

1. GENERAL SPECIFICATION

- 1.1 The contractor shall provide a LHS™ Linear Heat Sensor for early detection of fire or overheat condition in protected areas or equipment. The sensor cable shall be a fixed-temperature linear heat detector capable of detecting heat from a fire over its entire length. The LHS Linear Heat Sensor shall connect directly to any fire alarm panel initiating circuit.
- 1.2 The LHS™ Linear Heat Sensor 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>
- 1.3 The manufacturer shall warrant the LHS™ Linear Heat Sensor manufactured by it for a period of eighteen (18) months from the date of shipment.
- 1.4 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 LHS™ Linear Heat Sensor and shall be able to produce a certificate stating such on request.
- 1.5 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.
- 1.6 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 LHS™ Linear Heat Sensor shall be in accordance to the following codes, standards and regulatory bodies:
 - A. NFPA 70: National Electrical Code
 - B. NFPA 72: National Fire Alarm Code
 - C. Factory Mutual Approval Guide (latest edition).
 - D. Requirements of the local Authority Having Jurisdiction.
- 2.2 The LHS™ Linear Heat Sensor shall be Factory Mutual System (FM) approved.
- 2.3 The manufacturer of the LHS™ Linear Heat Sensor 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 Fire Alarm-Suppression 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 Linear Heat Detector shall consist of a LHS™ Linear Heat Sensor and the initiating circuit of any listed fire alarm control panel. The LHS Linear Heat Sensor shall connect directly to the control panel without the need for any additional modules. The sensor cable shall be a fixed-temperature linear heat detector capable of detecting heat from a fire over its entire length.

4. COMPONENTS – DESCRIPTION AND OPERATION

4.1 Linear Heat Detector Sensor Cable

- A. The Linear Heat Detector Sensor Cable shall be a LHS™ Linear Heat Sensor manufactured by Kidde Fire Systems. The Linear Heat Detector 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.
- B. Heat from a fire shall cause the Linear Heat Detector 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.
- C. The Linear Heat Detector 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 specific application taking into consideration the temperature of the hazard, the ambient temperature and the environment where the sensor is installed.
- D. The Linear Heat Detector Sensor Cable shall connect to any fire control panel as a dry-contact initiating device.
- E. The Linear Heat Detector Sensor Cable maximum zone length shall be determined by the electrical characteristics of the fire control panel initiating circuit.
- F. The Linear Heat Detector Sensor Cable conductor resistance shall be no more than 30.48 ohms per 1,000 feet.

4.2 Intrinsic Safety Barriers

- A. Intrinsic Safety Barriers must be used if the Sensor Cable is installed in the following hazardous classification areas:
 - 1. Class I, Division 1, Groups A, B, C, D
 - 2. Class II, Division 1, Groups E, F, G

4.3 Linear Heat Detector Sensor Cable Installation

A. Wiring Guidelines

1. The Linear Heat Detector Sensor Cable shall be run as a Class B (2-wire) or Class A (4-wire) circuit. The circuit must be run as a loop, with no T-taps allowed.
2. The Linear Heat Detector Sensor Cable maximum zone length shall be determined by the electrical characteristics of the fire control panel initiating circuit.
3. Lead-in cable shall be used for installations where the fire control panel is located some distance away from the protected space. The lead-in cable shall be any copper wiring approved for fire alarm use.
4. Copper wiring approved for fire alarm use shall be used to connect separate lengths of sensor cable within a zone.
5. For Class B (2-wire) circuit wiring, an end-of-line device compatible with the fire control panel shall be installed at the end of the Linear Heat Detector Sensor Cable zone.
6. The end-of-line device shall be installed in a junction box and located in an accessible area for testing and maintenance purposes.
7. All splices and electrical connections to the Linear Heat Detector Sensor Cable shall be protected by a standard electrical junction box or sealed with electrical tape or silicon fusion tape.
8. The Linear Heat Detector Sensor Cable connection shall be protected by a junction box when connecting to the copper lead-in wire, interconnecting cable, or an end-of-line device.

B. Mounting Guidelines

1. The Linear Heat Detector Sensor Cable shall be mounted in a professional manner, in accordance with any applicable codes and requirements.
2. The Linear Heat Detector Sensor Cable shall be adequately supported to prevent sagging.
3. The Sensor Cable shall be supported every 3 feet. Tension on the cable cannot exceed 50 Newtons. The Sensor Cable shall be bent on a radius no smaller than 2 inches.
4. Suitable mounting hardware shall be selected depending on the equipment or support structures in the area being protected. The sensor cable shall be attached to a support that permits the least amount of movement. Standard

mounting hardware (master clamp, flange clamp or nylon cable tie) shall be used to secure the sensor cable to support structures.

5. A Weather-tight Connector shall be used to provide strain relief where the sensor cable enters an electrical box or enclosure.
6. The Sensor Cable shall be protected from mechanical damage in non-detecting exposed areas by running it in electrical metallic tubing (EMT).
7. When passing through walls, the Sensor Cable shall be run in short pieces of EMT. The ends of the EMT must have bushings to prevent damage to the sensor cable.
8. Stainless steel cable shall be used as messenger cable, if the Sensor Cable needs to be suspended for some distance over an object or area, without a ceiling to attach the cable to.

4.4 Mounting Hardware and Accessories

- 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 shall secure the sensor cable to beam flanges up to ½" thick.
 2. Flange Clip shall secure the sensor cable to metal flanges, up to ¼" thick, on roof trusses or shelving.
 3. Nylon Cable Tie shall secure the sensor cable to pipes up to 8" in diameter.

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 detection and control system shall be routed through the enclosures, raceways, and conduits dedicated to the fire detection and control 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. 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. Green colored wire shall be used exclusively for the identification of the earth-ground conductor of an AC or DC circuit.
 - G. Appropriate color-coding shall be utilized for all other field wiring.
 - H. 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. Installation and Electrical layouts drawn to the scale depicting the locations and mounting details of the all equipment
 - B. Details of Auxiliary functions required such as equipment shutdown, door holders, etc.
 - C. The complete point-to-point conduit routing plan.
 - D. Internal Wiring Diagrams for the fire alarm control panel showing the power supply requirements and all field wire terminations.
 - E. Calculations performed in accordance with the Manufacturers recommendations to justify the capacities of all standby batteries used on the system.
 - F. A document detailing the sequence of system operations and outputs provided on the receipt of individual system activation inputs.
- 5.2 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.
- 5.3 The contractor shall submit Ten (10) copies of shop drawings and the manufacturers product data sheets.

- 5.4 The contractor shall submit Five (5) copies of the LHS™ Linear Heat Sensor installation instructions 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 The contractor shall be certified and trained by the manufacturer on design, installation, operation and maintenance of the LHS™ Linear Heat Sensor. The certification must be valid throughout the completion time period for the project.
- 6.3 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 results shall be provided to the end-user.
- 6.4 The LHS™ Linear Heat Sensor shall be maintained as recommended by the manufacturer's installation instructions, the relevant NFPA Codes and the requirements of the local Authority Having Jurisdiction.