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PART 1 - INTRODUCTION

1.1 PURPOSE

- A. This section is intended to define the general installation and minimum product requirements for fire alarm systems.


PART 2 - GENERAL DESIGN REQUIREMENTS

2.1 SUMMARY

- A. This section describes procedures and provisions that are applicable to all fire alarm designs.
- B. Arrange a pre-design meeting with Yale Fire Services to review system design.
- C. Refer to other divisions of Yale Standards for related requirements.

2.2 REFERENCES

- A. Designs shall conform to the following National, State, and Local Codes and Standards, Underwriters Laboratory’s listings (UL), and as directed by Yale to include FM Global guidelines for design, install, and maintaining the system in accordance with Data Sheets 5-40 and 5-48.
 1. Connecticut State Building Code with Connecticut Supplement (2018 or most current adopted version) which includes the 2015 ICC family of codes (or most current adopted version) and Connecticut amendments.
 2. Connecticut State Fire Safety Code (2018 or most current adopted version).
 3. Connecticut State Fire Prevention (2018 or most current adopted version).
 4. NFPA 13 Standard for Installation of Sprinkler Systems (2013 or most current adopted version).
 5. NFPA 14 Standard for Installation of Standpipe Systems (2013 or most current adopted version).
 6. NFPA 20 Standard for the Installation of Fire Pumps (2013 or most current adopted version).
 7. NFPA 70 National Electrical Code (2017 or most current adopted version) and as amended by the State Building Code.
 8. NFPA 72 National Fire Alarm Code (2013 or most current adopted version).
 9. NFPA 101 Life Safety Code As adopted and amended in Section 29-292 of the Connecticut General Statutes (or most current adopted version).
 10. ASME/ANSI A17.1 Safety Code for Elevators and Escalators adopted and amended in Section 29-291 of the Connecticut General Statutes (or most current adopted version).
 11. ASME/ANSI A117.1 Accessible and Usable Buildings and Facilities Standard (edition as determined by reference from building codes above).

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12. ADA Standards for Accessible Design (2010 or most current adopted version).
13. Any additional requirements outlined in local ordinances as required by the Authority Having Jurisdiction (AHJ) and Yale Fire Prevention and Engineering Services.

2.3 SUBMITTALS


- A. Information to be submitted by suppliers to Owner is described in Fire Alarm specifications.
- B. Construction documents shall require submittal of product data and shop drawings for all equipment for which acceptable manufacturers are listed in this Design Criteria manual. The following information will be required to be submitted with product data and shop drawings:
 1. Cover sheet (in addition to letter of transmittal), 8-1/2 inches by 11 inches, attached to each copy of all submittals, indicating name of project, Yale project number, items included in submittal (with specification reference), names of contractor and fire alarm subcontractor, and number and date of submission. Cover sheet shall include minimum 6 inch high by 8-1/2 inch wide space for review stamps and comments.
 2. Manufacturer's catalog cuts, specifications, and other data required to demonstrate compliance with specified requirements, with all options and accessories clearly indicated. Dimensional drawings, wiring diagrams, capacity calculations, etc., are to be included where applicable. All products should be made in the U.S.A.
 3. Evidence of listing of equipment by a nationally recognized testing laboratory.
 4. Manufacturer's installation instructions and operation and maintenance instructions.
 5. Warranty information for all products for which warranties in excess of one year are required or offered without additional cost.

2.4 SYSTEM DESCRIPTION/PERFORMANCE


- A. A field survey of the area where the work is to be performed must be conducted by the engineer of record or his/her designee BEFORE the system is designed.
- B. Fire Alarm designs shall take into account the needs of the end users and the actual conditions, which will be encountered in the field during construction. Coordinate locations of equipment with existing and new architectural, structural, and other trade work. Fire alarm panels must have a minimum clear space of at least three feet in front of the panel, or the width of the cabinet access door, whichever is greater. All devices and associated components must be easily accessible and readily identified from floor level, either directly or via remote indicators.
- C. Construction drawings shall reflect as closely as possible the actual locations of equipment and the actual routing of wiring.

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- D. Construction shall include provisions for FIRE WATCH and as needed, a temporary fire alarm system for obtaining a Temporary Certificate of Occupancy. The temporary fire alarm system shall be in strict accord with requirements of Yale University Office of the Fire Marshal.
- E. Equipment such as fire alarm panels and associated power supplies, disconnects, and the likes shall be surface mounted in dedicated 2 hour rated rooms or closets.
- F. Provide a fire alarm annunciator panel at the designated fire department access point(s) into building.
- G. All wiring shall be concealed in conduit where possible or as directed. Exposed conduit shall be used in unfinished areas where fully coordinated with architecture, structure, and other trade work.
- H. The manufacturer's authorized representative to provide on-site supervision of installation. Final connection between equipment and the wiring systems to be made under direct supervision of the manufacturer's representative.
- I. System shall connect to Yale Central Station via fiber, dedicated phone line, IP line, cell phone, and/or Hesh Net as directed by the Yale Central Station Manager.
- J. Earthquake Protection: Seismic Bracing. Requirements to follow NFPA 13, ASCE 17, IBC and IMC.
- K. General Sequence of Operations:
 - 1. Activation of any fire alarm initiating device shall cause the following actions and indications:
 - a. Activate "ALARM" notification to the fire alarm control panel indicating device address, type, location, time and date.
 - b. Activate same "ALARM" notification to all remote annunciator panels.
 - c. Activate same "ALARM" notification to Yale Central Station.
 - d. Record all events to the system historical log and control panel printer.
 - e. Activate associated initiating device LED alarm indicator.
 - f. Activate audible and visual notification appliances.
 - g. Activate shutdown of air movers.
 - h. Close fire/smoke dampers.
 - i. Release magnetically held doors.
 - j. Release magnetically locked doors.
 - k. Actuation shall also cause an additional visual and audible annunciation in the elevator cab and required annunciators to alert all building occupants, fire fighters, and other emergency personnel that the elevators are no longer safe to use.
 - 2. Alarm activation of an elevator lobby smoke detector, elevator machine room smoke detector or any single elevator shaft smoke detector shall automatically:

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- a. Provide those automatic alarm functions as described above.
 - b. Shall cause the recall of that bank of elevators to the terminal floor and the lockout of controls. In the event of recall initiation by detector(s) in the first floor lobby, the recall shall be to the alternate floor.
 - c. Elevator recall activation shall also cause activation of all required hoist-way vents to open and mechanical ventilation fans to operate in fire emergency smoke evacuation mode.
 - d. Alarm activation of any heat detector/sensor in the elevator shaft or machine room shall, after field settable timed delay, activate shunt-trip device to disconnect power from elevator and elevator cab lighting.
3. Activation of any supervisory circuit shall cause the following actions and indications:
- a. Activate "SUPERVISORY ALARM" notification to the fire alarm control panel indicating device address, device type, device location, and time.
 - b. Activate same "SUPERVISORY ALARM" notification to all remote annunciator panels.
 - c. Activate same "SUPERVISORY ALARM" notification to Yale Central Station.
 - d. Record all events to the system historical log and control panel printer.
 - e. Audible signals shall be silence able from control panel by an acknowledge switch.
 - f. System alarm shall over-ride any supervisory condition.
 - g. Supervisory conditions shall include the following:
 - 1) Fire Protection Valve Tamper Switches
 - 2) High/Low Fire Protection Pressure Switches
 - 3) High/Low Fire Protection Temperature Sensors
 - 4) Emergency Power Transfer Switches
 - 5) Elevator Power Mainline Disconnects
 - 6) Fire Pump Main Disconnect (unless with locked "closed" per NEC 695)
 - 7) Carbon Monoxide Detection with Temporal-4 Alarm
 - 8) Fire Pump Running, Power Failure, Phase Reversal
 - 9) Generator Running and Transfer to Emergency Power
 - 10) Fire Suppression Systems for Cooking Operations
 - 11) System Connected to Dormitory Smoke Detectors (where provided)
 - 12) Sub-System Supervisory Signal (Pre-Action, FM 200, etc.)
 - 13) Critical Heat Tracing for Life Safety Systems
4. Receipt of a system trouble shall cause the following actions and indications similar to "System Supervisory Functions" above.
- a. Activate "TROUBLE ALARM" notification to the fire alarm control panel indicating device address, device type, device location, and time.
 - b. Activate same "TROUBLE ALARM" notification to all remote annunciator panels.
 - c. Activate same "TROUBLE ALARM" notification to Yale Central Station.
 - d. Record all events to the system historical log and control panel printer.
 - e. Audible signals shall be silence able from control panel by an acknowledge switch.

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- f. System alarm shall over-ride any trouble condition.
- g. Trouble conditions shall include the following:
 - 1) AC Power Failure
 - 2) Low Battery
 - 3) Open Circuits
 - 4) Ground Fault
 - 5) Short Circuits
 - 6) Generator Trouble
 - 7) Fire Pump Trouble
 - 8) Sub-System Trouble Signal (Pre-Action, FM 200, etc.)
 - 9) Miscellaneous: Leak Detection

L. Sequence of Operations for Systems with Sounder Bases:

1. Be able to send separate signals to Yale Security via the DMP for each of the following. Splitting up the supervisory signal may require additional modules:
 - a. Fire Alarm
 - b. Trouble
 - c. Supervisory (Sprinkler)
 - d. Supervisory (Apartment smoke detector)
 - e. Supervisory (Carbon Monoxide)
2. The following items will activate a Fire Alarm:
 - a. Pull stations
 - b. Common area or retail smoke detectors
 - c. Common area or retail heat detectors
 - d. Sprinkler waterflows/dry system pressure switches
 - e. More than one apartment smoke detector activation within a suite
 - f. More than one carbon monoxide activation within suite/building
 - g. In suite(s) with a single smoke detector, general fire alarm will be activated after the single detector is exposed to smoke for 60 seconds (Alarm Verification).
3. The following will activate a Supervisory (Sprinkler)
 - a. Sprinkler valve tamper switches
 - b. Dry system low air
 - c. Fire Pump (pump run, power failure, phase reversal)
4. The following will activate a Supervisory (Smoke Detector)
 - a. Single smoke detector activation within an apartment
 - b. Duct detectors

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5. The following will activate a Supervisory (Carbon Monoxide)


a. A single carbon monoxide detector activation within an apartment or in a common area, with understanding some carbon monoxide devices may be requires to cause a fire alarm.

M. Supervisory signals with visible and audible indications shall be “latching” within timeframe, at locations, and restoring in accord with NFPA 72 requirements.

PART 3 - MINIMUM PRODUCT REQUIREMENTS

3.1 GENERAL REQUIREMENTS

- A. Provide a fully addressable fire alarm for new or replacement systems and multiplexed for pre-existing systems where conventional devices must be retained subject to Yale approval.
- B. Fire alarm shall be an integrated system for control and monitoring of equipment by other divisions.
- C. The system shall include all required hardware and software to accomplish the requirements of the fire alarm specification whether itemized or not.
- D. Preferred fire alarm system manufacturers are as follows:
 - 1. Siemens Industries supplied by Siemens; Cromwell, CT.
 - 2. Gamewell/FCI (Honeywell) supplied by ESC; West Hartford, CT.
- E. The system shall include, but not be limited to, the following elements:
 - 1. Main central processing unit (CPU) and control for fire alarm.
 - 2. All remote control panels as required by the system or by design.
 - 3. Power supplies, batteries and battery chargers for each panel enclosure as required. Batteries larger than 15 AH rating must be installed in a separate enclosure. Batteries shall be sufficiently sized to achieve a minimum of 90 hours stand-by followed by 15 minutes of alarm.
 - 4. Intelligent, addressable, manual pull stations, heat detectors, analog smoke detectors, alarm monitoring modules, and supervised control modules.
 - 5. Audible and visual evacuation signaling devices.
 - 6. Remote amplifier panels for audible and booster panels for visual signaling devices
 - 7. Software and firmware as required to provide a complete functional system.

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8. System logging system (printer) with alternate source power receptacle.
9. Remote annunciator panel(s).
10. Conduit, raceways, boxes, and wire.


F. Cabinet locks for control and annunciator panels shall be per Yale standards.

3.2 FIRE ALARM SYSTEM POWER SUPPLIES

- A. Primary power for all fire alarm panels and secondary power battery chargers shall be in a separate conduit and obtained from a dedicated 120VAC source circuit breaker(s) in a Yale Alternate Source panel located in a readily accessible location of building. Breakers shall be locked in the “on” position via a locking attachment as an integral part of enclosure or assembly, not readily removed from the breaker or switch as defined by NEC. Handle locks that can be readily removed are not permissible.

3.3 SMOKE DETECTORS, INTELLIGENT (ADDRESSABLE)

- A. The detectors furnished shall be listed for use in environments as covered by FM Global, UL (JROX) conforming to UL standard UL268 for open area type smoke detectors and UL268A for duct smoke detectors.
- B. Detectors shall be installed according to the requirements of NFPA 72 for open area coverage. Pay special attention to high and/or irregular ceiling conditions such as sloped, pitched, vaulted, beamed, which require additional coverage.
- C. Where spot type detectors are not practical, utilize beam type detectors in accord with manufacturer’s documented installation guidelines. All beam sets shall be equipped with a remote test station.
- D. Utilize heat detectors where environment not conducive for smoke detection in such locations as custodial closets, bathrooms and shower areas, kitchens and cooking areas, mechanical equipment rooms exposed to steam.
- E. Detectors shall be installed in a manner that provides accessibility and periodic inspection, testing, and maintenance.
- F. Devices in areas where environmental conditions are outside of the listed operating parameters shall have the addressable electronics remotely located in a heated space of building. This also applies to all other initiating devices (i.e. pull stations) having addressability.
- G. The detectors shall be suitable for two wire operation and two-way communications on the intelligent analog signaling circuit.
- H. The detector shall display a flashing LED when the system is operating from normal or standby power


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and not in a trouble or alarm mode.

- I. The detector shall display a solid red LED when in alarm mode.
- J. The detectors shall have intelligent self-compensating technology so to minimize nuisance alarms.
- K. Address and sensitivity assignments shall be programmed electronically and devices requiring dip switches, rotary switches, staples or jumpers are not acceptable.
- L. In residential buildings where the fire alarm system has bedroom smoke detection monitored by the building fire alarm the following shall apply;
 - 1. All smoke detectors in bed rooms and common rooms shall have sounder bases to produce a low frequency (520Hz +/-10%) alarm signal with square wave or equivalent wakening ability.
 - 2. In single bed rooms, the smoke detector shall have alarm verification set for 60 seconds. When the detector activates, the building fire alarm will activate the sounder base in an “alarm” condition. The building fire alarm will also send a “supervisory” single station smoke detector activation to the Yale Central Alarm Station. If the detector is still in an “alarm” mode after 60 seconds, the building fire alarm will activate a general alarm and send an “alarm” signal to the Yale Central station.
 - 3. In residential buildings with a suite configuration with bedrooms off a common area, any smoke detector activation in the bedrooms or common area will cause all associated sounder bases to activate. The building fire alarm system will transmit a “supervisory” single station smoke detector activation to the Yale Central Station. If a 2nd smoke detector in the area activates, the building fire alarm system will turn off the sounder bases and activate a building general fire alarm. The building fire alarm system will transmit an “alarm” signal to the Yale Central Station.
 - 4. CO (carbon monoxide) detection shall be provided in areas of all buildings containing fuel burning appliances or fuel burning fireplaces per the Connecticut State Fire Safety Code, as required by the State Building Code or Connecticut State Fire Protection Code, in accordance with NFPA 720 and International Fire Code. Installation of CO detectors shall be in accord with the manufacturer’s documented guidelines.
 - 5. All sounder bases shall produce a distinctive activation signal consisting of a Temporal 3 signal for smoke detector alarm and Temporal 4 for carbon monoxide detector alarm.
 - 6. Stand-alone smoke and/or CO detector systems are not acceptable in dormitory bedrooms.

3.4 NOTIFICATION APPLIANCES

- A. All audio/visual devices shall meet or exceed the most recent requirements of Americans with Disabilities Act (ADA) and as indicated elsewhere in this standard.
- B. Ceiling devices are permitted as a strobe mounting alternative where ADA heights of 80” to 96” on

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wall is not achievable or desirable subject to the Architect and Yale.


- C. All new fire alarm visual indicating devices shall be synchronized. Where additional fire alarm visual indicating devices are added to an existing circuit, a synchronization module shall be installed to ensure all devices, both old and new are synchronized.
- D. Provide suitable metallic mounting boxes listed for the application, device, and colored accordingly.
- E. Devices Installed in Cold Rooms, Hot Rooms, Refrigerators, Freezers, Exterior of Buildings, and the likes with extreme operating temperatures:
 - 1. Strobe or LED flashing visual fire alarm devices installed in these spaces with separate extreme climate control must be “weather proof” with all necessary gasketing installed on the device and electrical box to maintain the UL listing for a weatherproof device.
 - 2. Electrical conduit surviving any weather rated fire alarm device must be made “liquid tight” at the connection with the weather rated box. Conduit must be insulated to prevent condensation from forming in the device and internally sealed at ends to prohibit moisture from condensing in the conduit or device. Conduit shall be installed in such a way (i.e. bottom) so any condensation which might form will not flow into the weatherproof electrical box serving the device.
- F. In buildings equipped with voice evacuation capabilities built into the fire alarm system, all new fire alarm indicating devices will be speaker/strobe type, installed in such a way that ALL occupants in the area of the newly installed devices can clearly hear (15dB above the ambient) and clearly understand (intelligibility) the voice message.

3.5 FIRE PROTECTION WATER FLOW, TAMPER SWITCH, AND SUPERVISORY SWITCH

- A. Existing and new tamper switches, water flow devices, air supervisory switches, and the likes for wet sprinkler, dry sprinkler, and standpipe systems shall be connected into the new fire system. Refer to drawings for quantity, type, and location of devices.
- B. Provide all required interfacing modules for a complete operational system. All monitor modules must have an indicator light to signify status.

3.6 DOOR HOLD OPEN DEVICES

- A. All magnetic door hold open devices must be 120 VAC, supplied by a dedicated 20 amp circuit with label indicating panel source and circuit number.
- B. The door hold open circuit shall be controlled by either an indicating fire alarm relay module or an addressable smoke detector relay base. If a relay module is used, it must be clearly visible from floor level and not installed behind a door or access panel. If located within an accessible ceiling, a remote marker is to be provided on ceiling tile directly below relay module in cavity.

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- C. A system smoke detector must be installed within five feet of the door with the mag holder installed. If the transom above the door is greater than eighteen inches between the top of the door and the ceiling, smoke detectors must be installed on both sides of the door.

3.7 REMOTE INDICATOR LIGHTS

- A. A remote indicator light shall be installed for any area not readily accessible (hazardous spaces, restricted spaces, shafts, hung ceilings, raised floors, etc.) that have a system detector installed. Indicators shall be located above entrance door to the protected space and for when hidden, located directly below or above device to be visible from floor. The light shall be clearly marked with the detector address and shall display a steady red LED signal when the corresponding device is in alarm.

3.8 END OF LINE RESISTORS


- A. End of line resistors shall be installed in the proximity of last unit on each circuit with permanent marker having the required labeling.
- B. Locations of all end of line resistors shall be indicated on floor plans and turned over to Yale as part of close out documentation. This shall permit ready testing and maintenance of system after installation.

3.9 IDENTIFICATION AND LABELING


- A. A permanent label is to be placed on the base of each device and/or on the face plate of the monitor or control module with the address number of that device. The label size will be large enough to be read from the floor and approved by Yale Fire Marshal's Office.
- B. All end of line resistor locations must be clearly marked on the device. The permanent label must be large enough to be read from the floor and approved by the Yale Fire Marshal's Office.
- C. All fire alarm audio/visual indicating appliances must clearly labeled with the visual circuit number, audio circuit number, and if applicable, the end of line resistor location.

3.10 WIRING

- A. All wiring in business, assembly, residential colleges, and mixed use 3 stories or higher shall be in conduit and shall be installed in strict compliance with all provisions of NEC Article 760 A & C for power limited fire protective signaling circuits, if required, may be reclassified as non-power limited and wired in accordance with NEC Article 760 A & B. Upon completion, the Contractor shall so certify in writing to the Owner and Contractor.
- B. A separate ground (isolated from conduit ground) must be pulled to all fire alarm equipment cabinets.
- C. Loads greater than 10 Amperes (for auxiliary functions) to be in an isolated conduit.

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- D. Provide 3/4" empty conduit, with drag line to telecommunications closet for telephone and/or data tie to Yale Security. Yale Telecom to provide conduit termination location.
- E. Conductor Type, Size, and Makeup
 - 1. Initiation Circuits: 2/C#14 AWG min, CU, Solid, Twisted Shielded Pair.
 - 2. Horn/Strobe Circuits: 2/C#14 AWG min, CU, Solid, Twisted Shielded Pair.
 - 3. Speaker Circuits: 2/C#14 AWG min, CU, Solid, Twisted Pair (Non-Shielded).
 - 4. Strobe Circuits: 2/C#14 AWG min, CU, Solid, Twisted Shielded Pair.
- F. For 120VAC Power and Battery Connections: #10 AWG minimum upsized accordingly for voltage drop, CU, Stranded, XHHW-2 as indicated in Yale standards for "Conductors and Cables".
- G. Use of stranded conductors with maximum of 7 strands for #16 AWG and 19 strands for sizes #14 AWG larger is permitted in replacement of solid copper only. Proper UL connectors must be used with stranded wire as indicated in Yale standards for "Conductors and Cables".
- H. All wire shall be in conduit, properly sized, and not to be smaller than 3/4" as indicated in Yale standards for "Raceways and Boxes". Vertical runs to be made in conduit without exception. Horizontal runs can be made with metallic surface raceway subject to Yale approval.
- I. Wiring of Flow Switches, Pressure Switches, Tamper Switches, and Low Air Switches are not to be combined. They are to be addressable points interfaced with monitor modules with the main Fire Alarm Panel. Furnish and install a minimum 18" of liquid tight flexible metallic conduit for the conductor at each water flow device, pressure switch, tamper switch, and low air switch.
- J. Wire color code requirements for fire alarm systems shall be as follows:
 - 1. Detection Circuits: Positive + Black
Negative - White
 - 2. Manual Pull Stations: Positive + Black
Negative - White
 - 3. Audible Circuits: Positive + Red
Negative - Blue
 - 4. Water Flow: Positive + Black
Negative - White
 - 5. Pressure Switch: Positive + Black
Negative - White


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|-----------------------------------------------------------------------|----------------------------------------------------------------------------|
| 6. Tamper Switch: | Positive + Black
Negative - White |
| 7. Low Air Switch: | Positive + Black
Negative - White |
| 8. Door Holders: | Positive + Yellow
Negative - Orange |
| 9. Remote Reset Annunciator: | Zone Wires: Brown
AC Neutral: White
DC Neutral: Grey |
| 10. Remote Lights: | Positive + Brown
Negative – Grey |
| 11. Key Switches:
Alarm Silence
System Reset
Trouble Silence | Blue with White Stripe
Red with White Stripe
Green with White Stripe |
| 12. 24 Volt DC Power: | Positive + Red
Negative – Black |
| 13. 120 Volt AC Power: | Positive + Black (Hot)
Negative – White (Neutral)
Ground: Green |
| 14. Firemen’s Phone: | Positive + Yellow
Negative - Blue |
| 15. Fan Shutdown: | Positive + Purple
Negative - Pink |

PART 4 - EXECUTION

4.1 LICENSE

- A. All fire alarm work shall be supervised by a certified NICET Level-III manufacturer's authorized representatives. Contractor shall provide names and certification numbers of all persons working on the fire alarm systems. The contractor shall provide this information to the Yale Project Manager.

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4.2 CLOSE OUT REQUIREMENTS

A. As Built Drawings:


1. As Built Drawings from the fire alarm contractor are to be provided for review and final printing to both the Engineer of Record for the Project and the Yale Office of the Fire Marshal. When approved and sealed, the final sets are to be printed and provided with reproducibles to the Yale plan room. A set of as built drawings shall also be located at the main fire alarm panel.

B. Warranty

1. The Contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent defect for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.
2. The equipment manufacturer shall make available to the Owner a contract proposal to provide a minimum of two (2) inspections and tests per year after the warranty period. Testing, service, and maintenance shall be in compliance with NFPA-72 guidelines and as applicable NFPA-3&4 standards for integrated systems.

C. System Testing:

1. Functional Testing: All equipment shall be pre-tested by the Contractor under supervision of a trained manufacturer's representative. System shall be demonstrated to perform all functions in the fire alarm specifications. This shall be done in preparation of the final acceptance testing.
2. Final Acceptance Testing: Contractor shall prepare an Acceptance Test Procedure (ATP) in accordance with NFPA 72 for testing the fire alarm system components and installation. Using the ATP, the Contractor shall be responsible for showing performance to the Authority Having Jurisdiction (AHJ) by demonstrating system functionality and verifying correct operation of all components, circuits, and programming.
3. Contractor shall provide an executed System Record Completion form in accord with NFPA 72. Projects that are to be FM approved, the Contractor shall include an executed Performance Checklist for New and Modified Fire Alarm Installations per Table 1 in FM Global Standards.
4. Certificates are to be completed and signed for each part of the system with copies provided to the Yale University Office of the Fire Marshal, Project Engineer, and Project Manager.
5. All testing equipment, instruments, tools, and labor required to conduct the system tests shall be made available by the Contractor.
6. All fire alarm system testing MUST be witnessed by a Yale University Fire Inspector.

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D. Attic Stock:

1. An agreed upon quantity with Yale of devices and single components shall be turned over as spare parts. Included shall be all necessary tools and associated equipment for system service, maintenance, and testing. This to be established as part of the pre-design meeting with Yale.

Date	Description of Change	Pages / Sections Modified	ID
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