

1. GENERAL SPECIFICATION

- 1.1 The contractor shall provide an Intelligent AlarmLine 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 AlarmLine Linear Heat Detection System shall consist of a Kidde Aries control unit and AlarmLine™ Linear Heat Detection zones.
- 1.3 The linear heat detection zones shall consist of an Addressable AlarmLine™ Module (AAM) and AlarmLine™ Linear Heat Sensor cable – an analog-integrating type linear heat 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 AlarmLine Linear Heat 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 AlarmLine 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 AlarmLine Linear Heat 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 AlarmLine Linear Heat 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 AlarmLine Linear Heat Detection System shall be Factory Mutual System (FM) approved.
- 2.3 The manufacturer of the Intelligent AlarmLine Linear Heat 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 AlarmLine Linear Heat 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 AlarmLine Linear Heat Detection System shall consist of a Kidde Aries control unit and the AlarmLine™ Linear Heat Detection zones. Each zone shall consist of an AlarmLine Sensor Cable and its Addressable AlarmLine™ Module (AAM). The AlarmLine™ Linear Heat Sensor cable shall be of an analog-integrating type 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 AlarmLine™ Linear Heat Detection

- A. The Linear Heat Detection zone shall consist of Kidde AlarmLine™ Linear Heat Sensor cable capable of detecting heat from a fire over its entire length and electronically addressable through a dedicated SmartOne Addressable AlarmLine Module (AAM).
- B. AlarmLine Linear Heat Sensor Cable
 - 1. The Linear Heat Detector Sensor Cable shall be an integrating or averaging type detector cable that detects a localized hot spot or a low-level temperature increase over its entire length. Fixed temperature sensor cable is not acceptable.
 - 2. Changes in temperature shall produce a change in resistance between the Sensor Cable conductors. This resistance change shall be monitored by the Addressable AlarmLine Module to detect a pre-alarm or alarm condition.
 - 3. The Sensor Cable shall be capable of self restoration when temperature drops below its set point, provided it has not been heated above the temperature point of 257° F (125° C).
 - 4. The Sensor Cable shall consist of four 26AWG solid copper conductors each insulated with a negative temperature coefficient material. The conductors shall be twisted at a rate of approximately thirty turns per foot (90 per meter) to cancel

out potential high voltage inductance. The conductor insulation shall be color coded for ease of installation. The sensor cable shall have an outer protective extrusion of high temperature PVC material.

5. [OPTIONAL FOR -016 SENSOR] The sensor cable shall have an additional outer extrusion of nylon as additional protection against harsh environments.
6. [OPTIONAL FOR -019 SENSOR] The sensor cable shall have an outer braid of Phosphor Bronze to increase its tensile strength and for protection against abrasion.
7. The Sensor Cable alarm set point shall be set through the Kidde Aries Configuration Software.

C. SmartOne Addressable AlarmLine™ Module (AAM)

1. The AAM shall be a microprocessor-based initiating device that communicates with the Kidde Aries Control Unit via the signaling line circuit. The AAM shall be a low-profile-type, intelligent device that monitors one AlarmLine linear heat sensor cable for continuity and over-temperature fire signatures.
2. The AAM shall be cable of monitoring up to 3,200 ft (1000 m) of Linear Heat Sensor Cable.
3. The AAM shall be capable of monitoring the linear heat sensor cable for both open and short circuit conditions. Non-fire related short circuit conditions must not cause a false alarm condition.
4. The Interface Module shall be reset through the fire alarm control panel.
5. Each AAM shall be electrically addressable and fully field-programmable to issue both pre-alarm and alarm signals directly to the Kidde Aries Control Unit via the signaling line circuit.
6. The AAM functionality and address shall be stored in each AAM's non-volatile memory. Systems that store monitor module functionality in the control unit shall not be considered as equivalent.

4.3 Mounting Hardware and Accessories

5. 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.

A. 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

B. A Sensor Cable Heat Pad shall be used in critical areas where greater lengths of Sensor Cable need to be concentrated into a compact area. The Heat Pad shall also be used as a test point at the end of each Sensor Cable zone.

5.2 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 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.

6. SUBMITTALS

6.1 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:

- J. 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.
- K. 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.
- L. 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.
- M. A document detailing the sequence of system operations and outputs provided on the receipt of individual system activation inputs.
- N. 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.
- 6.2 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.
- 6.3 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.
- 6.4 The contractor shall submit Ten (10) copies of shop drawings and product data sheets.
- 6.5 The contractor shall submit Five (5) copies each of the AlarmLine Linear Heat Detector, the Addressable AlarmLine Module and the Kidde Aries Design, Installation, Operation and Maintenance Manuals after complete installation.

7. SYSTEM INSTALLATION, COMMISSIONING AND MAINTENANCE

- 7.1 The contractor shall install the system in accordance with the manufacturer's installation, operation and maintenance manual.
- 7.2 Locations of all electrical equipment, the Kidde Aries Control Unit, and all system components are subject to the approval of the architect.
- 7.3 The contractor shall be certified and trained by the manufacturer on design, installation, operation and maintenance of the AlarmLine Linear Heat Detector and the Kidde Aries Control Unit. The certification must be valid throughout the completion time period for the project.
- 7.4 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. AlarmLine Linear Heat Detectors shall be tested, and proper operation verified, in accordance with the appropriate Kidde 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 AlarmLine 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