be observed in all enclosures, raceways, and conduits. Aluminum wire shall not be used.

- E. Splicing of circuits shall be kept to a minimum, and is only permitted in an electrical box suitable for the purpose. Appropriate hardware shall be used to make the wire splices. Wires that are spliced together shall have the same color insulation.
- F. White colored wire shall be used exclusively for the identification of the neutral conductor of an alternating-current circuit.
- G. Green colored wire shall be used exclusively for the identification of the earth-ground conductor of an AC or DC circuit.
- H. Appropriate color-coding shall be utilized for all other field wiring.
- I. All electrical circuits shall be numerically tagged with suitable markings at each terminal point. All circuits shall correspond with the installation drawings.

## **5. SUBMITTALS**

- 5.1 The factory-authorized Kidde Fire Systems Distributor shall provide the following drawings and documentation, acceptable to the local AHJ, for approval prior to starting any work on the project:
  - A. Plan and elevation drawings of the Intelligent Linear Heat Detection System showing the locations and mounting details of the Kidde Aries Control Unit and all field devices. Conduit routings shall be shown, with number of conductors, type of wire, and wire sizes indicated for each conduit segment.
  - B. Point-to-point wiring diagram showing the termination points for all field-wiring circuits to the Kidde Aries. All internal wiring and communications cabling shall be shown. All optional jumper settings shall also be indicated.
  - C. A secondary-power calculation that shows the quiescent- and alarm-power requirements for the Kidde Aries Control Unit and its peripheral 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.
  - D. A document detailing the sequence of system operations and outputs provided on the receipt of individual system activation inputs.
  - E. The contractor shall provide the following supporting materials for the equipment being utilized in this project:
    - 1. A complete component and equipment list with model numbers and Kidde Fire Systems part numbers
    - 2. Product information sheets for each item of equipment
    - 3. A theory of operations, with a description of system functionality

4. 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.
- 5.2 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 his responsibility to meet the requirements of the drawings and this specification.
- 5.3 The contractor shall submit a test plan that describes how the system shall be tested. This shall include a step-by-step description of all tests and shall indicate type and location of test apparatus to be used. Tests shall not be scheduled or conducted until the engineer of record approves the test plan.
- 5.4 The contractor shall submit Ten (10) copies of shop drawings and product data sheets.
- 5.5 The contractor shall submit Five (5) copies each of the LHS Linear Heat Detector and the Kidde Aries Design, Installation, Operation and Maintenance Manuals after complete installation.

## **6. SYSTEM INSTALLATION, COMMISSIONING AND MAINTENANCE**

- 6.1 The contractor shall install the system in accordance with the manufacturer's installation, operation and maintenance manual.
- 6.2 Locations of all electrical equipment, the Kidde Aries Control Unit, and all system components are subject to the approval of the architect.
- 6.3 The contractor shall be certified and trained by the manufacturer on design, installation, operation and maintenance of the LHS Linear Heat Detector and the Kidde Aries Control Unit. The certification must be valid throughout the completion time period for the project.
- 6.4 Final Commissioning Tests
  - A. The contractor shall record all equipment, tests and system configurations.
  - B. All final-acceptance tests shall be performed in the presence of the architect and the authority having jurisdiction. The extinguishing system shall be disconnected during the acceptance testing.
  - C. All conductors shall be tested for continuity, shorts to earth ground and shorts between pairs.

- D. LHS Linear Heat Detectors shall be tested, and proper operation verified, in accordance with the appropriate Kidde Fire Systems installation, operation, and maintenance manuals.
- E. All notification appliances shall be tested for proper operation.
- F. A complete functional test shall be conducted to confirm the operation of the system to the requirements of this specification.
- G. A copy of the commissioning tests and results shall be provided to the architect, the authority having jurisdiction, and the end-user.
- H. The system shall be properly armed and readied for its intended service following the successful completion of the commissioning tests. The end user shall be immediately notified when the system is put into service.
- I. The LHS Linear Heat Detector and the Kidde Aries Control Unit shall be maintained as recommended by the manufacturer's Design, Installation, Operation and Maintenance Manual, the relevant NFPA Codes and the requirements of the local Authority Having Jurisdiction