SECTION 16723

ADDRESSABLE FIRE ALARM SYSTEM

1 PART 1 GENERAL

1.1 DESCRIPTION

A. This section outlines the requirements for the installation, programming and configuration of Addressable Fire Alarm System equipment at ANC. The existing system includes Fire Alarm Control Panels, Automatic and Manually Activated Voice Evacuation Alarm Subsystem, Automatic and Manually activated alarm Initiating and Indicating Peripheral Devices and Appliances.

B. The existing South Terminal Siemens Building Technology, Landis Division fire alarm system will be networked with the existing North Terminal Landis & Staefa system (now Siemens Building Technology, Landis Division) via the existing color graphic operator terminal located in the South Terminal as part of the Concourse C, Phase 2 Building Completion Package. An additional color graphic operator terminal will also be provided in the North Terminal located in the Building Maintenance Office (Room NA163 adjacent to the front lobby) as part of the project.

1.2 SYSTEM REQUIREMENTS

A. New fire alarm devices and equipment shall match existing devices and equipment as manufactured by Siemens Building Technology, Landis Division or EST. No other manufacturers are acceptable. While under warranty all modifications to the system shall be accomplished by the original equipment installer to preserve the warranty (Siemens Building Technology, Landis Division). ANC requirements noted below exceed minimum code requirements in some cases.

B. Provide additional control panels, zone/signal cards, equipment, batteries, programming (including programming at operator terminals and remote annunciators), etc., required to support new and existing fire alarm devices. All devices shall operate in accordance with existing system requirements.

C. Manual Pull Stations

1. Manual pull stations shall be provided at every exit from every level and additional pull stations shall be provided as required to ensure the travel distance to the nearest pull station does not exceed 200 feet.

D. Detection Requirements

1. Duct Detectors: Provide photoelectric duct detectors in supply and return paths of air supply fans larger than 2,000 cfm.

2. Fire/Smoke Dampers:

a. Provide photoelectric duct detectors for operation of fire/smoke dampers located in ducts in accordance with the IBC/IMC.

b. Provide 4D Multisensor smoke detectors for operation of fire/smoke detectors located in unducted openings in accordance with the IBC/IMC.

c. Detectors for operation of fire/smoke dampers in elevator shafts without sprinkler protection shall generate an alarm condition and cause operation of the associated damper, but shall not generate a general building alarm. Duct detectors associated with other smoke/fire dampers shall generate a general building alarm.

3. Door Release Service: Provide 4D Multisensor smoke detector(s) for door release control in accordance with NFPA 72 and Part 3 of this section.

E. Notification Appliance Requirements

1. Voice evacuation speakers/strobes shall be provided in Group A and B occupancy areas (typically all public and office areas). In other areas (typically bag makeup areas and mechanical/electrical rooms) combination horn/strobe units shall be provided. Service areas in Level 0 shall be provided with speaker/strobes. The type of device to be used in each area will be reviewed and approved by ANC as part of the Design Submittal reviews.

2. Required Sound Levels (as established by written agreement with the AHJ): The required sound levels for audible notification appliances shall be as follows:

a. Terminal/bag makeup areas: 70dBA

b. Office areas: 60dBA

In areas with voice evacuation the announcement tone shall meet the noted sound level requirements. The voice message shall be intelligible but has no specific sound level requirement.

3. Visual Signaling: Visual notification appliances shall be provided in accordance with NFPA 72 and MOA requirements.

F. Monitoring Requirements

1. Provide monitoring of sprinkler flow, tamper and pressure switches as noted in Part 3 of this Section.

2. Provide monitoring of pre-action sprinkler control panels as noted in Part 3 of this Section.

3. Provide monitoring of kitchen hood extinguishing systems as noted in Part 3 of this Section.

G. Door Unlocking Devices

1. Any device or system intended to effect the locking/unlocking of emergency exits shall be connected to the building fire alarm system. These exits shall unlock upon receipt of fire alarm signal as noted in Part 3 of this Section.

1.3 REFERENCES

A. The equipment and installation shall comply with the current provisions of the following Codes and Standards:

1. National Electric Code, Article 760.

2. National Fire Protection Association Standards:

a. NFPA 72 , National Fire Alarm Code

b. NFPA 101, Life Safety Code

3. International Fire Code.

4. International Building Code.

5. International Mechanical Code.

6. Local and State Building Codes.

7. Local Authorities Having Jurisdiction.

8. Underwriters Laboratories Inc.

B. The system and all components shall be listed by Underwriters Laboratories Inc. for use in fire protective signaling system under the following standards as applicable:

1. UL 864/UOJZ, APOU Control Units for Fire Protective Signaling Systems.
2. UL 268 Smoke Detectors for Fire Protective Signaling Systems.
3. UL 268A Smoke Detectors for Duct Applications.
4. UL 217 Smoke Detectors Single Station.
5. UL 521 Heat Detectors for Fire Protective Signaling Systems.
6. UL 228 Door Holders for Fire Protective Signaling Systems.
7. UL 464 Audible Signaling Appliances.
8. UL 1638 Visual Signaling Appliances.
9. UL 38 Manually Activated Signaling Boxes.
10. UL 1971 Standard for Signaling Devices for the Hearing-Impaired.
11. UL 1481 Power Supplies for Fire Protective Signaling Systems.
12. UL 1711 Amplifiers for Fire Protective Signaling Systems.

C. Americans with Disabilities Act (ADA)

D. International Standards Organization (ISO)

1. ISO-9000
2. ISO-9001

1.4 SHOP DRAWING SUBMITTALS

A. Submit to the Authority Having Jurisdiction and obtain a written statement of Approval of proposed system revisions. This Approval shall be obtained prior to submitting to ANC.

B. Submit complete one-line risers and point-to-point-wiring diagrams prepared especially for the installation.

C. Provide conduit layout drawings of the system, indicating type, size and number of all conductors, conduits and junction boxes.

D. Provide calculations verifying standby battery capacity per NFPA 72, including manufacturer's published current consumption data for all equipment on the System.

E. Provide calculations verifying that notification appliance circuits voltage drops do not exceed the limits further specified in this Section.

F. Provide calculations verifying that audio amplifier circuits are sized in accordance with this Section.

G. Shop Drawings shall be prepared using CAD. Final approved Shop Drawings shall be updated with precise "as-built" conditions and shall be submitted with the Operations and Maintenance Manuals. File format shall be AutoCAD "DWG" or "DXF".

2 PART 2 PRODUCTS

2.1 GENERAL

A. Additional equipment furnished shall be new and unused. Existing equipment in good condition may be relocated and reused. The existing fire alarm system shall remain operational while the new equipment is being integrated into the system with exceptions only as allowed in Section 16010. The revised system shall be final accepted by the local authorities having jurisdiction and ANC.

B. System installation and operations shall be verified by the manufacturer's representative and a verification certificate presented upon completion. The manufacturer's representative shall be responsible for an on-site demonstration of the operation of the system in accordance with Part 3 of this section.

2.2 AUTOMATIC ALARM OPERATIONS

A. Alarm operations noted below are for each specific building, i.e., an alarm in the South Terminal shall only cause the noted alarm operations in the South Terminal.

B. Operation of each alarm input device shall show on the LCD display at each Control Panel and the Remote Alphanumeric Display Annunciators and shall light specified LEDs at the Remote Graphic Annunciator. Each Intelligent device shall annunciate individually except at the Remote Graphic Annunciator (see Remote Graphic Annunciator for specific requirements).

C. LCD display messages and Graphic Annunciator layout shall be approved by the Authority Having Jurisdiction and ANC prior to programming. Changes required by the AHJ or the Owner shall be implemented.

D. The system shall print the event on each system printer with the time and date, type, condition, and a user defined message.

E. The system shall display operational status of each signal circuit to inform the emergency user of the system status.

F. Upon alarm, the system shall sound the evacuation signals throughout the building.

G. Upon alarm, the system shall shut down the building's air supply fans. Shutdowns shall be hardwired from the Fire Alarm System (i.e., not implemented via building automation controls) and immediate acting, and shall not be overridden by Hand-Off-Auto switches or other controls.

H. Upon alarm, the system shall de-energize door holders to release fire doors. Provide separate circuit(s) as necessary for operation of all door holders. Door holder circuits shall be 120VAC, circuits from a normal power, 208Y/120V panelboard in the vicinity of the controlled doors. Submit for approval all proposed power sources prior to installation or connection of equipment.

I. Upon alarm, the system shall de-energize smoke dampers and smoke/fire dampers to close dampers. Provide a commandable relay for control of each damper.

J. Detectors for operation of fire/smoke dampers in elevator shafts without sprinkler protection shall generate an alarm condition and cause operation of the associated damper, but shall not generate a general building alarm. Detectors associated with other smoke/fire dampers shall generate a general building alarm.

K. Upon alarm, the system shall effect the locking/unlocking of emergency exits connected to the building fire alarm system.

2.3 EQUIPMENT

A. The existing South Terminal Addressable Fire Alarm System is a Model EST3, as manufactured by Siemens Building Technology, Landis Division.

B. The System includes the following features:

1. Audio Paging and Emergency Evacuation subsystem with fully digitized and multiplexed audio. One amplifier shall be supplied per speaker circuit to enhance system survivability.

2. Local Control and Display Annunciators

   a. Each panel in the installed system includes local Control and Display Annunciators.

3. Remote System Display (Point) Annunciators

   a. Each remote display annunciator panel in the installed system includes remote Control and Display Annunciators.

   b. No system control functions shall be accessible from the existing display annunciator located in the Safety Building.

4. Signalling line circuits shall be Class A (Style 7).

5. Hard Wired NAC Circuits: Supervised hard-wired Notification Appliance Circuits (NAC) for the control of 24Vdc Signaling Appliances shall be wired Class A (Style Z).

6. Integrated Audio

   a. The system includes distributed audio amplifiers, minimum of one for each speaker circuit, to ensure system survivability. If additional speaker circuits are required provide sufficient amplifiers to power system speakers at **maximum rated capacity of connected speakers (i.e., all speakers set at maximum tap)**. Include allowance for future speakers on new speaker circuit. Refer elsewhere in this section for spare capacity requirements (allowance for additional future system speakers).

2.4 INTELLIGENT DETECTORS

A. The System Intelligent Detectors shall be as follows:

1. Photoelectric Smoke Detector, SIGA-PS The photo detector shall be rated for ceiling installation at a minimum of 30 ft (9.1m) centers and be suitable for wall mount applications. The percent smoke obscuration per foot alarm set point shall be field selectable to any of five sensitivity settings ranging from 1.0 percent to 3.5 percent. The photo detector shall be suitable for operation in the following environment:

   a. Temperature: 32 degrees F to 120 degrees F (0 degrees C to 49 degrees C)

   b. Humidity: 0-93 percent RH, non-condensing

   c. Elevation: no limit

2. 4D Multisensor Detector, SIGA-IPHS: The 4D Multisensor smoke detector shall be rated for ceiling installation at a minimum of 30-feet (9.1m) centers and suitable for wall mount applications. The percent smoke obscuration per foot alarm set point shall be field selectable to any of five sensitivity settings ranging from 1.0 percent to 3.5 percent. The integral heat sensor shall cause an alarm when it senses a change in ambient temperature of 65 degrees F (35 degrees C) or reaches it fixed temperature alarm set point of 135 degrees F (57 degrees C) nominal. The 4D Multisensor detector shall be suitable for operation in the following environment:

   a. Temperature: 32 degrees F to 100 degrees F (0 degrees C to 38 degrees C)

b. Humidity: 0-93 percent RH, non condensing

c. Elevation : Up to 6,000 ft (1828 m)

3. Detector Mounting Bases

a. Standard Detector Mounting Bases, SIGA-SB / SIGA-SB4: Provide standard detector mounting bases (SIGA-SB or SIGA-SB4 as required).

b. Isolator Detector Mounting Bases, SIGA-IB / SIGA-IB4: Provide isolator detector mounting bases (SIGA-IB or SIGA-IB4 as required) every 10 devices.

4. Duct Detector Housing, SIGA-DH: Provide smoke detector duct housing assemblies (SIGA-DH) to facilitate mounting an intelligent analog photoelectric detector (SIGA-PS), along with a standard or isolator detector mounting base. Provide remote alarm LEDs (SIGA-LED) for each duct detector. Remote alarm LEDs shall be located in a readily visible location in the vicinity of the duct detector. Field coordinate exact location of remote alarm LEDs with ANC.

2.5 INTELLIGENT MODULES

A. Intelligent Modules shall be provided for monitoring or controlling equipment or circuits as required by the application.

1. Single Input Module, SIGA-CT1

2. Dual Input Module, SIGA-CT2

3. Monitor Module, SIGA-MM1

4. Waterflow/Tamper Module, SIGA-WTM

5. Single Input Signal Module, SIGA-CC1

6. Dual Input Signal Module, SIGA-CC2

7. Control Relay Module, SIGA-CR

8. Universal Class A/B Module, SIGA-UM

2.6 INTELLIGENT MANUAL PULL STATIONS

A. Double Action Manual Pull Station, SIGA-278

1. Provide intelligent double action, single stage fire alarm stations (SIGA-278). The fire alarm station shall be of Lexan construction with an internal toggle switch. Provide a key locked test feature. Finish the station in red with white “PULL IN CASE OF FIRE” lettering.

2.7 NOTIFICATION APPLIANCES

A. Self-Synchronized Strobes

1. Strobes, 405 Series: Provide strobes manufactured by EST, Cat No. 405 Series. In - Out screw terminals shall be provided for wiring. The strobes shall have a red metal faceplate. They shall provide 15 cd, 15/75 cd, 30 cd, 60 cd or 110 cd synchronized flash outputs as required by the application. The strobe shall have lens markings oriented for wall mounting. Provide weatherproof wall boxes for outdoor mounting.

B. Horns

1. Temporal Horns, 757 Series: Provide electronic horns manufactured by EST, Cat. No. 757 Series. In - Out screw terminals shall be provided for wiring. The horn shall have a

red plastic housing. Horns shall be selectable for high or low dBA output. Selection of low or high output shall be reversible. Horns shall be selectable for steady or temporal output. Selection of steady or temporal output shall be reversible. Provide weatherproof wall boxes for outdoor mounting.

C. Horn/Strobes

1. Temporal Horn/Strobes, 757 Series

a. Provide electronic horn/strobes manufactured by EST, Cat. No. 757 Series. In - Out screw terminals shall be provided for wiring. The horn/strobe shall have a red plastic housing. Horn/strobes shall be selectable for high or low dBA output. Selection of low or high output shall be reversible. Horns shall be selectable for steady or temporal output. Selection of steady or temporal output shall be reversible.

b. The strobe shall provide 15 cd, 15/75 cd, 30 cd or 110 cd synchronized flash output as required by the application. The strobe shall have lens markings oriented for wall mounting.

c. Provide weatherproof wall boxes for outdoor mounting.

D. Cone Speaker/Strobes

1. Four inch Wall or Ceiling Mount as required by the application, 757 Series

a. Provide speaker/strobes with a 4 inch Mylar cone as manufactured by EST, Cat. No. 757 Series. Paper type cones are not acceptable. The rear of the speaker shall be completely sealed protecting the cone during and after installation. In - Out screw terminals shall be provided for wiring. Speaker/strobe housings shall be red. Speakers shall be provided for use with 25V systems. Speakers shall provide power taps at 1/4w, 1/2w, 1w, and 2w. Speaker/strobes shall provide UL confirmed 87 dBA sound output at 2w.

b. Strobes shall provide 15 cd, 15/75 cd, 30 cd or 110 cd synchronized flash output as required by the application. The strobe shall have lens markings oriented for wall mounting or ceiling mounting as indicated on the drawings.

2.8 ANCILLARY DEVICES

A. Remote Relays: Provide remote control relays connected to supervised ancillary circuits for control of fans, dampers, door releases, etc.

1. Multi Voltage Control Relays, MR-100 Series: Relay contact ratings shall be SPDT and rated for 10 amperes at 115 VAC. A single relay may be energized from a voltage source of 24 VDC, 24 VAC, 115 VAC, or 230 VAC. A red LED shall indicate the relay is energized. A metal enclosure shall be provided.

2. Multi Voltage Control Relays, MR-200 Series: Relay contact ratings shall be DPDT and rated for 10 amperes at 115 Vac. A single relay may be energized from a voltage source of 24 VDC, 24 VAC, 115 VAC, or 230 VAC. A red LED shall indicate the relay is energized. A metal enclosure shall be provided.

2.9 ELECTROMAGNETIC DOOR HOLDERS, 1500 SERIES

A. Provide electromagnetic door holders with the following features.

1. Flush mounted wall units or floor units as required by door and application.

2. Silent operation.

3. Minimum 25 Lbf. (111 Nt) holding force.

4. 120V 60Hz operation.

5. Finish shall be brushed zinc.

6. EST 1500 Series.

2.10 EXISTING "FIREWORKS" COLOR GRAPHIC OPERATOR TERMINAL (SOUTH TERMINAL)

A. The existing Color Graphics Package (CGP) is an EST "Fireworks" Intelligent Interactive Computer Terminal. The CGP shall have full control over the systems being monitored through operator sign off/sign on procedures that are completely password controlled.

B. If required, existing floor plans will be updated by ANC for changes in the floor plan of the protected premises. Tenant shall provide ANC with AutoCAD plans suitable for this purpose.

C. The existing "Fireworks" color graphic terminal will be upgraded to a network compatible "Fireworks" terminal as part of the Concourse C, Phase 2 Building Completion Package. The existing terminal will be networked with the network capable "Fireworks" color graphics terminal being provided in the North Terminal as part of the Concourse C, Phase 2 Building Completion Package.

2.11 EXISTING "FIREWORKS" COLOR GRAPHIC OPERATOR TERMINAL NORTH TERMINAL

A. An EST "Fireworks" Intelligent Interactive Computer Terminal is being provided as part of the Concourse C, Phase 2 Building Completion Package. The CGP shall have full control over the systems being monitored through operator sign off/sign on procedures which are completely password controlled.

B. If required, existing floor plans will be updated by ANC for changes in the floor plan of the protected premises. Tenant shall provide ANC with AutoCAD plans suitable for this purpose.

2.12 EXISTING GRAPHIC ANNUNCIATOR PANEL

A. If required, the existing graphic layout will be revised to show revisions to the basic floor plan of the building by ANC. Tenant shall provide ANC with AutoCAD plans suitable for this purpose.

B. The South Terminal Annunciator Panel is located in a Level 1 entry vestibule at Baggage Claims.

C. The North Terminal Annunciator Panel is located in the Main Entry Lobby of the North Terminal.

2.13 SYSTEM MAP

A. If required, the system map on the wall beside each Fire Alarm Control Panel, will be updated by ANC to show any floor plan revisions, similar to that on the graphic annunciator. Tenant shall provide ANC with AutoCAD plans suitable for this purpose.

2.14 CONDUCTORS

A. In general, conductors shall be of the sizes and types recommended by the system manufacturer.

B. Voltage drop on Notification Appliance Circuits shall not exceed 10 percent at the most distant device on each circuit (including future devices as noted in 2.15 below).

2.15 SPARE CAPACITY

A. If available, existing spare capacity on existing notification and signaling line circuits may be utilized for additions to the system.

B. If additional Speaker Notification Appliance Circuits are required they shall be sized to allow a minimum of five additional future speakers to be added to each new circuit provided. Additional Notification Appliance Circuits (horn/strobe and strobe circuits) shall be sized to allow a minimum of five additional future devices to be added to each new circuit provided (assume 75cd strobes). For voltage drop calculation purposes, assume fifty feet for each added device (a total length of 250 feet).

C. If additional Signaling Line Circuits are required they shall be sized to provide a minimum of 20 percent spare capacity to allow future addition of devices.

2.16 SECONDARY SUPPLY CAPACITY AND SOURCES

A. The secondary power supply for emergency voice/alarm communications service shall be capable of operating the system under maximum quiescent load for 24 hours and then shall be capable of operating the system during a fire or other emergency for a period of 2 hours. Fifteen minutes of evacuation alarm operation at maximum connected load shall be considered the equivalent of 2 hours of emergency operation. For a combination system, the secondary supply capacity required above shall include the load of any non-fire related equipment, functions, or features which are not automatically disconnected upon transfer of operating power to the secondary supply.

B. The secondary supply consists of the following:

1. An automatic starting, engine driven generator arranged in accordance with NFPA 72 and storage batteries with 24 hours of capacity arranged in accordance with NFPA 72.

2. Operation on secondary power shall not affect the performance of the fire alarm system.

3 PART 3 EXECUTION

3.1 INSTALLATION (GENERAL)

A. The entire system shall be installed in a workmanlike manner in accordance with approved manufacturer's manuals and wiring diagrams. Provide all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation. All wiring shall be of the type recommended by the NEC, approved by local authorities having jurisdiction for the purpose, and shall be installed in dedicated conduit throughout.

B. All penetration of floor slabs and fire walls shall be fire stopped in accordance with all local fire codes.

C. Existing remote alphanumeric display annunciator, printer, and associated equipment in Safety Building dispatch room: ANC will provide all required reprogramming of display annunciator to support the revised system.

D. Existing Fireworks colorgraphic operator terminals in North and South Terminals: ANC will provide all required reprogramming of operator terminals to support the revised system.

E. Existing control and display annunciators in control panels: ANC will provide all required reprogramming of control and display annunciators to support the revised system.

F. Field coordinate exact mounting locations for all devices.

G. Wall mounted devices in finished areas such as pull stations and notification appliances shall be recessed in flush mounted junction boxes. Surface mounted box extensions shall not be used.

H. Adjust each detector in accordance with manufacturer's recommendations for the specific location and circumstance.

I. Control functions which include outputs activated by specific inputs, such as door releases, elevator recall, fan shutdown, damper operation, etc., shall have both inputs and associated outputs connected to the same control panel. All control functions shall be accomplished with addressable control modules. Control through relay bases is not acceptable.

J. Control relays shall be located within three feet of the device or circuit controlled in accordance with NFPA 72.

3.2 SYSTEM WIRING

A. All wiring shall be in metal raceways shared by no other system. Raceways shall be installed in accordance with Section 16111-CONDUIT AND FITTINGS. Paint conduit red at every box and at 10 foot intervals between boxes.

B. Field devices shall be installed in accordance with Section 16131-OUTLET BOXES. Paint boxes and covers red.

C. Install Conductors in accordance with Section 16120-WIRE AND CABLE. No wire nuts shall be used. All wires shall be landed on device terminals, or terminal strips or blocks, and shall be labeled and numbered at their terminations. All wiring shall be installed in a neat and workmanlike manner. Bundles of wiring shall be secured with self-locking nylon or Velcro cable ties, not tape. If terminal strips or blocks are required to transistion wire size down at devices, they shall not be located in the device junction box unless adequate space is available. Surface mounted box extensions shall not be used at recessed device locations to provide adequate room. If required, locate terminal strips or blocks in properly sized, separate junction boxes, located in accessible ceiling spaces. Clearly mark covers of junction boxes per Section 16010.

3.3 DUCT DETECTORS

A. Smoke dampers and fire/smoke dampers: Coordinate installation of duct-mounted detectors for control of smoke dampers and smoke/fire dampers with equipment and ANC. Locate duct mounted smoke detector within five feet of smoke/fire damper with no air inlets or outlets between detector and damper. Damper shall close when smoke detector goes into alarm.

B. Air Handling Units: Coordinate installation of duct-mounted detectors with equipment and ANC. Duct detectors shall be located in accordance with NFPA 72 and manufacturer's recommendation to the greatest extent practical. Proposed duct detector locations shall be submitted for approval during construction prior to installation of duct detectors. Submit duct detector differential pressure measurements to verify proper operation of duct detectors.

C. Provide remote LED indicators for all duct mounted smoke detectors. Provide a descriptive label in accordance with Section 16010 - IDENTIFICATION. Field coordinate location of remote LED indicators with ANC.

3.4 DETECTORS FOR DOOR RELEASE SERVICE

A. Coordinate installation of smoke detectors for control of bagbelt roll down area separation doors with ANC during construction prior to installation of detectors. All bagbelt roll down doors associated with the same bag makeup area shall close whenever any of the detectors controlling separation doors in the area go into alarm. All bagbelt roll down doors on the Level 2 shall close upon general alarm.

B. Ceiling-mounted detectors for door release service shall be centered on the opening, at a maximum distance of 5'-0" from opening. Minimum distance from opening shall be as noted in NFPA 72.

C. Overhead Doors: Provide local release only for overhead doors. Power roll down door release mechanism from battery backed-up fire alarm auxiliary power source.

3.5 MAGNETIC DOOR HOLDERS

A. Unless otherwise noted or specified or dictated by the specified holder design, magnetic door holders shall be mounted near the top of the doors they serve, and within 6 inches of the latch-side edge of each door served.

B. Door holders shall produce no objectionable hum. Repair, replace, or relocate all holders that produce audible hum.

3.6 DOOR UNLOCKING DEVICES

A. Any device or system intended to effect the locking/unlocking of emergency exits shall be connected to the building fire alarm system. The exits in each building shall unlock upon receipt of fire alarm signal in that specific building.

3.7 INTERCONNECTIONS TO OTHER SYSTEMS

A. Provide input modules for sprinkler flow, tamper, and low air pressure switches. Provide sufficient modules to give each switch an individual address. Connect supervised circuits from modules to switches and program system to provide specified functions for each switch.

B. Monitor pre-action sprinkler control panels for sprinkler flow, tamper and low pressure (if applicable) conditions. Provide output from fire alarm system to pre-action panel to operate pre-action valve to charge sprinkler piping when a minimum of two smoke detectors in the covered area go into alarm.

C. Connect kitchen hood extinguishing systems to fire alarm system so that activation of extinguishing system results in a general fire alarm condition. Provide control and monitor modules and connections to the extinguishing system panel alarm contacts to provide fire alarm functions and maintain shutdown functions. Coordinate connections with Division that hood system is provided under.

3.8 PROGRAMMING

A. ANC will provide system programming as required for operation of system.

3.9 TESTING AND REPORTS

A. Upon completion of the system installation, an Approved representative of the system manufacturer shall conduct a thorough test of the system and all related devices and components of the system, and submit a written report of the findings to ANC **at least 72 hours prior to the substantial completion site observation**. The testing shall include, as a minimum, verification of the following:

1. The functional operation of resettable initiating devices (manual stations, detectors, etc.) and circuit.
2. The functional operation of alarm devices and circuits.
3. The functional operation of monitored device circuits.
4. The functional operation of control and output circuits.
5. The supervision function of Initiating, Indicating, Monitoring, Control and Supply Circuits.
6. Central Station automatic signaling.
7. Proper initiation and execution of mechanical systems control sequences.

8. Verify that wire size, power supply, number of devices on a circuit, etc. are suitable to support 100 percent of devices being in alarm or operated simultaneously. Test shall include the following as a minimum:

    a. Place detectors and monitor modules in alarm. Each shall display its address and alarm condition. At least the first ten devices on each circuit shall also have their alarm LEDs lighted, where applicable.

    b. Operate control modules for the alarm or operated condition. Each module shall display its address and condition.

    c. Reset alarmed and operated devices. The panel shall display the address of any off-normal devices.

9. Test a representative number of detectors for trouble by removing the detector from its base. The address and trouble condition for each shall be displayed. Insert a different type of detector into the base. The address and trouble condition shall be displayed. The detector shall return to normal only when the proper detector type is reinserted into the base.

10. Print out the English-language descriptor, currently sensed value, prealarm threshold value, alarm threshold value and status of each sensor. Also print out the English-language descriptor and status of each module. The printout shall also include the date and time.

3.10 EXAMINATION

A. Prior to the commencement of the work, an examination and analysis of the area(s) where the Fire Alarm / Life Safety System and all associated components are to be installed shall be made.

B. Any of these area(s) which are found to be outside the manufacturers' recommended environments for the particular specified products shall be noted on a Site Examination Report which shall be given to ANC.

C. Any shorts, opens, or grounds found on existing wiring shall be corrected prior to the connection of these wires to any panel component or field device.

3.11 DEMONSTRATION

A. Each of the intended operations of the installed Fire Alarm / Life Safety System shall be demonstrated to ANC and the Local Authority Having Jurisdiction by the Installing Engineered System Distributor.

END OF SECTION