

SECTION 00911 - ADDENDUM NUMBER 3

PARTICULARS

- 1.01 DATE: July 1, 2013
- 1.02 PROJECT: UNIVERSITY OF SOUTH CAROLINA, 350 WAYNE - FIRE PROTECTION UPGRADES
- 1.03 PROJECT NUMBER: State Project #H27-Z099, A/E #13016.01
- 1.04 OWNER: University of South Carolina
- 1.05 ARCHITECT: GMK Associates, Inc.
- TO: PROSPECTIVE BIDDERS
- 2.01 This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated May 31, 2013, and Addendum Number 1 issued June 26, 2013, and Addendum Number 2 issued July 1, 2013, with amendments and additions noted below.
- 2.02 Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may disqualify the Bidder.
- 2.03 This Addendum consists of 1 pages and the following attachments:
- A. Added specification section 16720

CHANGES TO THE PROJECT MANUAL

- 3.01 Add the attached specification section 16720 - Fire Detection, Alarm and Mass Notification to the project manual.
- A. Note: For this project, the FACP will only monitor the relevant sprinkler system devices as shown on the drawings and relay the signal to the monitoring devices as shown on the drawings and relay the signal to the monitoring station via telephone wires. Some devices are indicated in the specification in order to require the new panel to be expandable as per the spec.
- B. The specification section was not attached to addendum No. 1, therefore it is being re-issued.

END OF SECTION

PART 1 – GENERAL

1.1. SUMMARY

- A. This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.
- B. Work covered by this section includes the furnishing of labor, equipment, and materials for installation of the fire alarm system as indicated on the drawings and specifications.
- C. The Fire Alarm System shall consist of all necessary hardware equipment and software programming to perform the following functions:
 - 1. Fire alarm and detection operations
 - 2. Monitoring of the fire sprinkler system(s)
 - 3. Voice evacuation of the building(s) occupants
 - 4. One-way emergency communication system (mass notification)

1.2. ACCEPTABLE MANUFACTURERS

Manufacturers: All equipment must be UL Listed and meet the specifications herein. The only brands acceptable for use at the University of South Carolina are: Simplex, FCI (Fire Control Instruments) and Notifier. The contractor must also be certified to supply and install the equipment.

1.3. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract apply to this section.
- B. The system and all associated operations shall be in accordance with the following:
 - 1. IBC 2009
 - 2. NFPA 72, National Fire Alarm Code – 2010
 - 3. NFPA 70, National Electrical Code – 2008
 - 4. Other applicable NFPA standards
 - 5. Local Jurisdictional Adopted Codes and Standards
 - 6. ADA Accessibility Guidelines

7. SC Office of the State Engineer Regulations

1.4. SYSTEM DESCRIPTION

- A. General: Provide a complete, non-coded, addressable, microprocessor-based fire alarm system with initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein.
1. For this project, the FACP will only monitor the relevant sprinkler system devices as shown on the drawings and relay the signal to the monitoring station via telephone wires.
 2. This FACP will be expanded in the future to provide monitoring and notification for the adjacent building at 707 Catawba Street.
- B. Software: The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory. System shall be capable of storing dual configuration programs with one active and one in reserve. Panel shall be capable of full system operation during a new configuration download.
- C. History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. A separate alarm and trouble log shall be provided.
- D. Wiring/Signal Transmission:
1. Transmission shall be hard-wired, using separate individual circuits for each zone of alarm operation as required or addressable signal transmission, dedicated to fire alarm service only.
 2. System connections for initiating, signaling line circuits and notification appliance circuits shall be Class B.
 3. Circuit Supervision: Circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive indicating audible tone and alphanumeric annunciation.
- E. Required Functions: The following are required system functions and operating features:
1. Priority of Signals: Fire alarm events have highest priority. Subsequent alarm events are queued in the order received and do not affect existing alarm conditions. Priority Two, Supervisory and Trouble events have second-, third-, and fourth-level priority respectively. Signals of a higher-level priority take

- precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all events regardless of priority or order received.
2. Noninterfering: An event on one zone does not prevent the receipt of signals from any other zone. All zones are manually resettable from the FACP after the initiating device or devices are restored to normal. The activation of an addressable device does not prevent the receipt of signals from subsequent addressable device activations.
 3. Transmission to Remote Central Station: Automatically route alarm, supervisory, and trouble signals to a remote central station service transmitter provided under another contract. Fire alarm communication must be compatible with USC Public Safety system.
 4. Annunciation: Operation of alarm and supervisory initiating devices shall be annunciated at the FACP and the remote Annunciator (if provided), indicating the location and type of device.
 5. General Alarm: A system general alarm shall include:
 - a) Indication of alarm condition at the FACP and the annunciator(s).
 - b) Identification of the device /zone that is the source of the alarm at the FACP and the annunciator(s).
 - c) Operation of audible and visible notification devices throughout the building until silenced at FACP.
 - d) Notifying USC Public Safety.
 6. Supervisory Operations: Upon activation of a supervisory device such as fire pump power failure, low air pressure switch, and tamper switch, the system shall operate as follows:
 - a) Activate the system supervisory service audible signal and illuminate the LED at the control unit and the remote annunciator.
 - b) Pressing the Supervisory Acknowledge Key will silence the supervisory audible signal while maintaining the Supervisory LED "on" indicating off-normal condition.
 - c) Record the event in the FACP historical log.
 - d) Transmission of supervisory signal to remote central station.
 - e) Restoring the condition shall cause the Supervisory LED to clear and restore the system to normal.
 7. Alarm Silencing: If the "Alarm Silence" button is pressed, all audible alarm signals shall cease operation.
 8. System Reset

- a) The "System Reset" button shall be used to return the system to its normal state. Display messages shall provide operator assurance of the sequential steps ("IN PROGRESS", "RESET COMPLETED") as they occur. The system shall verify all circuits or devices are restored prior to resetting the system to avoid the potential for re-arming the system. The display message shall indicate "ALARM PRESENT, SYSTEM RESET ABORTED."
 - b) Should an alarm condition continue, the system will remain in an alarmed state.
9. A manual evacuation (drill) switch shall be provided to operate the notification appliances without causing other control circuits to be activated.
10. WALKTEST: The system shall have the capacity of 8 programmable passcode protected one person testing groups, such that only a portion of the system need be disabled during testing. The actuation of the "enable one person test" program at the control unit shall activate the "One Person Testing" mode of the system as follows:
- a) The city circuit connection and any suppression release circuits shall be bypassed for the testing group.
 - b) Control relay functions associated to one of the 8 testing groups shall be bypassed.
 - c) The control unit shall indicate a trouble condition.
 - d) The alarm activation of any initiation device in the testing group shall cause the audible notification appliances assigned only to that group to sound a code to identify the device or zone.
 - e) The unit shall automatically reset itself after signaling is complete.
 - f) Any opening of an initiating or notification appliance circuit wiring shall cause the audible signals to sound for 4 seconds indicating the trouble condition.
- F. Analog Smoke Sensors:
1. Monitoring: FACP shall have the capability of individually monitor sensors for calibration, sensitivity, and alarm condition, and shall individually adjust for sensitivity. The control unit shall determine the condition of each sensor by comparing the sensor value to the stored values.
 2. Environmental Compensation: The FACP shall have the capability to maintain a moving average of the sensor's smoke chamber value to automatically compensate for dust, dirt, and other conditions that could affect detection operations.
 3. Programmable Sensitivity: Photoelectric Smoke Sensors compatible with the

FACP shall have 7 selectable sensitivity levels ranging from 0.2% to 3.7%, programmed and monitored from the FACP.

4. Sensitivity Testing Reports: The FACP shall have the capability to provide sensor reports that meet NFPA 72 calibrated test method requirements. The reports shall be viewed on a CRT Display or printed for annual recording and logging of the calibration maintenance schedule.
 5. The FACP shall have the capability to automatically indicate when an individual sensor needs cleaning. The system shall provide a means to automatically indicate when a sensor requires cleaning. When a sensor's average value reaches a predetermined value, (3) progressive levels of reporting are provided. The first level shall indicate if a sensor is close to a trouble reporting condition and will be indicated on the FACP as "ALMOST DIRTY." This condition provides a means to alert maintenance staff of a sensor approaching dirty without creating a trouble in the system. If this indicator is ignored and the second level is reached, a "DIRTY SENSOR" condition shall be indicated at the FACP and subsequently a system trouble is reported to the Central Monitoring Station. The sensor base LED shall glow steady giving a visible indication at the sensor location. The "DIRTY SENSOR" condition shall not affect the sensitivity level required to alarm the sensor. If a "DIRTY SENSOR" is left unattended, and its average value increases to a third predetermined value, an "EXCESSIVELY DIRTY SENSOR" trouble condition shall be indicated at the control unit.
 6. The FACP shall have the capability to continuously perform an automatic self-test on each sensor which will check sensor electronics and ensure the accuracy of the values being transmitted. Any sensor that fails this test shall indicate a "SELF TEST ABNORMAL" trouble condition.]
 7. Multi-Sensors shall have the capability to combine photoelectric smoke sensing and heat sensing technologies. An alarm shall be determined by either smoke detection, with selectable sensitivity from 0.2 to 3.7 %/ft obscuration; or heat detection, selectable as fixed temperature or fixed with selectable rate-of-rise; or based on an analysis of the combination of smoke and heat activity.
 8. Programmable bases. It shall have the capability to program relay and sounder bases to operate independently of their associated sensor.
 9. Magnet test activation of smoke sensors shall be distinguished by its label and history log entry as being activated by a magnet.
- G. Audible Alarm Notification: have the capability to provide audible notification.
- H. Fire Suppression Monitoring:
1. Water flow: Activation of a water flow switch or pressure switch shall initiate general alarm operations.

2. Sprinkler valve tamper switch: The activation of any valve tamper switch shall activate system supervisory operations.
3. WSO: Water flow switch and sprinkler valve tamper switch shall be capable of existing on the same initiating zone. Activation of either device shall distinctly report which device is in alarm on the initiating zone.

I. Power Requirements

1. The control unit shall receive AC power via a dedicated 120VAC (15A) circuit.
2. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal AC power in a normal supervisory mode for a period of 24 hours with 5 minutes of alarm operation at the end of this period. The system shall automatically transfer to battery standby upon power failure. All battery charging and recharging operations shall be automatic.
3. All circuits requiring system-operating power shall be 24 VDC and shall be individually fused at the control unit.
4. The incoming power to the system shall be supervised so that any power failure will be indicated at the control unit. A green "power on" LED shall be displayed continuously at the user interface while incoming power is present.
5. The system batteries shall be supervised so that a low battery or a depleted battery condition, or disconnection of the battery shall be indicated at the control unit and displayed for the specific fault type.
6. The system shall support NAC Lockout feature to prevent subsequent activation of Notification Appliance Circuits after a Depleted Battery condition occurs in order to make use of battery reserve for front panel annunciation and control.
7. The system shall support 100% of addressable devices in alarm or operated at the same time, under both primary (AC) and secondary (battery) power conditions.
8. Loss of primary power shall sound a trouble signal at the FACP. FACP shall indicate when the system is operating on an alternate power supply.

1.5. SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and General Specification Sections.
 1. Product data sheets for system components highlighted to indicate the specific products, features, or functions required to meet this specification. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does

not comply with this specification.

2. Wiring diagrams from manufacturer.
 3. Shop drawings showing system details including location of FACP, all devices, and circuiting.
 4. Battery calculations.
 5. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, NAC, relay, Sensor, and auxiliary control circuits.
 6. Operation and maintenance data for inclusion in Operating and Maintenance Manual. Include data for each type product, including all features and operating sequences, both automatic and manual.
- B. Submission to Authority Having Jurisdiction: In addition to routine submission of the above material, make an identical submission to the authority having jurisdiction. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the Authority, make resubmissions if required to make clarifications or revisions to obtain approval.

1.6. QUALITY ASSURANCE

- A. Installer Qualifications: A factory authorized installer is to perform the work of this section.
- B. Each and all items of the Fire Alarm System shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by Underwriters Laboratories, Inc. (UL), and shall bear the "UL" label.

PART 2 – PRODUCTS

2.1. ADDRESSABLE MANUAL PULL STATIONS

- A. Description: Addressable single- or double-action type, red LEXAN, with molded, raised-letter operating instructions of contrasting color. Station will mechanically latch upon operation and remain so until manually reset by opening with a key common with the control units.
- B. Protective Shield: Where required provide a tamperproof, clear LEXAN shield and red frame that easily fits over manual pull stations. When shield is lifted to

gain access to the station, a battery powered piercing warning horn shall be activated. The horn shall be silenced by lowering and realigning the shield. The horn shall provide 85dB at 10 feet and shall be powered by a 9 VDC battery.]

2.2. SMOKE SENSORS – Addressable - FACP shall be compatible with SD’s meeting these requirements:

- A. General: Comply with UL 268, "Smoke Detectors for Fire Protective Signaling Systems." Include the following features:
1. Factory Nameplate: Serial number and type identification.
 2. Operating Voltage: 24 VDC, nominal.
 3. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation.
 4. Plug-In Arrangement: Sensor and associated electronic components are mounted in a module that connects to a fixed base with a twist-locking plug connection. Base shall provide break-off plastic tab that can be removed to engage the head/base locking mechanism. No special tools shall be required to remove head once it has been locked. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control unit.
 5. Quick Connect Arrangement: Photoelectric sensor and electronics in a single piece construction which shall twist-lock onto a mounting base that attaches to a standard electrical box.
 6. Each sensor base shall contain an LED that will flash each time it is scanned by the Control Unit (once every 4 seconds). In alarm condition, the sensor base LED shall be on steady.
 7. Each sensor base shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location.
 8. Each sensor shall be scanned by the Control Unit for its type identification to prevent inadvertent substitution of another sensor type. Upon detection of a "wrong device", the control unit shall operate with the installed device at the default alarm settings for that sensor; 2.5% obscuration for photoelectric sensor, 135-deg F and 15-deg F rate-of-rise for the heat sensor, but shall indicate a "Wrong Device" trouble condition.
 9. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.
 10. Sensors include a communication transmitter and receiver in the mounting base having a unique identification and capability for status reporting to the FACP. Sensor address shall be located in base to eliminate false addressing when replacing sensors.

11. Removal of the sensor head for cleaning shall not require the setting of addresses.
 - B. Type: Smoke sensors shall be of the photoelectric type.
 - C. Bases: The base shall be a 'sounder' base type.
- 2.3. HEAT SENSORS – Addressable – FACP shall be compatible with HD's meeting these requirements:
- A. Include the following features:
 1. Factory Nameplate: Serial number and type identification.
 2. Operating Voltage: 24 VDC, nominal.
 3. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation.
 4. Plug-In Arrangement: Sensor and associated electronic components are mounted in a module that connects to a fixed base with a twist-locking plug connection. Base shall provide break-off plastic tab that can be removed to engage the head/base locking mechanism. No special tools shall be required to remove head once it has been locked. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control unit.
 5. Each sensor base shall contain an LED that will flash each time it is scanned by the Control Unit (once every 4 seconds). In alarm condition, the sensor base LED shall be on steady.
 6. Each sensor base shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location.
 7. Each sensor shall be scanned by the Control Unit for its type identification to prevent inadvertent substitution of another sensor type. Upon detection of a "wrong device", the control unit shall operate with the installed device at the default alarm settings for that sensor; 2.5% obscuration for photoelectric sensor, 135-deg F and 15-deg F rate-of-rise for the heat sensor, but shall indicate a "Wrong Device" trouble condition.
 8. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.
 9. Sensors include a communication transmitter and receiver in the mounting base having a unique identification and capability for status reporting to the FACP. Sensor address shall be located in base to eliminate false addressing when replacing sensors.

10. Removal of the sensor head for cleaning shall not require the setting of addresses.
 - B. Thermal Sensor: Combination fixed-temperature and rate-of-rise unit with plug-in base and alarm indication lamp; 135-deg F fixed-temperature setting except as indicated.
 - C. Thermal sensor shall be of the epoxy encapsulated electronic design. It shall be thermistor-based, rate-compensated, self-restoring and shall not be affected by thermal lag.
 - D. Sensor fixed temperature sensing shall be independent of rate-of-rise sensing and programmable to operate at 135-deg F or 155-deg F. Sensor rate-of-rise temperature detection shall be selectable at the FACP for either 15-deg F or 20-deg F per minute.
 - E. Sensor shall have the capability to be programmed as a utility monitoring device to monitor for temperature extremes in the range from 32-deg F to 155-deg F.
- 2.4. ADDRESSABLE CIRCUIT INTERFACE MODULES – FACP shall be compatible with modules meeting these requirements:
(Interface modules shall only be required if shown on the contract drawings.)
 - A. Addressable Circuit Interface Modules: Arrange to monitor one or more system components that are not otherwise equipped for addressable communication. Modules shall be used for monitoring of waterflow, valve tamper, non-addressable devices, and for control of evacuation indicating appliances and AHU systems.
 - B. Addressable Circuit Interface Modules will be capable of mounting in a standard electric outlet box. Modules will include cover plates to allow surface or flush mounting. Modules will receive their operating power from the signaling line or a separate two wire pair running from an appropriate power supply as required.
- 2.5. STANDARD ALARM NOTIFICATION APPLIANCES – FACP shall be compatible with Devices meeting these requirements:
 - A. Horn: Piezoelectric type horn shall be listed to UL 464. The horn shall have a minimum sound pressure level of 85 dBA @ 24VDC. The horn shall mount directly to a standard single gang, double gang or 4" square electrical box, without the use of special adapter or trim rings.
 - B. Visible/Only: Strobe shall be listed to UL 1971. The V/O shall consist of a xenon flash tube and associated lens/reflector system. The V/O enclosure shall mount

directly to standard single gang, double gang or 4" square electrical box, without the use of special adapters or trim rings. V/O appliances shall be provided with different minimum flash intensities of 15cd, 75cd and 110cd. Provide a label inside the strobe lens to indicate the listed candela rating of the specific Visible/Only appliance.

- C. Audible/Visible: Combination Audible/Visible (A/V) Notification Appliances shall be listed to UL 1971 and UL 464. The strobe light shall consist of a xenon flash tube and associated lens/reflector system. Provide a label inside the strobe lens to indicate the listed candela rating of the specific strobe. The horn shall have a minimum sound pressure level of 85 dBA @ 24VDC. The audible/visible enclosure shall mount directly to standard single gang, double gang or 4" square electrical box, without the use of special adapters or trim rings.
 - D. Notification Appliance Circuit provides synchronization of strobes at a rate of 1Hz and operates horns with a Temporal Code Pattern March Time cadence operation. The circuit shall provide the capability to silence the audible signals, while the strobes continue to flash, over a single pair of wires. The capability to synchronize multiple notification appliance circuits shall be provided.
 - E. Accessories: The contractor shall furnish the necessary accessories.
- 2.6. NAC Power Extender – FACP shall be compatible with Power Extenders meeting these requirements:
- A. NAC Power Extender panels as needed shall be a stand-alone panel capable of powering a minimum of 4 notification appliance circuits. Notification appliance circuits shall be Class B Style Y rated at 2 amps each.
 - B. The internal power supply & battery charger shall be capable of charging up 12.7 Ah batteries internally mounted or 18Ah batteries mounted in an external cabinet.
 - C. The NAC extender panel may be mounted close to the host control panel or can be remotely located.
 - D. Alarms from the host fire panel shall signal the NAC power extender panel to activate. The panel shall monitor itself and each of its NACs for trouble conditions and shall report trouble conditions to the host panel.
- 2.7. VOICE/SPEAKER NOTIFICATION APPLIANCES – FACP shall be compatible with SD's meeting these requirements:
- A. Audible appliances shall conform to the applicable requirements of UL 464. Appliances shall be connected into notification appliance circuits. Audible appliances shall generate a unique audible sound from other devices provided in the building and surrounding area. Surface mounted audible appliances shall be

painted red. Recessed audible appliances shall be installed with a grill that is painted red.

1. Speakers shall conform to the applicable requirements of **UL 1480**. Speakers shall have six different sound output levels and operate with audio line input levels of 100 Vac, 70 Vac, 7 Vac, and 25 Vac, by means of selectable tap settings. Tap settings shall include taps of 1/4, 1/2, 1, 2, and 8 watt. Speakers shall incorporate a high efficiency speaker for maximum output at minimum power across a frequency range of 400Hz to 4000Hz, and shall have a sealed back construction. Speakers shall be capable of installation on standard 4 inch square electrical boxes. Where speakers and strobes are provided in the same location, they may be combined into a single wall mounted unit. All inputs shall be polarized for compatibility with standard reverse polarity supervision of circuit wiring via the Fire Alarm Control Panel.
2. Provide speaker mounting plates constructed of cold rolled steel having a minimum thickness of 16 gauge and equipped with mounting holes and other openings as needed for a complete installation. Fabrication marks and holes shall be ground and finished to provide a smooth and neat appearance for each plate. Each plate shall be primed and painted.

PART 3 – EXECUTION

3.1. INSTALLATION, GENERAL

- A. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.
- B. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
 1. Factory trained and certified personnel.
 2. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.
 3. Personnel licensed or certified by state or local authority.

3.2. EQUIPMENT INSTALLATION

- A. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient control unit(s), annunciator(s), manual stations, automatic fire detectors, smoke detectors, audible and visible notification

appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system as shown on the contract drawings and approved shop drawings.

3.3. WIRING INSTALLATION

- A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction (AH) and shall be installed in accordance with the appropriate articles from the current approved edition of NFPA 70: National Electric Code (NEC).
- B. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.
- C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.
- D. All fire alarm circuits shall be installed in metallic conduit, EMT or better. Flexible cabling may be used within 4 ft of an appliance as needed. Listed, metal clad fire alarm cable in lieu of EMT shall only be used with specific written approval of the Engineer.

3.4. FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.
- B. Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems. Examples of qualified personnel shall be permitted to include, but shall not be limited to, individuals with the following qualifications:
 - 1. Factory trained and certified.
 - 2. National Institute for Certification in Engineering Technologies (NICET) fire alarm certified.
 - 3. Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems.

- C. Pretesting: Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.
- D. Final Test Notice: Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.
- E. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72.
- F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Provide completed Record of Completion certificates as outlined in NFPA 72.
- H. Final Test, Certificate of Completion, and Certificate of Occupancy:
 - 1. Test the system as required by the Authority Having Jurisdiction in order to obtain a certificate of occupancy.

3.5. CLEANING AND ADJUSTING

- A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Clean unit internally using methods and materials recommended by manufacturer.
- B. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

3.6. TRAINING

- A. Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance personnel as specified below.
 - 1. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 8 hours' training.
 - 2. Schedule training with the Owner at least seven days in advance.

END OF SECTION 16720