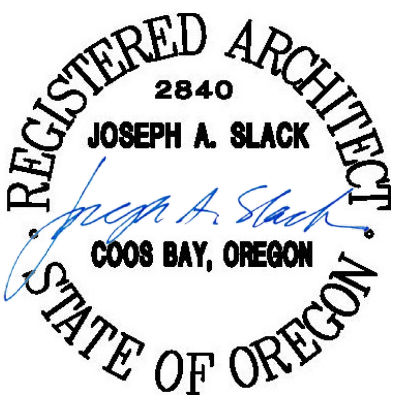
ADDENDUM #3 - OCTOBER 10, 2018



RE: **SOUTHWESTERN OREGON COMMUNITY COLLEGE (SWOCC)**
Health & Science Technology Building RE-BID
Project # 4713 (OPSIS) / #17.16 (HGE)

FROM: OPSIS Architecture
c/o HGE INC., Architects, Engineers & Planners
333 South 4th Street
Coos Bay, Oregon 97420
541-269-1166

TO: Prospective Bidders

This Addendum forms a part of the Contract Documents and modifies the original Documents dated 09.05.2018, as noted below. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.

This Addendum consists of **FOUR (4)** pages with the following attachments:

- Electrical Engineer Lighting Fixtures Substitution Requests Reviews, 5 pages total
- Section 00 01 10 Table of Contents, ADD#3
- Section 09 51 00 Acoustical Ceilings, ADD#3
- Section 28 31 11 Digital Addressable Fire-Alarm System

CHANGES TO PROJECT MANUAL:

1. **Section 00 01 10 Table of Contents:** REPLACE with attached revised Table of Contents, ADD #3. Revisions are as follows:
   - Lobbying Certification and Restriction Form is found in Section 00 45 46 Government Certification.
   - Sections with corrected section numbers are in **bold font.**
   - DELETED the following sections:
     i. Section 27 41 33 Television Systems
     ii. Section 27 51 16 Public Address System

2. **Section 00 52 00 Agreement Form, A101 Standard Form of Agreement Between Owner and Contractor, paragraph 5.1.6:** Change Retainage to Five percent (5.00%).

3. **Section 00 73 00 Supplementary Conditions, page 3, Item 2. 3.7 Permits, Fees, Notices, and Compliance with Laws:** ADD to paragraph a. 3.7.1 (1) "Owner shall also pay any Utility Provider fees."

4. **Section 09 51 00 Acoustical Ceilings:** REPLACE with attached revised Section 09 51 00. Revised specification corrects the name "Celotex" to "Certainteed" and Certainteed products are added to specified.

5. **INSERT** the following section in the Project Manual-Specifications. It was inadvertently omitted.

    - Section 28 31 11 Digital Addressable Fire-Alarm System

6. **Section 33 12 00 Water Utility Distribution Equipment, paragraph 2.4 A:** REPLACE with the following:

    "A. FDC
    1. FDC shall be 6-inch National Pipe Threads by (1) 4-inch threaded hose connection with 5-inch STORZ adapter.
    2. Finish: Cast Brass.
    3. FDC shall be as manufactured by Guardian Fire Equipment, Inc."

CHANGES TO DRAWINGS:

1. **Drawing Sheet L0.00 Landscape Schedule - Notes, General Planting Notes, 8:** DELETE reference to Kellogg's Acidall in its entirety. Refer to Soils Agronomy Report Sheet per L0.00, General Notes, Note 8 for recommended soil additives.

2. **Sheet L1.00 Overall Landscape Plan:** Add the following note: "Bark Mulch typical at all planting areas unless noted for rock or hydroseed."

3. **Sheet L1.00 Overall Landscape Plan, Hatch Legend, after 3/4" Open Quarry:** ADD the following: " typical at building perimeter".

4. **Drawing Sheet L2.10:** Plant labels (callouts) are for reference only. Refer to Plant Key with legend of plants and suggested quantities on Sheet L2.10 and Plant Schedule on Sheet L0.00.

5. **Sheet C9.20, Detail 11:** 2-3" of mulch to be Hydromulch / seed mixture per specifications. Refer to Section 32 90 00 Seeding.

6. **Sheet C9.20, Detail 12:** rock to be located at the base of pipe outlets and at edge of concrete walk to prevent erosion.

APPROVALS:

SPECIFIED SECTION	**SPECIFIED ITEM**	**APPROVED**
06 40 00 Architectural Woodwork, paragraph 2.1	Approved manufacturers	Action-Pride Cabinets, Inc., 63017 Sherman Rd., Bend, OR 97703; 541-383-2061; Fax: 541-330-3958
06 40 00 Architectural Woodwork, paragraph 2.1	Approved manufacturers	Aaron Carlson Corporation, 1505 Central Ave NE, Minneapolis, MN 55413; telephone 612-789-8885

07 21 00 Thermal Insulation, paragraph 2.2.C.1	Roxul Cavity Rock DD; INSUL-2, External Wall Cavity Mineral Wool Board	JM CladStone Water & Fire Block Insulation - 6.0pcf by Johns Mannville, 717 17th Street, Denver, CO 80202; 303-978-2434
07 21 19 Foamed-in-Place Insulation; paragraph 2.2A	Icynene MD-C-200; INSUL-6, Polyicynene Spray Insulation	JM Corbond III Closed-Cell Spray Polyurethane Foam Insulation by Johns Mannville, 717 17th Street, Denver, CO 80202; 303-978-2434
07 42 00 Composite Aluminum Panels, paragraph 2.1 A.1	MP-3, Pressure Equalized Rain Screen Wall Cladding System, Skyline Metal, Inc. System: SSMPER-X: Basis of Design	Panelwall 2300 by Bestworth Rommel, 19818 74th Ave. NE, Arlington, WA 98223; 514-501-6235/360-435-2927
07 54 19 Fully Adhered PVC Single Ply Membrane Roofing, paragraph 2.1	Approved manufacturers	.060 PVC Membrane by Mule-Hide Products, 1195 Prince Hall Dr., Beloit, WI 53511; 608-361-6828; www.mulehide.com
11 24 24 Safety and Tie-Back Anchors; paragraph 2.1	Approved manufacturers	Safeguard Industries, 7740 E Gelding Drive, Suite 110, Scottsdale, AZ 85260; 888-936-0752
23 09 00 Instrumentation and Controls for HVAC, paragraph 2.1A	Approved manufacturers	Siemens Talon (by Cascade Hydro-Air), PO Box 6892, Portland, OR 97228; 503-369-1759
23 09 00 Instrumentation and Controls for HVAC, paragraph 2.13 M	Control Dampers	Greenheck model VCD-43 by Johnson Air Products, 2220 SE Ninth Ave., Portland, OR 97214; 503-234-5071
23 36 00 Air Terminal Units, paragraph 2.3 Critical Environment Control Valve	Approved manufacturers	Price c/o ACI Oregon Mechanical & HVAC Sales; 503-238-6900

23 63 13 Air Cooled Condensers, paragraph 2.1A	Approved manufacturers	Daikin Applied Model RCS Split System Condensing Units C/O Air Reps LLC, 15860 SW Upper Boones Ferry Rd., Lake Oswego, OR; 503-620-4300; Note by Engineer: Must meet performance requirements (including max weight, clearance, etc.) specifications, and allocated footprint.
23 81 26 Split-System Air Conditioners; paragraph 2.1A	Approved manufacturers	Daikin AC model FTK/RK Ductless Split System Air Conditioners C/O Air Reps LLC, 15860 SW Upper Boones Ferry Rd., Lake Oswego, OR; 503-620-4300; Note by Engineer: Must meet performance requirements and specifications.
23 81 46 Air Source Heat Pumps, paragraph 2.1A	Approved manufacturers	Daikin AC model RXYQ168TATJU Large Capacity, VRV IV Heat Pump C/O Air Reps LLC, 15860 SW Upper Boones Ferry Rd., Lake Oswego, OR; 503-620-4300; Note by Engineer: Must meet performance requirements (including max weight, clearance, etc.) specifications, and allocated footprint.

See following this page Lighting Fixture Submittal Reviews by Mazzetti, of submittals from Malcar Northwest, The Lighting Project, and Northern Illumination Company; Mazzetti Submittal Reviews dated October 8, October 5, and October 8, respectively.

END OF ADDENDUM #3

SUBMITTAL REVIEW

PROJECT NAME: SWOCC Health and Science Technology Building
MAZ PROJECT NUMBER: 175-045
SPECIFICATION NUMBER: MALCAR18-28484
SUBMITTED ITEM(S): Lighting Fixtures Product Data

ACTION CODE:

A. NO EXCEPTIONS TAKEN
B. REJECTED
C. SUBMIT SPECIFIED ITEM
D. MAKE CORRECTIONS NOTED
E. REVISE & RESUBMIT

CHECKING IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. ANY ACTION SHOWN IS SUBJECT TO THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR: DIMENSIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE; FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATION OF HIS WORK WITH THAT OF OTHER TRADES; VERIFICATION OF QUANTITIES, SIZES AND SPECIFIC PHYSICAL CHARACTERISTICS OF INDIVIDUAL EQUIPMENT ITEMS; COORDINATION OF INTERDISCIPLINARY EQUIPMENT ASPECTS SUCH AS PROPER ELECTRICAL CHARACTERISTICS, AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER.

MAZZETTI

DATE October 8, 2018 BY Kait Mendenhall

ITEM	COMMENTS	ACTION CODE
E1- Arc	No exceptions taken. Architect to confirm finish.	D
	Architect to provide final approval based on aesthetics	
E1- AAL	Luminaires does not match profile and aesthetic of specified	B
E2	Provide with surface mount channel per detail by architect.	D
E3	Luminaires does not match profile and aesthetic of specified	B
E4	No exceptions taken, pending luminaire can be aimed down. Architect to confirm finish.	D
P1	Provide with dual circuit control of indirect-direct.	D
P1A	Provide with dual circuit control of indirect-direct.	D
P2	Provide with dual circuit control of indirect-direct.	D
	Provide with "Dim to Zero" dimming	
P3	Provide with dual circuit control of indirect-direct.	D
R1	No exceptions taken.	A
R1A	Provide with wall wash distribution	D
R2	No exceptions taken.	A
R3	No exceptions taken.	A
R4	Provide with surface mount channel per detail by architect.	D

PROJECT NAME: SWOCC Health and Science Technology Building
MAZ PROJECT NUMBER: 175-045
SPECIFICATION NUMBER: MALCAR18-28484
SUBMITTED ITEM(S): Lighting Fixtures Product Data

R5	Provide withrecessed mount channel.	D
R6	No exceptions taken.	A
R7	No exceptions taken.	A
R8	Provide with surface mount channel per detail by architect.	D
R11	Provide with vibrant LED source	D
R12	Provide with "Dim to Zero"	D
R13	Provide with vibrant LED source	D
S1	No exceptions taken.	A
S2	Provide with chain hanging hardware to address field conditions	D
S3	Additional information required for approval. (IE- Warranty, Rated Life, Size, etc)	B
S4A	Additional information required for approval. (IE- Warranty, Rated Life, Size, etc) Please specificatio is for Theatrical Luminaire	B
S4B	Additional information required for approval. (IE- Warranty, Rated Life, Size, etc) Please specificatio is for Theatrical Luminaire	B
S5	Luminaire does not equal performance of specified at over 100 lumens/watt	B
S6	Provide with surface mount channel per detail by architect.	D
S8	No exception taken	A
S9	Luminaire does not equal performance of specified at over 100 lumens/watt	B
S10	No exception taken	A
W1	No exception taken	A
W2	No exceptions taken.	A
W4	Cutsheet was missing	B
X	No exceptions taken.	A

END OF REVIEW COMMENTS

SUBMITTAL REVIEW

PROJECT NAME: SWOCC Health and Science Technology Building
MAZ PROJECT NUMBER: 175-045
SPECIFICATION NUMBER: TLPNW18-9031
SUBMITTED ITEM(S): Lighting Fixtures Product Data

ACTION CODE:

A. NO EXCEPTIONS TAKEN
B. REJECTED
C. SUBMIT SPECIFIED ITEM
D. MAKE CORRECTIONS NOTED
E. REVISE & RESUBMIT

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MAZZETTI

DATE October 8, 2018 BY Kait Mendenhall

ITEM	COMMENTS	ACTION CODE
E1	Luminaires does not match profile and aesthetic of specified	B
E2	Provide with surface mount channel	A
E3	No exceptions taken. Architect to confirm finish.	A
P1	No exceptions taken. Architect to confirm finish.	A
P1A	No exceptions taken. Architect to confirm finish.	A
P2	Provide with 1% dimming driver. Architect to confirm finish.	D
P3	No exceptions taken. Architect to confirm finish.	A
R1	No exceptions taken. Architect to confirm finish.	A
R1A	No exceptions taken. Architect to confirm finish.	A
R2	No exceptions taken. Architect to confirm finish.	A
R3	Provide with 5% 0-10V dimming. Architect to confirm finish.	D
R4	Provide with surface mount channel per detail by architect.	D
R5	Wet location not needed.	D
R6	Williams is an acceptable manufacturer, but provide rec downlight without lens	B
R7	No exceptions taken. Architect to confirm finish.	A

PROJECT NAME: SWOCC Health and Science Technology Building
MAZ PROJECT NUMBER: 175-045
SPECIFICATION NUMBER: TLPNW18-9031
SUBMITTED ITEM(S): Lighting Fixtures Product Data

R8	Provide with surface mount channel per detail by architect.	D
R10	Lumenwerx is acceptable, but final approval based on profile of the donor wall.	D
R11	Williams is an acceptable manufacturer, but provide rec downlight without lens Provide with flood distribution	B
R12	No exceptions taken. Architect to confirm finish.	A
R13	Williams is an acceptable manufacturer, but provide rec downlight without lens	B
S1	Provide with 5% 0-10V dimming. Architect to confirm finish.	D
S2	Provide with chain hanging hardware to address field conditions	D
S3	Provide with trailing edge dimming. Provide with soft focus lens. Architect to confirm finish.	D
S4A	Type S4A was specified as an adjustable theatrical luminaire what was mistakenly submitted as a cove luminaire	B
S6	No exceptions taken.	A
S7	Luminaire is not acceptable unless it can be offered in 3500K.	B
S8	Dimming not required.	D
S9	No exceptions taken.	A
S10	No exceptions taken.	A
S11	Luminaire is not acceptable unless it can be offered in 3500K.	B
W1	No exceptions taken. Architect to confirm finish.	A
W2	Lumianire does not match flat profile of specified product.	B
W4	No exceptions taken. Architect to confirm finish.	A
X	No exceptions taken.	A
	END OF REVIEW COMMENTS	

SUBMITTAL REVIEW

PROJECT NAME: SWOCC Health and Science Technology Building
MAZ PROJECT NUMBER: 175-045
SPECIFICATION NUMBER: 18-0544
SUBMITTED ITEM(S): Lighting Fixtures Product Data

ACTION CODE:

A. NO EXCEPTIONS TAKEN
B. REJECTED
C. SUBMIT SPECIFIED ITEM
D. MAKE CORRECTIONS NOTED
E. REVISE & RESUBMIT

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MAZZETTI

DATE October 5, 2018 BY Kait Mendenhall

ITEM	COMMENTS	ACTION CODE
E1	No exceptions taken. Architect to confirm finish.	D
	Architect to provide final approval based on aesthetics	
E3	No exceptions taken. Architect to confirm finish.	D
	Architect to provide final approval based on aesthetics	
E4	Luminaire does not match profile and aesthetic of specified luminaire	B
P1A	No exceptions taken. Architect to confirm finish.	D
R11	Approvale pending confirmation of 1% dimming and 90 CRI	D
	Submittal does not contain enough information for approval	
	enough information. Architect to confirm finish.	
R13	Approvale pending confirmation of 1% dimming and 90 CRI	B
	Submittal does not contain enough information for approval	
	enough information. Architect to confirm finish.	
S5	No exceptions taken.	A
S6	Provide with 45 degree channel.	D
CBE	Approval by Electrical Engineer	D
	END OF REVIEW COMMENTS	

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DIVISION 0 – PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 1 – GENERAL REQUIREMENTS

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DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

DIVISION 26 – ELECTRICAL

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END OF SECTION

ACOUSTICAL CEILINGS ADD#3

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment, and services necessary for the installation of suspended acoustical ceilings complete with suspension systems and glue-up installations on walls.

B. Related Sections:

1. Division 1 Section “Design-Build Requirements” for suspended acoustical ceilings.

1.2 REFERENCES

A. Acoustical and Insulating Materials Association Bulletin.

B. American Society for Testing and Materials (ASTM).

1.3 SUBMITTALS

A. Submit the following in accordance with Division 1 Section "Submittal Procedures."

B. Samples of exposed tee grid and acoustical board for review of color.

C. Shop drawings showing coordination of suspension grid layout with room dimensions and penetrations of ceiling mounted equipment. Include layout of systems utilizing acoustic isolation components.

D. Suspension System Design Data: Copies of Engineered Design calculations, drawings and documentation prepared by a structural engineer registered in the State of Oregon, showing compliance and classification of light, intermediate, or heavy duty system. Include manufacturer’s literature or ICC Reports and identification of connection devices and approved loading capabilities.

E. Manufacturer’s Suspension System Data: When using a standard 24-inch x 48-inch or 24-inch x 96-inch grid system in lieu of an Engineered Design, submit copies of manufacturer’s literature or ICC Report indicating light, intermediate, or heavy duty system. Include fixture schedule and other ceiling supported equipment and their weight, with connection devices and approved loading capabilities.

1.4 QUALITY ASSURANCE

A. Installer’s Qualifications: All work performed by skilled acoustical mechanics in the best and most professional manner. Material installed to provide a proper and symmetrical pattern in each area with joints straight and true and all corners level.

B. Regulatory Agency Requirements: All ratings in conformance with the Acoustical and Insulating Materials Association Bulletin.

C. Seismic Requirements:

2. Suspended acoustical ceiling systems, with or without lighting fixtures, air terminals, or other ceiling mounted items shall comply with the requirements of ASTM C635, ASTM C636, and the building code.

3. Ceiling areas of 144 s.f. or less surrounded by walls which connect directly to the structure above shall be exempt from these standards.

4. Light Duty systems to be used only where no loads other than ceiling acoustical materials weighing not more than 1.5 lbs./s.f. are supported by the suspension system.

5. Intermediate and Heavy Duty classification systems shall be used where suspension system is used to support acoustical material weighing more than 1.5 lbs./s.f., lighting fixtures or other equipment.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Properly store material within the building in such a manner and sufficiently in advance of installation to ensure adjustment to building temperatures and humidities.

1.6 PROJECT CONDITIONS

A. Do not begin installation until residual moisture from concrete, plaster and other wet application material is dissipated, building enclosed with permanent heating/cooling equipment in operation.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate with Division 26 for installation of lighting components integrated in the ceiling installation.

1.8 WARRANTY

A. Provide manufacturer’s standard warranty, one year minimum. This Warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.

1.9 MAINTENANCE

A. Extra Materials: Furnish to the Owner in factory-sealed containers a 2% overrun of acoustical board from the same production run as that used in this installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acoustical Board: Armstrong, Rockfon, USG, **CertainTeed Ceilings.**

B. Exposed Tee Grid: Armstrong.

C. Adhesive: Franklin International, 800-877-4583.

D. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."

2.2 MATERIALS

A. ACT-1, Acoustical Board:

1. Fiberglass with DuraBrite acoustically transparent membrane,, square tegular edge, 24-inches x 96-inches x 1-inch thick, IBC Class A flame-spread index per ASTM E84, LR 0.90, NRC 0.95, AC 190.

2. Product: Armstrong "Optima Square Tegular," 3282; **CertainTeed Ceilings Symphony F ##1346B-IOF-1;** color white.

3. Cloud Edge Trim: Armstrong “4-inch Axiom Vector”; **CertainTeed Ceiling Cloud Perimeter Trim #CAS-004.**

4. Shadow perimeter angle at walls.

B. ACT 2, Acoustical Board:

1. Fiberglass with DuraBrite acoustically transparent membrane, square tegular edge, 24-inches x 48-inches x 1-inch thick, IBC Class A flame-spread index per ASTM E84, LR 0.90, NRC 0.95, AC 190.

2. Product: Armstrong "Optima Square Tegular," 3252; **CertainTeed Ceilings Symphony F #1340B-IOF-1;** color white.

C. ACT-3, Acoustical Board:

1. Mineral fiber, square edge, smooth texture, 24-inches x 48-inches x 5/8-inch thick, IBC Class A flame-spread index per ASTM E84, LR 0.89, CAC 33 minimum. Minimum two coats factory-applied washable white vinyl latex paint.

2. Product: Armstrong "Kitchen Zone," 672; **CertainTeed Ceiling Vinylrock #1140-CRF-1;** color white.

D. ACT-4, Acoustical Board:

1. Stone wool, square lay-in edge, 24-inches x 48-inches x 1-inch thick; color, flat black; texture, smooth. Light reflection, 0.04. NRC, 0.85 - 0.95. Fire class, A. Fire performance. Flame Spread Index 5, Smoke Developed Index 0.

2. Product: Rockfon “Cinema Black”; **CertainTeed Ceilings Theatre Black #1940-THB-5.**

3. Locations:

a. Suspended ceiling grid, 2 boards stacked to achieve 2-inch thickness.

b. Walls, glue-up installation, 1-inch thick.

E. Suspension Systems:

1. Exposed Tee: Main and cross tees, 1-1/2-inches deep, 15/16-inch wide, exposed surfaces finished with flat baked enamel, color to match acoustical board. Matching wall angles and Armstrong BERC 2 seismic clips.

a. Products:

(1) Armstrong “Prelude XL Seismic Rx” at non-fire rated ceilings.

a Techzone Grid at ACT-1.

(2) Rockfon/Chicago Metallic Seismic 1200, 15/16, heavy duty, white, steel.

(3) **CertainTeed Ceilings Seismic Secure 15/16” Classic Stab Grid.**

F. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

G. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

H. Adhesive:

1. Solvent free polymer emulsion adhesive for acoustical materials, ASTM D1779, UL labeled fire resistant. IBC Class I flame-spread index as tested per ASTM E84.

2. Product: As approved by acoustical board manufacturer for glue-up wall installation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Adhesive Systems: Install acoustic tile over gypsum board backing using fire rated adhesive. Apply in non-directional pattern with finished surface in flat smooth plane.

B. Suspension Systems:

1. System to be supported on minimum 12 gauge galvanized hanger wire at 4-feet o.c. Suspension wires spaced at greater than 4-feet shall be 10 gauge.

2. Approved type attachment devices capable of supporting five times the ceiling load and not less than 100 lbs. Powder driven devices not permitted. Vertical wires attached with a minimum of three turns and not hang more than 1-in-6 out-of-plumb unless countersloping hangers are provided.

3. Carrying channels and main runners to be level within 1/8-inch in 12-feet with hangers taut. Bending or kinking of hangers not permitted. Deflection limited to 1/360 (1/8-inch) in 4-feet. Fixture loads causing excess deflection shall be independently supported or the grid supplementally supported within 6-inches of each corner, and such loads shall not cause rotation of runners more than 2 degrees from vertical. Provide trapeze type system where obstructions preclude direct attachment. All runners shall be supported within 8-inches of wall or discontinuity.

4. Lateral bracing required in lieu of Engineered Design installed within 4-feet of walls and at 12-feet o.c. in each direction. Install four 12 gauge wires within 2-inches of a main runner intersection with a cross runner and splayed at 90 degrees from each other and at an angle not exceeding 45 degrees of the ceiling plane.

5. Adjacent and parallel to the wall, secure a stabilizer bar to the members perpendicular to the wall to prevent spreading. The wall closure member may be used at two adjacent walls with clearances maintained at the other two walls.

6. Seismic Clips: Install in compliance with ASTM C636, CISCA, and standard industry practices.

7. Light Fixture Support:

    a. Positively attach all lighting fixtures to the suspended ceiling system. The attachment device shall have a capacity of 100% of the lighting fixture weight acting in any direction.

    b. When intermediate systems are used, 12 gauge hangers shall be attached to the grid members within 3-inches of each corner of each fixture. Tandem fixtures may utilize common wires.

    c. Where heavy-duty systems are used, supplemental hangers are not required if a 48-inch modular hanger pattern is followed. When cross runners are used without supplemental hangers to support lighting fixtures, these cross runners must provide the same carrying capacity as the main runner.

    d. Lighting fixtures weighing less than 56 lbs. shall have, in addition to the requirements outlined above, two 12-gauge hangers connected from the fixture housing to the structure above. These wires may be slack. Lighting fixtures weighing 56 lbs. or more shall be supported directly from the structure above by approved hangers.

    e. Pendant-hung lighting fixtures shall be supported directly from the structure above using 9 gauge wire or approved alternate support without using the ceiling suspension system for direct support.

8. Air Terminal Support:

    a. Ceiling mounted air terminals or services weighing less than 20 lbs. shall be positively attached to the ceiling suspension main runners or to cross runners with the same carrying capacity as the main runners.

b. Terminals or services weighing 20 lbs. but not more than 56 lbs., in addition to the above, shall have two 12-gauge hangers connected from the terminal or service to the ceiling system hangers or to the structure above. These wires may be slack.

c. Terminals or services weighing more than 56 lbs. shall be supported directly from the structure above by approved hangers.

C. Exposed Tee Suspension System: Where suspended acoustic tee bar ceilings are called for on the Drawings, the suspension system shall be an exposed T grid. Standard hangers placed 48-inches o.c. in both directions. Exposed metal parts finished with white baked enamel. Suspension system hung in a true plane with a grid pattern of 2-feet x 4-feet unless otherwise noted.

D. Tegular edge boards that are cut to fit less than full size ceiling grid modules shall have a matching tegular edge routed into the cut edge. Paint the routed tegular edge with paint type and color to match the factory finish.

3.2 COMPLETION

A. Adjusting Defective Work: Adjust grid height as required to maintain ceiling system leveled to within 1/8-inch in 12-feet. Remove and replace panels and tiles which are improperly placed, broken, or damaged. Adjust perimeter molding where gaps between molding and vertical surface exceeds 1/8-inch. Adjust suspension system grid to form flush hairline joints.

3.3 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 GENERAL

1.1 WORK INCLUDED

A. Fire alarm system design, approval from authorities having jurisdiction, installation and test including all components devices, hardware, software, conduit and wiring

B. Provide fully engineered design documents and shop drawings for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, calculations and description of operation

C. The system shall conform to all applicable sections of the NFPA and the Life Safety Code. The system shall also comply with the National Electrical Code (NEC), local codes, Building Code, UL wiring criteria, American with Disability Act (ADA) and authorities having jurisdiction.

1.2 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The Architectural, Mechanical and Electrical drawings may indicate in general location of equipment and devices. The Architect and Engineer make no representation that the quantity or location or devices shown on plans or indicated in these specifications is sufficient to satisfy authorities having jurisdiction.

1.3 SUMMARY

A. Not all items are applicable or listed:

1. Fire-alarm control unit.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Heat detectors.
5. Notification appliances.
6. Device guards.
7. Magnetic door holders.
8. Remote annunciator.
9. Addressable interface device.
10. Digital alarm communicator transmitter.

11. Network communications.

B. Related Requirements:

1. Section 280513 "Conductors and Cables for Electronic Safety and Security" for cables and conductors for fire-alarm systems.

1.4 DEFINITIONS

A. EMT: Electrical Metallic Tubing.

B. FACP: Fire Alarm Control Panel.

C. HLI: High Level Interface.

D. NICET: National Institute for Certification in Engineering Technologies.

E. PC: Personal computer.

1.5 SUBMITTALS

A. Documents

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect/Engineer. The submittal received by the Architect/Engineer is informational and for record purposes only. No review comments provided.

B. Product Data: For each type of product, including furnished options and accessories.

1. Copy (if any) of list of data required by authorities having jurisdiction.

2. Include construction details, material descriptions, dimensions, profiles, and finishes.

3. Include rated capacities, operating characteristics, and electrical characteristics.

C. Shop Drawings: For fire-alarm system.

1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.

2. Include plans, elevations, sections, details, and attachments to other work.

3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.

4. Detail assembly and support requirements.

5. Include voltage drop calculations for notification-appliance circuits.

6. Include battery-size calculations.

7. Include input/output matrix.

8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.

9. Include performance parameters and installation details for each detector.

10. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.

    a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.

    b. Show field wiring and equipment required for HVAC unit shutdown on alarm and override as required.

    c. Locate detectors according to manufacturer's written recommendations.

11. Include floor plans to indicate outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

D. General Submittal Requirements:

1. Shop Drawings shall be prepared by persons with the following qualifications:

    a. Trained and certified by manufacturer in fire-alarm system design.

    b. NICET-certified, fire-alarm technician; Level III or Level IV as applicable.

    c. Licensed or certified by authorities having jurisdiction.

2. The design documents signed and sealed by the qualified professional engineer responsible for their preparation employed by the installer.

E. Additional Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria used, including analysis data.

1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.

2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.

3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.6 ADDITIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

C. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction if required:

a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

b. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.

c. Riser diagram.

d. Device addresses.

e. Record copy of site-specific software.

f. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:

1) Equipment tested.

2) Frequency of testing of installed components.

3) Frequency of inspection of installed components.

4) Requirements and recommendations related to results of maintenance.

5) Manufacturer's user training manuals.

g. Manufacturer's required maintenance related to system warranty requirements.

h. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.

2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.

3. Smoke Detectors, Fire Detectors, and Flame Detectors: Quantity equal to 10percent of amount of each type installed, but no fewer than one unit of each type.

4. Detector Bases: Quantity equal to two percent of amount of each type installed, but no fewer than one unit of each type.

5. Keys and Tools: One extra set for access to locked or tamper-proofed components.

6. Audible and Visual Notification Appliances: One of each type installed.

7. Fuses: Two of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II, Level III or Level IV technician as appropriate and applicable.

C. NFPA Certification: Obtain certification according to NFPA 72 by a UL Listed alarm company or in the form of a placard by an FM Global approved alarm company or by other certification agency as acceptable to authorities having jurisdiction

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.

1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Source Limitations for Fire-Alarm System and Components: Applicable to projects that are renovations of or additions to existing facilities. Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

B. Noncoded, UL-certified or FM Global-placarded as required for the project and in compliance to the requirements of the authorities having jurisdiction, addressable system, with multiplexed signal transmission and voice and/or horn/strobe evacuation as required.

C. Automatic sensitivity control of certain smoke detectors.

D. All components provided shall be listed for use with the selected system.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems as required. This is not intended to be a complete list:

1. Manual stations.

2. Heat detectors.

3. Smoke detectors.

4. Duct smoke detectors.

5. Automatic sprinkler system water flow.

B. Fire-alarm signal shall initiate the following actions as required. This is not intended to be a complete list:

1. Continuously operate alarm notification appliances**,** including voice evacuation notices as applicable.

2. Identify alarm and specific initiating device at fire-alarm control unit and network control panels, off premises panels and remote annunciators as applicable.

3. Transmit an alarm signal to the remote alarm receiving station.

4. Unlock electric door locks in designated egress paths.

5. Release fire and smoke doors held open by magnetic door holders.

6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.

7. Close smoke dampers in air ducts of designated air-conditioning duct systems.

8. Recall elevators to primary or alternate recall floors.

9. Activate elevator power shunt trip.

10. Record events in the system memory.

C. Supervisory signal initiation shall be by one or more of the following devices and actions as applicable. This is not intended to be a complete list:

1. Sprinkler, hydrant valve supervisory switch and tamper switch.

2. Elevator shunt-trip supervision.

3. User disabling of zones or individual devices.

4. Loss of communication with any panel on the network.

D. System trouble signal initiation shall be by one or more of the following devices and actions as applicable. This is not intended to be a complete list:

1. Open circuits, shorts, and grounds in designated circuits.

2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.

3. Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.

4. Loss of primary power at fire-alarm control unit.

5. Ground or a single break in internal circuits of fire-alarm control unit.

6. Abnormal ac voltage at fire-alarm control unit.

7. Break in standby battery circuitry.

8. Failure of battery charging.

9. Abnormal position of any switch at fire-alarm control unit or annunciator.

E. System Supervisory Signal Actions:

1. Initiate notification appliances.

2. Identify specific device initiating the event at fire-alarm control unit, connected network control panels and off-premises network control panels, and remote annunciators as applicable.

3. Record the event on system printer.

4. After a time delay as determined, transmit a trouble or supervisory signal to the remote alarm receiving station.

5. Transmit system status to building management system.

6. Display system status on graphic annunciator.

2.3 FIRE-ALARM CONTROL UNIT

A. Manufacturers: Subject to compliance with SWOCC Campus Standard requirements, provide products by one of the following:

1. Simplex Grinnell LP

2. Fike Corporation

3. Notifier

4. Siemens Industry, Inc

5. Gamewell – FCI by Honeywell

B. General Requirements for Fire-Alarm Control Unit:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.

a. System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.

b. Include a real-time clock for time annotation of events on the event recorder and printer.

c. Provide communication between the FACP and remote circuit interface panels, annunciators, and displays.

d. The FACP shall be listed for connection to a central-station signaling system service.

e. Provide nonvolatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a complete power down condition. The FACP shall provide a minimum 500-event history log.

2. Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.

3. Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.

C. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type, For medium sized projects 40 character display unit minimum. For others 80 characters, minimum.

2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke detector sensitivity and other parameters if required.

D. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:

1. Pathway Class Designations: NFPA 72, Class A, Class B, Class C, Class D or Class E as applicable.

2. Pathway Survivability: Level 0 or Level 1 as applicable.

3. Install no more than **50** addressable devices on each signaling-line circuit.

4. Serial Interfaces. Provide as Required:

a. One dedicated RS 485 port for central-station and/or remote station operation as applicable using point ID DACT.

b. One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).

c. One USB or RS 232 port as applicable for PC configuration.

E. Notification-Appliance Circuit:

1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.

2. Where notification appliances provide signals to sleeping areas, the alarm signal shall be a 520-Hz square wave with an intensity 15 dB above the average ambient sound level or 5 dB above the maximum sound level, or at least 75 dBA, whichever is greater, measured at the pillow.

3. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.

F. Elevator Recall:

1. If Elevator is in the scope, the recall shall be initiated only by one of the following alarm-initiating devices:

a. Elevator lobby detectors except the lobby detector on the designated floor.

b. Smoke detector in elevator machine room.

c. Smoke detectors in elevator hoist way.

2. Elevator controller shall be programmed to move the cars to the alternate recall floor if lobby detectors located on the designated recall floors are activated.

3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.

a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.

G. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall **be** connected to fire-alarm system to be determined by the designer and in compliance to the authorities having jurisdiction.

H. Remote Smoke-Detector Sensitivity Adjustment for analog addressable systems with analog addressable smoke detectors.: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.

I. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

J. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, shall be powered by 24-V dc source as required.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

K. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

1. Batteries: Sealed lead calcium.

L. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.4 MANUAL FIRE-ALARM BOXES

A. Manufactures: Subject to compliance with requirements, provide products by one of the following:

1. Simplex Grinnell LP

2. Fike Corporation

3. Notifier

4. Siemens Industry, Inc

5. Gamewell – FCI by Honeywell

B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate an alarm may be required in-lieu of Single-action mechanism to reduce accidental alarm initiations. Coordinate for requirement, breaking-glass or plastic-rod or pull-lever type; with integral or attached addressable module as applicable arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.

2. Station Reset: Key- or wrench-operated switch.

3. Indoor Protective Shield for physical protection other than wire guard: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.

4. Weatherproof Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.5 SYSTEM SMOKE DETECTORS

A. Manufactures: Subject to compliance with requirements, provide products by one of the following:

1. Simplex Grinnell LP

2. Notifier

3. Siemens Industry, Inc

4. Gamewell – FCI by Honeywell

5. Fenwal Protection Systems

B. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.

2. Detectors shall be four or two wire type as required.

3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.

5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.

6. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.

7. Remote Control: Unless otherwise required by the owner, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition. As an additive bid alternate price for individually adjustable for sensitivity by fire-alarm control unit.

a. Rate-of-rise temperature characteristic of combination smoke- and heat-detection units shall be selectable at fire-alarm control unit for 15 or 20 deg F per minute.

b. Fixed-temperature sensing characteristic of combination smoke- and heat-detection units shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F .

c. Multiple levels of detection sensitivity for each sensor.

d. Sensitivity levels based on time of day.

C. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

a. Primary status.

b. Device type.

c. Present average value.

d. Present sensitivity selected.

e. Sensor range (normal, dirty, etc.).

D. Ionization Smoke Detector:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

a. Primary status.

b. Device type.

c. Present average value.

d. Present sensitivity selected.

e. Sensor range (normal, dirty, etc.).

E. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

   a. Primary status.

   b. Device type.

   c. Present average value.

   d. Present sensitivity selected.

   e. Sensor range (normal, dirty, etc.).

3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.

4. Each sensor shall have multiple levels of detection sensitivity.

5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.

6. Relay Fan Shutdown for Direct-Shutdown of the Fan: Fully programmable relay rated to interrupt fan motor-control circuit.

2.6 NONSYSTEM SMOKE DETECTORS

A. General Requirements for Nonsystem Smoke Detectors:

1. Nonsystem smoke detectors shall be listed as compatible with the fire-alarm equipment installed or shall have a contact closure interface listed for the connected load.

2. Nonsystem smoke detectors shall meet the monitoring for integrity requirements in NFPA 72.

B. Single-Station Duct Smoke Detectors:

1. Comply with UL 268A; operating at 120-V ac.

2. Sensor: LED or infrared light source with matching silicon-cell receiver.

   a. Detector Sensitivity: Smoke obscuration between 2.5 and 3.5 percent/foot when tested according to UL 268A.

3. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. The fixed base shall be

designed for mounting directly to air duct. Provide terminals in the fixed base for connection to building wiring.

a. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; listed for use with the supplied detector.

4. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.

5. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit where required.

2.7 HEAT DETECTORS

A. Manufactures: Subject to compliance with requirements, provide products by one of the following:

1. Simplex Grinnell LP

2. Notifier

3. Siemens Industry, Inc

4. Gamewell – FCI by Honeywell

B. General Requirements for Heat Detectors: Comply with UL 521.

1. Temperature sensors shall test for and communicate the sensitivity range of the device.

C. Heat Detector, Combination Type: Actuated by either a fixed temperature or a rate of rise.

1. Mounting: Adapter plate for outlet box mounting or Twist-lock base interchangeable with smoke-detector bases as required.

2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

D. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature

1. Mounting: Adapter plate for outlet box mounting or Twist-lock base interchangeable with smoke-detector bases as required.

2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.8 NOTIFICATION APPLIANCES

A. Manufactures: Subject to compliance with requirements, provide products by one of the following:

1. Simplex Grinnell LP
2. Siemens Industry, Inc
3. Federal Signal Corporation
4. GE UTC Fire & Security
5. Harrington Signal, Inc

B. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as required equipped for mounting as required and with screw terminals for system connections.

1. Combination Devices where applicable: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as required and with screw terminals for system connections.

C. Chimes, Low-Level Output: Vibrating type, 75-dBA minimum rated output.

D. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.

E. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn, using the coded signal prescribed in UL 464 test protocol.

F. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- high letters on the lens.

1. Rated Light Output:

a. As required for the location of use .

b. Provide field selectable type where required .

2. Mounting: Wall mounted unless otherwise indicated.

3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.

4. Flashing shall be in a temporal pattern, synchronized with other units.

5. Strobe Leads: Factory connected to screw terminals.

6. Mounting Faceplate: Factory finished, **red** as required.

G. Exit Marking Audible Notification Appliance:

1. Exit marking audible notification appliances shall meet the audibility requirements in NFPA 72.

2. Provide exit marking audible notification appliances at the entrance to all building exits.

3. Provide exit marking audible notification appliances at the entrance to areas of refuge with audible signals distinct from those used for building exit marking.

2.9 MAGNETIC DOOR HOLDERS. COORDINATE WITH SECTION 087100 “DOOR HARDWARE”.

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.

1. Electromagnets: Require no more than 3 W to develop 25-lbf holding force.

2. Wall-Mounted Units: Flush mounted unless otherwise indicated.

3. Rating: 24-V ac or dc OR 120-Vac as required.

B. Material and Finish: Match door hardware.

2.10 REMOTE ANNUNCIATOR

A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.

1. Mounting: Flush or Surface cabinet as required by owner, NEMA 250, Type 1.

B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.11 ADDRESSABLE INTERFACE DEVICE

A. General:

1. Include address-setting means on the module.

2. Store an internal identifying code for control panel use to identify the module type.

3. Listed for controlling HVAC fan motor controllers.

B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.

C. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall and to circuit-breaker shunt trip for power shutdown as required.

1. Allow the control panel to switch the relay contacts on command.

2. Have a minimum of two normally open and two normally closed contacts available for field wiring.

D. Control Module:

1. Operate notification devices.

2. Operate solenoids for use in sprinkler service.

2.12 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.

B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture **two** telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.

C. Local functions and display at the digital alarm communicator transmitter shall include the following:

1. Verification that both telephone lines are available.

2. Programming device.

3. LED display.

4. Manual test report function and manual transmission clear indication.

5. Communications failure with the central station or fire-alarm control unit.

D. Digital data transmission shall include the following. Revise to match fire alarm unit characteristics and requirements of the central station. Add additional signals as required:

1. Address of the alarm-initiating device.

2. Address of the supervisory signal.

3. Address of the trouble-initiating device.

4. Loss of ac supply.

5. Loss of power.

6. Low battery.

7. Abnormal test signal.

8. Communication bus failure.

E. Secondary Power: Integral rechargeable battery and automatic charger. Provide if power supply at fire-alarm control unit is inadequate or if additional supply is required by Project conditions

F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.13 NETWORK COMMUNICATIONS

A. Provide network communications for fire-alarm system according to fire-alarm manufacturer's written requirements.

B. Provide network communications pathway per manufacturer's written requirements and requirements in NFPA 72 and NFPA 70.

C. Provide integration gateway using BACnet, Modbus or other protocol as required for connection to building automation system.

2.14 DEVICE GUARDS

A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.

1. Factory fabricated and furnished by device manufacturer.

2. Finish: Paint of color to match the protected device.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."

1. Devices placed in service before all other trades have completed cleanup shall be replaced.

2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.

B. Manual Fire-Alarm Boxes:

1. Install manual fire-alarm box in the normal path of egress within 60 inches of the exit doorway.

2. Mount manual fire-alarm box on a background of a contrasting color.

3. The operable part of manual fire-alarm box shall be between 42 inches and 48 inches above floor level. All devices shall be mounted at the same height unless otherwise indicated.

C. Smoke- or Heat-Detector Spacing:

1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.

2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.

3. Smooth ceiling spacing shall not exceed 30 feet or as required per manufacturer instructions.

4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A or Annex B as applicable in NFPA 72.

5. HVAC: Locate detectors as required not closer than 36 inches from air-supply diffuser or return-air opening.

6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.

D. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.

E. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches long shall be supported at both ends.

1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.

F. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.

G. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.

H. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.

I. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling. Install all devices at the same height unless otherwise indicated.

3.3 PATHWAYS

A. Pathways above recessed ceilings and in non-accessible locations may be routed exposed.

1. Exposed pathways located less than 96 inches above the floor shall be installed in EMT.

B. Provide additive bid alternate for pathways installed in EMT.

C. Exposed EMT shall be painted red enamel.

3.4 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.

B. Make addressable connections with a supervised interface device to the following devices and systems as applicable. Install the interface device less than 36 inches from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

1. Alarm-initiating connection to smoke-control system (smoke management) at firefighters' smoke-control system panel.

2. Alarm-initiating connection to stairwell and elevator-shaft pressurization systems.

3. Smoke dampers in air ducts of designated HVAC duct systems.

4. Magnetically held-open doors.

5. Electronically locked doors and access gates.

6. Alarm-initiating connection to elevator recall system and components.

7. Supervisory connections at valve supervisory switches.

8. Supervisory connections at elevator shunt-trip breaker.

9. Data communication circuits for connection to building management system.

3.5 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Install framed instructions in a location visible from fire-alarm control unit.

3.6 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.7 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

C. Perform the following tests and inspections:

1. Visual Inspection: Conduct visual inspection prior to testing.

a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.

b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.

4. Test audible appliances for the private operating mode according to manufacturer's written instructions.

5. Test visible appliances for the public operating mode according to manufacturer's written instructions.

6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

D. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

E. Fire-alarm system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

G. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

H. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.8 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include **12** months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for

proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION