MEPNN Supplier Scouting Opportunity Synopsis

Section 1: General Information

Scouting Number	2025-059
Item to be Scouted	Ball Valves
Days to be scouted	30
Response Due By	03/29/2025
Description	Threaded end or grooved end ball valves, bronze body. See attached specification for more details
Notify Requester Immediately	
State item to be used in	New Mexico

Section 2: Technical Information

Type of supplier being sought	Manufacturer
Reason	BABA
Describe the manufacturing processes (elaborate to provide as much detail as possible)	Casting and assembly.
Provide dimensions / size / tolerances / performance specifications for the item	See attached specification for more details - 28_31_00B_Fire_Detection_and_Alarm Page 15 M. Suppression Sprinkler Systems - 21_13_13B_Wet-Pipe_Sprinkler_Systems - Post Indicator Valve Assembly Page 1 Part 1 General Page 2 1.02 DEFINITIONS Page 4 1.05 QUALITY ASSURANCE Page 5 1.07 AMERICAN IRON AND STEEL 1.08 BUILD AMERICA BUY AMERICA (BABA) 1.09 MATERIAL SELECTION 1.10 EXTRA MATERIALS Part 2 Products 2.01 GENERAL Page 08 2.06 VALVES A. General Requirements B. Ball Valves Page 10 2.07 TRIM AND DRAIN VALVES A. GENERAL C. BALL VALVES

List required materials needed to make the product, including materials of product components	See attached specification for more details - 28_31_00B_Fire_Detection_and_Alarm Page 15 M. Suppression Sprinkler Systems - 21_13_13B_Wet-Pipe_Sprinkler_Systems - Ball Valves Page 1 Part 1 General Page 2 1.02 DEFINITIONS Page 4 1.05 QUALITY ASSURANCE Page 5 1.07 AMERICAN IRON AND STEEL 1.08 BUILD AMERICA BUY AMERICA (BABA) 1.09 MATERIAL SELECTION 1.10 EXTRA MATERIALS Part 2 Products 2.01 GENERAL Page 08 2.06 VALVES A. General Requirements B. Ball Valves Page 10 2.07 TRIM AND DRAIN VALVES A. GENERAL C. BALL VALVES
Are there applicable certification requirements?	Yes
Certification(s) required	UL
Are there applicable regulations?	No
Are there any other stndards, requirements, etc.?	Yes
Details	NFPA 70, NFPA 72, NFPA 13, UL 1091, FM, See attached specification for more details.
NAICS 1	221310 Water Supply and Irrigation Systems
NAICS 2	
Additional Technical Comments	

Section 4: Business Information

Estimated potential business volume	one-time purchase of 2 items
Estimated target price / unit cost information (if unavailable explain)	Best available, as this is related to BABA, acceptable pricing is to be determined in negotiation.
When is it needed by?	Project is expected to bid Winter 2025
Describe packaging requirements	Individualized wrapped or palletized
Where will this item be shipped?	Clovis, New Mexico

Additional Comments

Is there other information you would like to include?	As Requested for BABA Compliance: Agency Providing Funds: Bureau of Reclamation: Albuquerque Area Office Name/POC: Ken Richards Email: krichards@usbr.gov

SECTION 21 13 13
WET-PIPE SPRINKLER SYSTEMS

PART 1 GENERAL

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1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Society of Mechanical Engineers (ASME):
   a. B16.1, Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250.
   b. B16.4, Gray Iron Threaded Fittings: Classes 125 and 250.
   c. B16.5, Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
2. American Water Works Association (AWWA):
   a. C110/A21.10, Ductile-Iron and Gray-Iron Fittings.
   b. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   c. C115/A21.15, Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
3. ASTM International (ASTM):
   a. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   b. A135/A135M, Standard Specification for Electric-Resistance-Welded Steel Pipe.
   c. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   d. A197/A197M, Standard Specification for Cupola Malleable Iron.
   e. A307, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength.
   f. A563/A563M, Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric).
   g. A795/A795M, Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
4. FM Global (FM).
5. National Fire Protection Association (NFPA):
   a. 13, Installation of Sprinkler Systems.
   b. 70, National Electrical Code (NEC).
   c. 72, National Fire Alarm and Signaling Code.
   d. 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants.
   e. 1963, Standard for Fire Hose Connections.

6. UL:
    a. 193, Standard for Safety Alarm Valves for Fire-Protection Service.
    b. 199, Safety Automatic Sprinklers for Fire-Protection Service.
    c. 213, Rubber Gasketed Fittings for Fire-Protection Service.
    d. 262, Standard for Gate Valves for Fire-Protection Service.
    e. 312, Check Valves for Fire-Protection Service.
    f. 346, Standard for Waterflow Indicators for Fire Protective Signaling Systems.
    g. 393, Standard for Safety Indicating Pressure Gauges for Fire-Protection Service.
    h. 405, Standard for Fire Department Connection Devices.
    i. 464, Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories.
    j. 753, Standard for Alarm Accessories for Automatic Water-Supply Control Valves for Fire-Protection Service.
    k. 789, Standard for Indicator Posts for Fire-Protection Service.
    l. 1091, Butterfly Valves for Fire-Protection Service.
    m. 1474, Standard for Adjustable Drop Nipples for Sprinkler Systems.
    n. 1626, Residential Sprinklers for Fire-Protection Service.
    o. 1767, Early-Suppression Fast-Response Sprinklers.

1.02 DEFINITIONS

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A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

B. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device.

C. Abbreviations:

1. American National Taper Pipe Thread (NPT).
2. Authority having jurisdiction (AHJ).
3. Hertz (Hz).
4. Pounds per square inch, gauge (psig).
5. Single-pole, double-throw (SPDT).
6. Volts alternating current (V ac).
7. Volts direct current (V dc).

1.03 DESIGN REQUIREMENTS

A. Provide design criteria and area densities for automatic sprinkler systems as indicated on the Drawings.

B. Provide sprinkler systems, including seismic bracing designed and installed in accordance with NFPA 13.

C. Hydraulically design systems. Submit calculations to verify that, at minimum, densities indicated on the Drawings are met.

D. Base hydraulic calculations on water flow tests conducted within time specified by local regulations and recorded at or near proposed system tie-in point.

E. Contract Drawings are provided for general layout of sprinkler system. Contractor design responsibility includes determining exact layout and dimensions of system. Clearly identify deviations from Drawings or Specifications in the Shop Drawing submittal.

1.04 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Drawings for wet-pipe sprinkler systems; include plans, elevations, sections, details, and attachments to other work.
   b. Product Data: For pipe, fittings, valves, sprinklers and all other attachments and components needed to provide a complete and compliant installation. For electrical/alarm components include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
   c. Contractor-Design Submittal: Sprinkler system design; include analysis data signed and sealed by qualified professional engineer. Submit for approval by Owner's insurance underwriter and the fire marshal prior to the start of construction.
   d. Coordination Drawings:
      1) Sprinkler systems, drawn to scale, illustrating coordination of sprinkler system with:
         a) Process piping.
         b) Domestic water piping.
         c) HVAC duct work.
         d) Lighting fixtures.
   e. Anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Qualification Data: Qualified installer, design technician, and professional engineer.
2. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, approved by authorities having jurisdiction, including hydraulic calculations if applicable.
3. Welding certificates.
4. Manufacturer's printed installation instructions.
5. Fire hydrant flow test report.
6. Field test reports and certificates.
7. Field quality control reports.
8. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.
9. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
10. Manufacturers Certificate of Iron and Steel (AIS) compliance in accordance with Section 01 33 00, Submittal Procedures.

1.05 QUALITY ASSURANCE

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A. Comply with the 2021 International Fire Code with local amendments, NFPA 13, building codes, and government regulations.

B. Provide approvals, permits, and required inspections.

C. Provide materials and equipment UL listed and in compliance with applicable NFPA standards and fire marshal's requirements. Submit documentation that specific items furnished under this section for this Project conform to such requirements.

D. Welding Qualifications: Refer to NFPA 13 for qualifications and restrictions.

E. Preinstallation Meeting:

1. In accordance with Section 01 31 19, Project Meetings.
2. Convene minimum 1 week prior to commencing work of this section.

1.06 QUALIFICATIONS

A. Provide layout drawings for fire protection systems prepared by or under the supervision of a NICET Fire Protection Engineering Technician, Level 3 or Level 4, subfield of Fire Protection Engineering Water-Based Systems Layout or as otherwise permitted by State or local Statute. If required by State or local Statute, provide Drawings reviewed and stamped by a registered professional engineer having registration in the State of New Mexico or other procedure

acceptable to the AHJ. Submit a copy of the current certification of the NICET technician and the registered Engineer with the initial submittal.

1.07 AMERICAN IRON AND STEEL

A. This section contains materials that shall comply with the American Iron and Steel (AIS) requirements of this Contract.

1.08 BUILD AMERICA BUY AMERICA (BABA)

A. This section contains materials that shall comply with the Build America Buy America requirements of this Contract.

1.09 MATERIAL SELECTION

A. Unless specifically mentioned otherwise herein, materials such as; mounting hardware materials, pipe supports, ductwork and supports, electrical framing channel, supports for electrical conduits and cable trays, electrical boxes and fittings, electrical conduit, and enclosure types used in specific areas shall be in accordance with the Material Classification Schedule on the Drawings.

1.10 EXTRA MATERIALS

A. Furnish, tag, and box for shipment and storage the following spare parts, special tools, and materials:

Item	Quantity
Sprinkler Cabinet	One each
Sprinklers	Six of each different size unit
Special tools required to maintain or dismantle	One complete set for each different size unit

B. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

PART 2 PRODUCTS

2.01 GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by qualified testing agency, and marked for intended location and application. Comply with additional requirements of NFPA 72.

B. Refer to Section 28 31 00, Fire Detection and Alarm, for additional requirements and interface to wet-pipe sprinkler systems.

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C. Sprinkler system equipment, specialties, accessories, installation, and testing: comply with NFPA 13.

D. Piping Materials: Comply with requirements in Piping Schedule located below.

2.02 STEEL PIPE AND FITTINGS

A. Pipe:

1. FM Approved Standard Weight, Schedule 40 Galvanized and Black Steel Pipe: ASTM A53/A53M or ASTM A153. Pipe ends may be factory or field formed to match joining method.
2. Do not use light wall pipe or any pipe thinner than schedule 40 pipe.

B. Fittings:

1. Galvanized and Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern. Provide galvanized fittings and couplings:
   a. Where scheduled.
   b. Exterior locations.
2. Flanges:
   a. Cast Iron: ASME B16.1 or AWWA C110/A21.10, AWWA C111/A21.11, AWWA C115/A21.15, 250 psi water service rating, Class 125 dimensions and bolt pattern.
   b. Galvanized and Uncoated, Steel Flanges and Flanged Fittings: ASME B16.5, Class 150, dimensions and bolt pattern.
3. Grooved-Joint, Steel Pipe Appurtenances:
   a. Galvanized and Uncoated, Grooved-End Fittings and Couplings for Steel Piping: UL 213 listed for fire protection service, FM approved, malleable-iron casting or ductile-iron casting; with dimensions matching steel pipe. Standard EPDM gaskets. Rigid type except where flexible type is required for vibration isolation or stress relief.
   b. Manufacturers:
      1) Tyco.
      2) Victaulic Company.
4. Certify fittings, couplings, flanges, and flange adaptors used with thinwall pipe or Schedule 10 pipe by the fitting manufacturer as dimensionally compatible with and fully connectable to the pipe used without field modifications.
5. Welded or segmented fittings are not acceptable.

2.03 PIPING SCHEDULE

A. Piping Between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with threaded ends; cast-iron threaded fittings; and

threaded or grooved ends; grooved-end fittings; grooved-end pipe couplings; and grooved joints.

B. Standard-pressure, Wet-pipe Sprinkler System, 8 inches and Smaller:

1. Standard-weight or Schedule 40, black steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Standard-weight or Schedule 40, galvanized steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
3. Standard-weight or Schedule 40, black steel pipe with plain ends; uncoated, plain-end pipe fittings; and twist-locked joints.
4. Standard-weight or Schedule 40, galvanized steel pipe with plain ends; galvanized, plain-end pipe fittings; and twist-locked joints.
5. Standard-weight or Schedule 40, black steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end pipe couplings for steel piping; and grooved joints.
6. Standard-weight or Schedule 40, galvanized steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end pipe couplings for steel piping; and grooved joints.
7. Standard-weight or Schedule 40, black steel pipe with plain ends; steel welding fittings; and welded joints.

2.04 PIPE COATING

A. Coat all exposed fire sprinkler piping in accordance with System No. 4, as specified in Section 09 90 00, Painting and Coating.

B. Pipe Color: All exposed fire sprinkler piping shall be painted red.

2.05 PIPING JOINING MATERIALS

A. Pipe Flange Gasket Materials: AWWA C110/A21.10, rubber, flat face, 1/8-inch (3.2 mm) thick.

1. Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.
2. Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.

B. Metal Pipe Flange Bolts and Nuts: ASTM A307 Grade B, galvanized, with galvanized nuts in accordance with ASTM A563/A563M Grade A.

C. Unions: 150 psig galvanized malleable iron, ASTM A197, threaded, ground joint, integral seat.

2.06 VALVES

A. General Requirements:

1. Valves shall be UL listed or FM approved.
2. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig.
3. Make flanged end and wafer type valves compatible for installation with flanges as specified.

B. Ball Valves:

1. Standard: UL 1091, except with ball instead of disc.
2. 1-1/2 Inches and Smaller: Bronze body with threaded ends.
3. 2 Inches and 2-1/2 Inches: Bronze body with threaded ends or ductile-iron body with grooved ends.
4. 3 Inches: Ductile-iron body with grooved ends.
5. Manufacturers:
   a. ASC Engineered Solutions.
   b. Victaulic Company.

C. Iron Butterfly Valves:

1. Standard: UL 1091.
2. Pressure Rating: 175 psig.
3. Body Material: Cast or ductile iron.
4. Stem: Stainless steel.
5. Style: Lug or wafer.
6. Manufacturers:
   a. Global Safety Products, Inc.
   b. NIBCO INC.
   c. Tyco.
   d. Victaulic Company.

D. Check Valves:

1. Standard: UL 312.
2. Pressure Rating: 250 psig minimum.
3. Type: Swing check or spring assisted swing check.
4. Body Material: Cast or ductile iron.
5. End Connections: Flanged or grooved.
6. Manufacturers:
   a. Kennedy Valve.
   b. Mueller Company.
   c. NIBCO INC.
   d. Tyco.
   e. Victaulic Company.

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E. Iron OS&Y Gate Valves:

1. Standard: UL 262.
2. Pressure Rating: 250 psig minimum.
3. Body Material: Cast or ductile iron.
4. End Connections: Flanged or grooved.
5. Manufacturers:
    a. Kennedy.
    b. Mueller Co.; Water Products Division.
    c. NIBCO INC.
    d. Tyco.
    e. Victaulic Company.

F. Indicating-Type Butterfly Valves:

1. Standard: UL 1091.
2. Pressure Rating: 175 psig minimum.
3. Valves 2 Inches and Smaller:
    a. Valve Type: Ball or butterfly.
    b. Body Material: Bronze.
    c. End Connections: Threaded or grooved.
4. Valves 2-1/2 Inches and Larger:
    a. Valve Type: Butterfly.
    b. Body Material: Cast or ductile iron.
    c. Stem Material: Stainless steel.
    d. End Connections: Flanged, grooved, or wafer.
5. Valve Operation: Weatherproof actuator housing with handwheel and integral dual single-pole, double-throw (SPDT) (Form C) contacts, rated for a minimum of 10 amps at 125/250V ac, 2 amps at 30V dc, 10 mA minimum at 24V dc in tamper-proof cover with mounting and required hardware for attachment to indicated valves visual indicating device.
6. Manufacturers:
    a. Kennedy Valve.
    b. NIBCO INC.
    c. Tyco.
    d. Victaulic Company.

G. NRS Gate Valves:

1. Standard: UL 262.
2. Pressure Rating: 250 psig minimum.
3. Body Material: Cast iron with indicator post flange.
4. Stem: Nonrising.
5. End Connections: Flanged or grooved.

6. Manufacturers:
    a. Kennedy Valve.
    b. Mueller Co.
    c. NIBCO INC.
    d. Tyco.
    e. Victaulic Company.

H. Indicator Wall Posts:

1. Standard: UL 789.
2. Type: Horizontal for wall mounting.
3. Body Material: Cast iron with extension rod and locking device.
4. Operation: Hand wheel.
5. Manufacturers:
    a. Kennedy Valve.
    b. Mueller Co.
    c. NIBCO INC.
    d. Tyco.
    e. Victaulic Company.

2.07 TRIM AND DRAIN VALVES

A. General:

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1. Standard: UL's "Fire Protection Equipment Directory" listing or FM "Approval Guide," listing.
2. Pressure Rating: 175 psig minimum.

B. Angle Valves:

1. Manufacturers:
    a. ASC Engineered Solutions.
    b. Potter-Roemer.
    c. United Brass Works, Inc.

C. Ball Valves:

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1. Manufacturers:
    a. NIBCO.
    b. Tyco.
    c. Victaulic Company.

2.08 SPECIALTY VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or FM "Approval Guide" listing.
2. Pressure Rating:
   a. Standard-Pressure Piping Specialty Valves: 175 psig minimum.
   b. High-Pressure Piping Specialty Valves: 250 psig minimum.
3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.
5. End Connections: Flanged or grooved.

B. Alarm Check Valves:

1. Standard: UL 193.
2. Design: Vertical installation.
3. Valve internal components shall be replaceable without removing the valve from the installed position.
4. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gauges, retarding chamber, and fill-line attachment with strainer.
5. Drip Cup Assembly: Pipe drain with check valve to main drain piping.
6. Manufacturers:
   a. Tyco; Series AV.
   b. Victaulic Company; Series 751.
   c. Viking Corporation; Series J-1.

C. Post Indicating Valve Assembly:

1. Type V137 Resilient Seated Gate Valve 4 Inches to 12 Inches:
   a. UL Listed and FM Approved for fire protection, iron body, resilient seat, bronze mounted, ASME B16.1 Class 125 flanged ends, nonrising stem, 2-inch operating nut, in accordance with AWWA C509, design working water pressure 200 psig, full port, fusion-epoxy coated inside and outside per AWWA C550, NSF 61 certified, indicator post flange and indicator post assembly with lockable handle.
   b. Manufacturers and Products:
      1) Kennedy Valve; Ken-Seal II.
      2) M&H Valve; Style 4067.
      3) Mueller; P 2360.

2. Indicator Post Assembly:
    a. Cast or ductile iron post head, bell, and wrench with cast or ductile iron or steel barrel.
    b. Plexiglas or equal protected window to indicate OPEN and CLOSED position.
    c. Padlockable eye bolt for wrench.
    d. Adjustable bury depth. Bury depth as required for valve installation.
    e. UL Listed and FM Approved.
    f. Manufacturers and Products:
        1) Clow; Style 2945.
        2) Mueller; A 20806.

2.09 FIRE DEPARTMENT CONNECTIONS

A. Yard Type:

1. Standard: UL 405.
2. Type: Exposed, freestanding.
3. Pressure Rating: 175 psig minimum.
4. Body Material: Corrosion-resistant metal.
5. Inlets: Brass with threads according to NFPA 1963 and matching local fire department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
6. Caps: Brass, lugged type, with gasket and chain.
7. Escutcheon Plate: Round, brass, floor type.
8. Outlet: Bottom, with pipe threads.
9. Number of Inlets: Two.
10. Sleeve: Brass.
11. Sleeve Height: 18 inches (460 mm).
12. Escutcheon Plate Marking: Similar to “AUTO SPKR.”
13. Outlet Size: 3 inches.
14. Manufacturers:
    a. ASC Engineered Solutions.
    b. Elkhart Brass.
    c. Guardian Fire Equipment, Inc.
    d. Potter-Roemer.

B. Fire Department Outlet Test Fitting:

1. Brass body and polished chrome plate lettered HYDRANT.
2. Polished brass female 4-inch NPT by 2-1/2-inch male hose thread snoots with caps and chains.
3. Two-way hydrant with two outlets and inlet configuration as required for location.

4. Manufacturers:
    a. ASC Engineered Solutions.
    b. Elkhart Brass Mfg. Company, Inc.
    c. Guardian Fire Equipment, Inc.
    d. Potter Roemer.

2.10 SPRINKLER SPECIALTY PIPE FITTINGS

A. Branch Outlet Fittings:

1. Standard: UL 213.
2. Pressure Rating: 175 psig minimum.
3. Body Material: Ductile-iron housing with EPDM seals, bolts, and nuts.
4. Type: Mechanical-cross fittings and mechanical-tee.
5. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
6. Size: Dimension to fit on sprinkler main and with outlet connections as required to match connected branch piping.
7. Branch Outlets: Grooved, plain-end pipe, or threaded.
8. Manufacturers:
    a. ASC Engineered Solutions.
    b. Tyco.
    c. Victaulic Company.

B. Flow Detection and Test Assemblies:

1. Standard: UL's "Fire Protection Equipment Directory" listing or FM "Approval Guide" listing.
2. Pressure Rating: 175 psig minimum.
3. Body Material: Cast-iron or ductile-iron housing with orifice, sight glass, and integral test valve.
4. Size: Same as connected piping.
5. Inlet and Outlet: Threaded or grooved.
6. Manufacturers:
    a. Guardian Fire Equipment, Inc.
    b. Reliable Automatic Sprinkler Co., Inc.
    c. Tyco.
    d. Victaulic Company.

C. Branch Line Testers:

1. Standard: UL 199.
2. Pressure Rating: 175 psig.
3. Body Material: Brass.
4. Size: Same as connected piping.
5. Inlet: Threaded.
6. Drain Outlet: Threaded and capped.

7. Branch Outlet: Threaded, for sprinkler.
8. Manufacturers:
    a. Guardian Fire Equipment, Inc.
    b. Potter-Roemer.
    c. Tyco.

D. Sprinkler Inspector's Test Fittings:

1. Standard: UL's "Fire Protection Equipment Directory" listing or FM "Approval Guide" listing.
2. Pressure Rating: 175 psig minimum.
3. Body Material: Cast-bronze, cast-iron, or ductile-iron housing with sight glass.
4. Size: Same as connected piping.
5. Inlet and Outlet: Threaded or grooved.
6. Manufacturers:
    a. Guardian Fire Equipment, Inc.
    b. Tyco.
    c. Victaulic Company.
    d. Viking Corporation.

E. Flexible, Sprinkler Hose Fittings:

1. Standard: UL 1474.
2. Type: Flexible braided Type 304 stainless steel flexible tube hose for connection to sprinkler, and with bracket for connection to ceiling grid.
3. Pressure Rating: 175 psig minimum.
4. Size: Same as connected piping, for sprinkler.
5. Manufacturers:
    a. ASC Engineered Solutions.
    b. Fivalco Inc.
    c. Victaulic Company.
    d. Viking Group, Inc.

2.11 SPRINKLERS

A. General:

1. Standard: UL's "Fire Protection Equipment Directory" listing or FM "Approval Guide" listing.
2. Pressure Rating:
    a. Automatic Sprinklers: 175 psig minimum.

B. Sprinkler Schedule:

1. Use sprinkler types below for the following applications:
   a. Rooms without Ceilings: Upright sprinklers.
   b. Wall Mounting: Sidewall sprinklers.
2. Provide sprinkler types below with finishes indicated:
   a. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
   b. Flush Sprinklers: Bright chrome, with painted white escutcheon.
   c. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.
   d. Upright and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

C. Automatic Sprinklers with Heat-Responsive Element:

1. Early-Suppression, Fast-Response Applications: UL 1767.
2. Nonresidential Applications: UL 199.
3. See Drawings for additional information.
4. Sprinkler Finishes:
   a. Chrome plated.
   b. Bronze.
   c. Painted.
5. Special Coatings:
   a. Wax.
   b. Lead.
   c. Corrosion-resistant paint.
6. Sprinkler Escutcheons:
   a. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
   b. Ceiling Mounting: Chrome-plated steel, one piece, flat.
   c. Sidewall Mounting: Chrome-plated steel, one piece, flat.
7. Sprinkler Guards:
   a. Standard: UL 199.
   b. Type: Wire cage with fastening device for attaching to sprinkler.
8. Manufacturers:
   a. Reliable Automatic Sprinkler Co., Inc.
   b. Tyco.
   c. Victaulic Company.
   d. Viking Corporation.

2.12 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Electrically Operated Alarm Bell:

1. Standard: UL 464.
2. Type: Vibrating, 24V dc, electric alarm bell.
3. Size: Minimum 8-inch (200-mm) diameter.
4. Finish: Red enamel factory finish, suitable for outdoor use.
5. UL listed and FM approved.
6. Comply with NFPA 72 for installation, inspection, testing, and maintenance. Bell shall be powered with supervised circuit.
7. Manufacturers:
   a. Fire-Lite Alarms, Inc.; a Honeywell company.
   b. Notifier; a Honeywell company.
   c. Potter Electric Signal Company.

C. Water Flow Indicators:

1. Standard: UL 346.
2. Water Flow Detector: Electrically supervised.
3. Components: Provide device with two sets of SPDT (Form C) contacts. Provide minimum switch electrical rating of 10 amps at 125/250V ac, 2 amps at 30V dc resistive, 10 mA at 24V dc.
4. Type: Paddle operated.
5. Pressure Rating: 250 psig.
6. Installation: Horizontal or vertical.
7. UL listed and FM approved.
8. Manufacturers:
   a. Potter Electric Signal Company.
   b. System Sensor; a Honeywell company.
   c. Tyco.
   d. Viking Corporation.

D. Valve Supervisory Switches:

1. Standard: UL 346.
2. Type: Electrically supervised.
3. Components: Single unit composed of dual single-pole, double-throw (SPDT) (Form C) contacts, rated for a minimum of 10 amps at 125/250V ac, 2 amps at 30V dc, 10 mA minimum at 24V dc in tamper-proof cover with mounting hardware for attachment to indicated valves.
4. Design: Signals that controlled valve is in other than fully OPEN position.
5. UL listed and FM Approved.

6. Manufacturers:
    a. ADT Security Services, Inc.
    b. Potter Electric Signal Company.
    c. System Sensor; a Honeywell company.

2.13 PRESSURE GAUGES

A. Description:

1. Standard: UL 393.
2. Dial Size: 3-1/2-inch to 4-1/2-inch (90-mm to 115-mm) diameter.
3. Pressure Gauge Range: 0 psig to 250 psig minimum.
4. Water System Piping Gauge: Include “WATER” or “AIR/WATER” label on dial face.
5. Air System Piping Gauge: Include retard feature and “AIR” or “AIR/WATER” label on dial face.
6. Manufacturers:
    a. AMETEK; U.S. Gauge Division.
    b. Ashcroft, Inc.
    c. Brecco Corporation.
    d. WIKA Instrument Corporation.

2.14 SLEEVES AND PENETRATIONS FOR PIPING SYSTEMS

A. Sleeves:

1. Walls:
    a. Interior and Exterior Walls: Schedule 40 carbon steel.
    b. Concrete: Cast-iron wall sleeves with integrally cast water stop.
    c. Interior Partitions: 22-gauge (U.S. Standard) minimum galvanized sheet steel.
2. Interior Floor: Schedule 40 carbon steel.
3. Slab on Grade: Cast-iron wall sleeves with integrally cast water stop.
4. Underground (Beneath Foundations, Footings, Grade Beams): Standard weight corrugated steel, bituminous coating inside and outside, with close-fitting bituminous coated plate at each end.

B. Sleeve and Penetration Packing:

1. Modular Wall and Casting Seals: Link-Seal as manufactured by Thunderline Corporation, Flexicraft PipeSeal. Sleeve and modular wall and casting seal to be furnished together as a single integrated unit.
2. Penetration Packing (With or Without Sleeve) for Interior Walls and Interior Elevated Floors:
    a. UL listed, FM approved materials and sealant systems, by 3M Fire Barrier Wrap/Strip FS-195+.
    b. Flexible elastomeric material unless specified otherwise.

c. Include additional materials and accessories to meet requirements of manufacturer and this section.
d. Compatible with penetrated surface.
e. Hazard Ratings:
    1) Pipes Penetrating Fire Rated Walls, Fire Rated Ceilings, and Fire Rated Floor Slabs (1 hour or greater): Material having maximum flame spread of 25 and maximum smoke develop rating of 50, selected to maintain fire rating of penetrated surface.
    2) Pipes Penetrating Other Interior Walls: Material having maximum smoke develop rating of 50, selected to prevent smoke transmission through penetration.
    3) Pipes Penetrating Nonrated Interior Floors: Mineral wool and fire-rated caulk.

PART 3 EXECUTION

3.01 PREPARATION

A. Perform fire hydrant flow test according to NFPA 13 and NFPA 291.

B. Submit test results promptly.

C. Reference Piping Schedule on the Drawings and Section 09 90 00, Painting and Coating, and Section 40 05 15. Piping Support Systems, for additional pipe and pipe support requirements.

1. Pipe Color: All exposed fire sprinkler piping shall be painted red.

3.02 SERVICE-ENTRANCE PIPING

A. Connect sprinkler piping to water service piping for service entrance to building as shown on the Drawings.

B. Install shutoff valve, backflow preventer, pressure gauge, drain, and other accessories indicated at connection to water service piping.

3.03 PIPING INSTALLATION

A. Locations and Arrangements:

1. Install piping in accordance with approved Shop Drawings, schematics, and diagrams which indicate general location and arrangement of piping.
2. Deviations from approved piping Shop Drawings require written approval from AHJ. Submit written approval to Engineer before deviating from approved working plans.

B. Piping Standard: Comply with NFPA 13 sprinkler piping installation requirements.

C. Seismic Design Category (SDC) is shown on Structural General Notes on the Drawings.

D. Based on the SDC, seismic bracing is not required for this Project.

E. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

F. Install unions adjacent to each valve in pipe 2 inches and smaller.

G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13.

H. Install sprinkler piping with drains for complete system drainage.

I. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

J. Install automatic drain valve at each check valve for fire department connection, to drain piping between fire department connection and check valve. Install drain piping to and spill over floor drain or to outside building.

K. Install alarm devices in piping systems.

L. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with NFPA 13 requirements for hanger materials.

M. Install pressure gauges on riser or feed main, at each sprinkler test connection, and at top of each standpipe.

1. Include pressure gauges with connection not less than 1/4 inch and with soft metal seated globe valve, arranged to drain pipe between gauge and valve.
2. Install gauges to permit removal, and where not subject to freezing.

N. Fill sprinkler system piping with water.

O. Install sleeves for piping penetrations of walls, ceilings, and floors.

P. Install sleeve seals for piping penetrations of concrete walls and slabs.

3.04 JOINT CONSTRUCTION

A. Steel Piping:

1. Pressure-Sealed Joints: Join with tools recommended by fitting manufacturer.
2. Welded Joints: Construct joints according to NFPA 13, using qualified processes and welding operators according to Article Quality Assurance.
   a. Shop-weld pipe joints where welded piping is indicated.
   b. Do not use welded joints for galvanized-steel pipe.
3. Cut-Grooved and Roll-Grooved Joints:
   a. Cut square-edge groove or roll rounded-edge groove in end of pipe according to NFPA 13.
   b. Install grooved joints in accordance with the manufacturer's latest published installation instructions.
   c. Provide grooved ends clean and free from indentations, projections, and tool marks.
   d. Join steel pipe and grooved-end fittings according to NFPA 13 for steel pipe joints.

B. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.05 VALVE AND SPECIALTIES INSTALLATION

A. Install listed fire protection valves, drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and AHJ.

B. Install listed fire protection shutoff valves supervised open, located to control sources of water supply other than fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water supply connection. Install backflow preventers instead of check valves in potable water supply sources.

D. Specialty Valves:

1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.
2. Alarm Valves: Include bypass check valve and retarding chamber drain line connection.

E. Specialty Sprinkler Fittings: Install downstream of control valves instead of specified fittings if indicated in approved Shop Drawings.

3.06 SPRINKLER INSTALLATION

A. Install sprinklers into flexible, sprinkler hose fittings and install hose into bracket on ceiling grid.

B. Do not install any sprinklers that have been dropped, damaged, or show a visible loss of fluid. Never install any sprinkler with a cracked bulb.

C. Remove sprinkler bulb protector by hand. Do not use any tools or devices that could damage the bulb.

3.07 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install yard-type, fire department connections in concrete slab support. Comply with requirements for concrete in Section 03 30 00, Cast-in-Place Concrete.

1. Install protective pipe bollards as shown on the Drawings for each fire department connection.

B. Install automatic drain valve at each check valve for fire department connection.

3.08 IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to NFPA 13 requirements.

B. Identify system components.

3.09 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until leak free.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13.
4. Energize circuits to electrical equipment and devices.
5. Coordinate with fire alarm tests. Operate as required.
6. Coordinate with fire pump tests. Operate as required.
7. Demonstrate that equipment hose threads match local fire department equipment.

B. Sprinkler piping system is defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

1. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13; include “Contractor’s Material and Test Certificate for Aboveground Piping.”

3.10 MANUFACTURER’S SERVICES

A. See Section 01 43 33, Manufacturers’ Field Services, and Section 01 91 14, Equipment Testing and Facility Startup.

B. Provide manufacturer’s services necessary to provide Manufacturer’s Certificate of Proper Installation per Section 01 43 33, Manufacturers’ Field Services.

3.11 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

END OF SECTION

SECTION 28 31 00
FIRE DETECTION AND ALARM

Commented [JK1]: SPECS: fix footer even numbered pages have wrong spec section number in them (28 21 00 instead of 28 31 00).

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Air National Guard (ANG): ETL 01-1-1, Air National Guard Design Policy.
2. Institute of Electrical and Electronics Engineers (IEEE): C62.41, Surge Voltages in Low-Voltage AC Power Circuits.
3. International Fire Code (IFC).
4. International Building Code (IBC).
5. National Electrical Manufacturers Association (NEMA): 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
6. National Fire Protection Association (NFPA):
    a. 70, National Electrical Code (NEC).
    b. 72, National Fire Alarm and Signaling Code.
    c. 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.
    d. 101, Code for Safety to Life from Fire in Buildings and Structures.
    e. 820, Fire Protection in Wastewater Treatment and Collection Facilities.
    f. 1221 Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems.
7. National Institute for Certification in Engineering Technologies (NICET).
8. Telecommunications Industry Association (TIA):
    a. 232, Interface Between Data Terminal Equipment and Data Circuit Terminating Equipment Employing Serial Binary Data Interchange.
    b. 485, Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems.
9. UL:
    a. 217, Single and Multiple Station Smoke Alarms.
    b. 228, Door Closures-Holders, With or Without Integral Smoke Detectors.
    c. 268, Smoke Detectors for Fire Protective Signaling Systems.
    d. 286A, Smoke Detectors for Duct Application.
    e. 464, Audible Signal Appliances.
    f. 497B, Protectors for Data Communication and Fire Alarm Circuits.

g. 864, Control Units for Fire-Protective Signaling Systems.
h. 1449, Standard for Transient Voltage Surge Suppressors.
i. 1480, Speakers for Fire-Protective Signaling Systems.
j. 1604, Electrical Equipment for Use in Class I and Class II, Division 2, and Class III Hazardous (Classified) Locations.
k. 1638, Visual Signaling Appliances – Private Mode Emergency and General Utility Signaling.
l. 1971, Signaling Devices for the Hearing Impaired.

10. Unified Facilities Criteria (UFC): 4-021-01, Design and O&M: Mass Notification Systems.
11. Uniform Fire Code (UFC): 3-600-01, Design: Fire Protection Engineering for Facilities.
12. United State Air Force (USAF):
    a. ETL 01-4, Fire Protection Engineering Criteria – Protective Aircraft Shelters (PAS).
    b. ETL 01-18, Fire Protection Engineering Criteria – Electronic Equipment Installations.
    c. ETL 02-15, Fire Protection Engineering Criteria – New Aircraft Facilities.
    d. ETL 98-8, Fire Protection Engineering Criteria – Existing Aircraft Facilities.

1.02 DEFINITIONS

A. Addressable: A fire alarm system component with a unique identification that can have its status individually identified or that is used to individually control other functions.

B. AHJ: Authority Having Jurisdiction.

C. CAD: Computer-Aided Design.

D. Coded: Audible or visible signal that conveys information about alarm event. Examples are, number of rings of a bell or flashes of a strobe. This could be used to convey location or type of alarm.

E. dB: Decibels.

F. DXF: Drawing Interchange Format.

G. ECP: Environmental Control Panel.

H. FACP: Fire Alarm Control Panel.

I. HVAC: Heating, Ventilating, and Air Conditioning.

J. I/O: Input/Output.

K. IDC: Initiating Device Circuit.

L. LCD: Liquid Crystal Display.

M. LED: Light-Emitting Diode.

N. MOV: Metal Oxide Varistor.

O. NAC: Notification Appliance Circuit.

P. RAM: Random Access Memory.

Q. SLC: Signaling Line Circuit.

R. SOM: Sequence of Operations Matrix.

S. Zone: A defined area within the protected premises. A zone can define an area from which an alarm signal can be received or an area to which a signal can be sent. The term zone is typically used when describing conventional, nonaddressable systems.

1.03 SYSTEM DESCRIPTION

A. Design Requirements:

1. Contract Drawings show location of fire alarm panel(s).
    a. Other Component Locations and Quantities: Determined by fire alarm system installer and included as part of installer's design.
    b. Other components include, but are not limited to, smoke detectors, heat detectors, manual pull stations, and notification appliances.
    c. Design and Installation: Meet requirements of local AHJ.
2. Contract Drawings show location of fire alarm system components.
3. Design, coordinate, and provide system in accordance with building codes indicated in Section 01 61 00, Common Product Requirements.
4. Design conduit layout and wiring interconnection of devices specified herein, and for interconnection of flow and supervisory switches and alarm bells specified in Section 21 13 13, Wet-Pipe Sprinkler Systems.
5. Coordinate, and include in design, requirements for interfacing with HVAC system.
6. Equipment suitable for addressable fire alarm system.

B. Performance Requirements:

1. Actuation of alarm (smoke or heat detector, flow switch, or other normally open initiating device contact) or trouble (trouble or supervisory switch) shall cause the following operations – Influent Pump Station Chemical Building Only:
   a. Audible and visual indications of alarmed devices on fire alarm control panel display, and on remote annunciator.
   b. Master fire alarm control panel shall transmit common alarm, supervisory, or trouble signal to pump station control system panel via normally closed contacts rated at 5A at 120V ac.
2. Actuation of duct smoke detectors shall, send signal (contact closure) to HVAC control panel (HCP) to shut off HVAC equipment in the Influent Pump Station and Caprock Pump Station Pump and Electrical Rooms only. Fan equipment shall shutdown in accordance with Section 23 09 00, Instrumentation and Control Devices for HVAC. Contact output to HCP shall be rated for no less than 5A, 250V ac.
3. Actuation of sprinkler flow switch shall alarm at panel.

1.04 SUBMITTALS

A. Action Submittals:

1. Descriptive product information for each individual system component.
2. Dimensional drawings of panels and associated equipment.
3. Itemized bill of material.
4. Operating and programming instructions.
5. Control panel configuration and module data.
6. Complete point to point wiring diagrams of system and device interconnection. Identify spare connection points.
7. Alarm initiating, indicating, and supervisory device electrical data.
8. Annunciator configuration and module data.
9. Plans showing device and panel locations as well as conduit and cable sizes. Prepare drawings and diagrams on drawing sheets of uniform size without extraneous information. Marked up electrical, HVAC, lighting or similar drawings or copies of catalog data sheets are not acceptable in lieu of required drawings or diagrams.
10. Sequence of Operation Matrix.
11. Battery sizing calculations.
12. Supervisory power requirements for equipment.
13. Alarm power requirements for equipment.
14. Power supply rating justification showing power requirements for system power supplies.
15. Sample warranty.
16. Recommended types and quantities for spare parts.

17. For each system's control panel, provide written schedule of active and spare addresses provided on each addressable circuit.
18. Anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Experience and qualifications of firm(s) proposed to design and install system.
2. Certifications documenting service technician's training. Certification shall indicate name of individual, training, dates, systems qualified, and current status.
3. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
4. Component and attachment testing seismic certificate of compliance as required by Section 01 45 33, Special Inspection, Observation, and Testing.
5. Copy of design documents, Shop Drawings, and calculations submitted to code-enforcement authorities.
6. Code-enforcement authority approval letter.
7. Factory test reports.
8. Detailed program and schedule for testing, inspection, and maintenance of fire alarm system that satisfies requirements of NFPA 72, manufacturer's recommendations, and local authority having jurisdiction.
9. Written documentation for logic modules as programmed, for system operation, with matrix showing interaction of input signals with output commands.
10. System program hard copy and electronic file in format acceptable to Engineer showing system functions, controls, and labeling of equipment and devices.
11. Documentation of system voltage, current, and resistance readings taken during installation, testing, and ATP phases of system installation.
12. System record drawings and wiring details including one set of reproducible masters and drawings in electronic file in a DXF format suitable for use in a CAD drafting program.
13. NFPA 72, Record of Completion: Submit to Owner and code-enforcement authorities.
14. NFPA 72, Inspection and Testing Form: Submit to Owner and code enforcement authorities.
15. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.
16. Certificate of compliance with the Build America, Buy America Act (BABA), in accordance with Section 01 33 00, Submittal Procedures.
17. Certificate of compliance with the American Iron and Steel Act (AIS) in accordance with Section 01 33 00, Submittal Procedures.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Provide names of projects, locations, and telephone numbers of persons to contact for at least two installations where Contractor or Subcontractor has installed detection and alarm systems that are similar in size and scope to the Work.
2. Licensed Firm Responsible for System Design, Installation and Testing: Document established reputation in fire alarm system industry having 5 years' experience in design, installation, and testing of fire alarm systems.
3. System Shop Drawings for code enforcement authority approval shall be prepared by a technician with minimum of NICET Level IV Certification for fire alarm systems, or a professional engineer registered in State of New Mexico.
4. Technician with minimum of NICET Level III Certification for fire alarm systems shall provide general supervision of project execution and shall perform final testing and certification of the system.
5. Technician with minimum of NICET Level II Certification for fire alarm systems shall directly supervise all onsite installation activities.
6. Service technician shall be formally trained by manufacturer.

B. Regulatory Requirements: Submit Shop Drawings and system design calculations for approval to the following code enforcement authorities.

1. Authority having Jurisdiction.

1.06 SPECIAL GUARANTEE

A. Provide manufacturer's extended guarantee or warranty, with Owner named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of the Owner, removal and replacement of Work specified in this Specification section found defective during a period of 5 years after date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work shall be as specified in the Contract Documents.

1.07 MAINTENANCE

A. Maintenance Service: For 2 years after Correction Period, provide maximum of two service calls, at Owner's request, to make adjustments or repairs required to keep system in satisfactory, full operation.

1.08 EXTRA MATERIALS

A. Furnish, tag, and box for shipment and storage the following spare parts, special tools, and material:

Item	Quantity
Special tools required to maintain or dismantle	One complete set for each different size unit

B. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Materials, equipment, and accessories specified in this section shall be products of:

1. Siemens Building Technologies.
2. Simplex Grinnell.
3. Gamewell-FCI.
4. Notifier.
5. GE-EST.
6. Honeywell.

B. Notification appliances, initiating devices, and accessories of fire alarm systems specified in this section shall be products of:

1. Siemens Building Technologies.
2. Simplex Grinnell.
3. Gamewell-FCI.
4. Notifier.
5. GE-EST.
6. Honeywell.
7. Gentex.
8. System Sensor.
9. Wheelock.

2.02 GENERAL

A. Material and Equipment:

1. Standard products of their respective manufacturers.
2. Models produced for not less than 3 years.

3. Equipment: Supported by a service organization that is, in the opinion of Owner, reasonably convenient to Site.

B. Review details of Project prior to start of the Work, verify dimensions in field, and revise conduit and equipment locations to avoid obstructions and allow installation of new equipment.

C. Do not begin system installation prior to receiving written approval of Shop Drawings from Engineer.

2.03 UL COMPLIANCE

A. Products manufactured within scope of UL: Conform to UL Standards and have an applied UL listing mark.

B. Provide equipment UL listed in accordance with requirements of NFPA.

2.04 SERVICE CONDITIONS

A. Altitude: Not greater than 5,500 feet above sea level.

B. Ambient Temperature:

1. Maximum 40 degrees C.
2. Minimum 0 degrees C.

C. Provide equipment fully rated without derating for these conditions.

2.05 FIRE ALARM CONTROL PANELS

A. General:

1. Control panel circuit for 24V dc, power limited, initiating circuits in accordance with NFPA 70, Article 760.
2. Assembled panel UL 864 listed Product Category UOJ2, as an integrated control system.
3. Enclosure:
   a. NEMA 250 Type 1.
   b. Color: Red.
4. Internally Mounted Module with:
   a. Transformer with 120V ac input and 21.5V ac output.
   b. Solid state rectifier for 21.5V ac input and fuse protected, filtered, and regulated 26V dc no-load output.
   c. Solid state transfer switch, minimum 8 amp-hours.
   d. Standby sealed, gelled electrolyte (lead acid) batteries sized for system operating period of 60 hours of standby mode operation.
   e. Solid state battery charger.

f. Over/under voltage monitor supervisory circuit.
g. LEDs for status of normal power, battery trouble, and power supply module trouble.
h. Alarm mode of 5 minutes after standby operation.

5. Local differentiating audible sound device for alarm, trouble, and supervisory conditions.
6. Full digital transmission protocol.
7. Addressable signal transmission protocol to be either digital pole/response protocol or proprietary communication protocol, with all antilog sensing device signals digitally transmitted to control panel.
8. MOV/gas discharge transient protection for power supply module, plus initiating and indicating alarm devices.
9. For addressable systems provide additional 20 percent capacity for future indicating and initiating devices.
10. EMI/RF Protection:
    a. Protect control equipment, devices, and wiring against unwanted radiated electro-magnetic interference (EMI) and from effects of audio and radio frequencies (RF) that can cause transmission of spurious alarms.
    b. Design system and install to be unaffected (with control cabinet faceplates installed) by operation of handheld, portable radios of up to 5 watts, or portable cellular telephones up to 1 watt, within 12 inches of system components.

B. Addressable Control Panel:

1. Modular construction with solid state, microprocessor-based components, programmable central processor unit, back lighted display of primary control status and essential alarm operating conditions, and concealed, maintenance, purpose operator's keypad.
2. Main control module consisting of operator's keyboard/keypad, local and remote communications and supervision capabilities, system control memory, and programming interface.
    a. Two-line, back lighted, 80 alphanumerical LCD characters with:
        1) Visible cursor for entering data information.
        2) Displayable when cabinet door is open.
    b. Primary operators keypad with:
        1) Acknowledge keys and LEDs for system alarm, supervisory service, and system trouble conditions.
        2) Power on LED.
        3) Alarm silence reset keys.
        4) Displayable when cabinet door is closed.
    c. Pass code protected action display keypad for:
        1) Circuit/device enable or disable.
        2) Control on/off.
        3) Test/status.

4) Auto or manual.
5) Activate/reset.
6) Display historical logs/real time.
7) Function/menu.
8) Program.
9) Delete.
10) Displayable when cabinet door is open.

d. Numerical entry and selection keypad, used in conjunction with action display keypad, to perform control function on system zones, initiating circuits, or auxiliary relays, and to gain access to system information. Displayable when cabinet door is closed.

e. Programmable control keypad with five pass code keys, associated LEDs, and identification labels for:
1) Manual evacuation.
2) HVAC shutdown disable.
3) Displayable when door is open.

f. Four function keys for control of variable functions related to primary operations keypad, displayable when door is open.

3. TIA 485, NFPA 72, Class A, Class B, Class C, or Class X data circuit capability for remote annunciators.
4. Form C relay contacts rated 2 amperes, 24V dc.
5. Down loader port for connection to microprocessor-based transponder.
6. Power supply interface module generating digital voltage and current data to LCD with:
a. DC power conversion and output terminals.
b. Supervision and control of power supply.
7. Modules with coded input on first alarm, local trouble LED, and in/out capabilities for:
a. 120 addressable initiating alarm sensors consisting of analog/addressable or traditional detector methods.
b. Four hardwired I/O points, field selectable in any combination to be either NFPA 72, Class A or Class B, initiating device circuits or NFPA 72, Class A or Class B, indicating appliance circuits or auxiliary control circuits.
c. Auxiliary Control Circuit Contacts: Single-pole, double-throw, rated 2 amperes at 24V dc and 0.5 ampere at 120V ac.
8. Auxiliary Control Circuit Contacts: Single-pole, double-throw rated, 2 amperes at 24V dc and 0.5 ampere at 120V ac.

2.06 ADDRESSABLE DETECTOR BASE

A. Solid state circuitry with integral LED visual alarm, dip switch or program selectable addressing, and common base receptacle for ionization, photoelectric, and heat detectors. Locate device address in base.

B. Constantly monitors detector status and status changes.

C. Suitable for mounting on standard outlet box.

D. Normally open, double-pole contacts rated 3 amperes, 30V dc.

2.07 INDIVIDUAL ADDRESSABLE MODULE

A. Solid state circuitry with selectable latch/nonlatch operating conditions and mounting plate.

B. Monitors single and multiple devices with dry contacts.

C. Suitable for installing inside 4-inch by 4-inch by 2-1/2-inch electrical box.

2.08 INITIATING DEVICE

A. Pull Station, Fire:

1. Double-action station for general alarm.
2. Constructed of red molded polycarbonate material, and raised white letters stating “FIRE.”
3. Surface-mounted with hinged front cover having keyed or allen-wrench reset lock.
4. Where required, rated for use in hazardous environments.
5. Keyed for single action lift door and pull handle for double action operating station with plastic break rod.
6. Activated station pull handle, latched in protruding position until reset by key.
7. Stations keyed alike with fire alarm control panel.
8. Screw terminal for field connections.
9. Normally open,-pole contacts rated 3 amperes, 30V dc for resistive loads.
10. Manual Pull Station: Microprocessor-based communication circuit address, and compatible with fire alarm control panel.

B. Smoke Detector:

1. Ionization type with plug-in, twist-lock base in accordance with UL 268.
2. Solid state circuitry, unipolar, single source, dual sensing chamber, suitable for device releasing service.
3. Concealed, field adjustable, sensitivity test switch.
4. LED; pulsed indication for power availability and steady indication for activated detectors.
5. Self-Compensating Circuitry:
   a. Voltage Range: 15V dc to 30V dc, 24V dc nominal.
   b. Temperature Range: 0 degree C to 38 degrees C.

c. Operating Temperature Range: Minus 10 degrees C to 50 degrees C.
d. Humidity Range: 0 percent to 95 percent relative humidity.

6. Normally open, single-pole contacts, rated 3 amperes, 30V dc for resistive loads.]
7. Auxiliary relay for fan shutdown.
8. Detectors equipped with insect screen.
9. Photoelectric sensors adjusted to within 3 percent of UL 217 window obturation sensitivity value.

C. Intelligent Fire Detectors:

1. Photoelectric and thermal detector software programmable from fire alarm control panel to match specific hazards and reduce nuisance tripping.
2. Addressable base to be field mounted on octagon box.
3. Software programmable to provide pre-alarm notification.
4. Capable of producing alarm from photoelectric detector, thermal detector, or microprocessor logic.
5. Field cleanable chamber with replaceable chamber components.
6. LED in base to provide status; Pulsed green for normal status, flashing amber for fault or fail condition, and flashing red for alarm.

D. Air Duct Smoke Detector (wired to HCP directly):

1. Duct mounted housing with prealigned sampling and exhaust tubes, analog sensing, solid state circuitry, and plug-in, twist-lock base for photoelectric detector in accordance with UL 286A, NFPA 72, NFPA 90A, and NFPA 101.
2. Sampling tubes to extend full width of branch air return duct.
3. Self-Compensating Circuitry:
   a. Voltage Range: 15V dc to 30V dc, 24V dc nominal.
   b. Temperature Range: 0 degrees C to 38 degrees C.
   c. Humidity Range: 10 percent to 90 percent relative humidity.
   d. Velocity Range: 400 feet to 4,000 feet per minute.
4. Front mounted LED with pulsed indication for alarm condition.
5. Normally open, single-pole, double-throw auxiliary relay with 2 amperes, 28V dc rated contacts for resistive loads.

2.09 NOTIFICATION APPLIANCES

A. Audible Alarm:

1. General:
   a. Polarized, 24V dc device with sound power measured dB in accordance with UL 464.
   b. Separate in/out wire leads for field connections.

c. Baked red enamel finish.
d. Audibility: In accordance with NFPA 72 and local requirements.

2. Modular Horn:
   a. Surface basic unit, complete with single projector, designed for mounting on 4-inch square weatherproof electrical box.
   b. Manufacturer supplied box with flush grille plate and basic surface unit for recessed horns.
   c. Explosion-Proof Horns: Vibrating diode type with sealed wires, and tapped for 3/4-inch conduit in accordance with UL 1604.
3. Single protection type bell with weatherproof housing, rated for 120V ac motor, adjustable mounting bracket, and audible output of 115 dB.

B. Visual Alarm, Fire:

1. Polarized, 24V dc, multi-candela indicating output in accordance with UL 1638.
2. Solid state circuitry for high intensity control of xenon flashtube.
3. Tamper-proof, translucent molded, polycarbonate, pyramidal shaped lens with "FIRE" in red lettering visible from 180-degree viewing field; red enclosure.
4. Polarized in/out wiring.
5. Designed for mounting on wall or ceiling, single-gang electrical box, or as part of audible/visible base housing.
6. Synchronized unit.

2.10 WIRING

A. AC power wiring shall meet requirements of Section 26 05 05, Conductors.

B. Low voltage wiring shall be solid copper or bunch tinned (bonded) stranded copper, minimum 14 AWG, and shall meet NEC Article 760 for nonpower limited service.

C. Network or addressable loop cables shall be as recommended by manufacturer for installation of their system and UL Listed for Fire Alarm Systems.

2.11 RACEWAYS

A. Conduit used for installation of Fire Alarm system shall follow requirements as identified in Section 26 05 33, Raceway and Boxes.

2.12 END-OF-LINE RESISTORS

A. Ohmic value and power rating as determined by manufacturer based upon number of circuit devices supplied and circuit configuration as installed.

B. Single-gang, stainless steel plate mounted in recessed box.

2.13 SURGE SUPPRESSORS

A. Surge Protective Devices (SPD):

1. Provide to suppress voltage transients that might damage fire alarm panel/transmitter components. Unit shall wire in series to power supply of protected equipment with screw terminations.
2. Unit shall be UL 1449 listed with a 330-volt suppression level and have a maximum response time of 5 nanoseconds.
3. Unit shall meet IEEE C62.41 Category B tests for surge capacity.
4. Features:
   a. Multi-stage construction that includes inductors and silicon avalanche zener diodes.
   b. Long life indicator lamp (LED or neon lamp) which extinguishes upon failure of protection components. Fusing shall be externally accessible when this feature is available.
5. Manufacturer and Product: Edco of Florida, Ocala, FL; Model HSP-121BT2.

PART 3 EXECUTION

3.01 GENERAL

A. Coordinate with other trades for mounting and interfacing with fire alarm system related devices.

B. Install control panels, initiating and alarm devices, conduit, and wiring for interconnection of devices specified herein**.**

3.02 INSTALLATION

A. Install and connect fire detection and alarm equipment in accordance with manufacturer's instructions and recommendations, and in accordance with applicable codes and standards.

B. Mount devices in accordance with manufacturer's instructions.

C. Provide outlet and junction boxes that are compatible with raceway system.

D. Mount detector LEDs so they are readily visible from floor.

E. Program or configure panels and devices, as required to operate as defined by Sequence of Operations Matrix on the Drawings.

F. Install conductors in accordance with Section 26 05 05, Conductors, and NFPA 70, Article 760.

G. Install initiating alarm, signal, and communication conductors in separate and independent raceway system.

H. Circuit wiring color-code, as established by installer, to be maintained throughout installation.

I. Size conductors in accordance with device manufacturer's recommendations. Increase AWG size of alarm conductors, if necessary, to maintain terminal voltage drop within acceptable level required by NEC and NFPA.

J. Do not install detectors until after construction cleanup is complete, in accordance with requirements of NFPA. If earlier installation is required by AHJ for protection during construction, clean or replace detectors installed prior to final clean-up.

K. Duct Smoke Detector: Furnish, wire, and connect to fire alarm system in accordance with this Specification. Install in accordance with Section 23 09 13, HVAC Controls, Field Components, and Instruments.

L. HVAC Equipment: Wire and connect fire alarm system to air handling system, smoke exhaust fan and smoke damper control circuits, and fan status contacts. Coordinate work with Section 23 09 00, Instrumentation and Control Devices for HVAC.

M. Suppression Sprinkler System: Wire and connect to fire alarm system to suppression sprinkler system. Coordinate work with Section 21 13 00, Fire-Suppression Sprinkler Systems.

3.03 CONDUIT, ELECTRICAL ENCLOSURES, TERMINAL CABINETS, PULL BOXES, AND BACKPLATES

A. Conduit Systems: Dedicated to fire alarm system and containing no unrelated conductors.

B. Fire Alarm System Conduits: Size and type specified under Section 26 05 33, Raceway and Boxes.

1. Conduit: As specified in Section 26 05 33, Raceway and Boxes.
   a. Flexible Metallic Conduit: Allowable for whips to devices only.
      1) Maximum Length: 6 feet.
      2) Minimum Diameter: 3/4-inch.

3) Set screw type couplings or connectors are specifically prohibited.

2. Size conduits according to conductors contained therein.
3. Maximum Cross Sectional Area Percentage Fill for Fire Alarm System Conduits: 40 percent.

C. Route and install conduit to minimize potential for physical damage, either mechanical or by fire; avoid interference with existing building systems, facilities or equipment; and to facilitate service and minimize maintenance. Coordinate installation between different trades to avoid conflicts.

1. Solidly attach conduit to building structural members or permanent walls, except flexible conduit whips to devices. Do not attach conduit to existing conduit, ductwork, cable trays, other ceiling equipment, drop ceiling hangers/grids or partition walls, except where necessary to connect to initiating, evacuation signaling, or auxiliary function devices.
2. Route conduit either parallel or perpendicular to building structural members.
3. Install conduit at a height to avoid obstructing any portion of a window, doorway cable tray, stairway, or passageway. Do not interfere with operation of existing mechanical or electrical equipment.
4. Locate conduit, junction boxes, pull boxes, terminal cabinets, electrical enclosures, and device backboxes to be readily accessible for inspection, testing, service, and maintenance.
5. Arrange conduit to minimize possibility of water in those conduits draining through control panels.
   a. Arrange conduit, except nipples between control panels, to enter control cabinets from below.
   b. Provide three 1/4-inch drain holes in conduit at horizontal low point beneath each control cabinet.
6. Provide bushings at termination of conduit, prior to wire installation.
7. Install junction boxes as necessary. Pull conductors through junction boxes, without splices.
8. Install pullboxes in each conduit at intervals not to exceed 100 feet.
9. Minimum Pullbox Size: 4-inch square, minimum.
10. Size device backboxes and junction boxes to accommodate number of conductors contained. Extension rings or extension boxes are prohibited.
11. Provide junction boxes, pull boxes, terminal cabinets, device backboxes, and raceways gasketed and weather-tight in accordance with requirements of Section 26 05 33, Raceway and Boxes.

D. Installation Requirements:

1. Conduit, Junction Boxes, Panels, Electrical Enclosures, Relays and Device Backboxes in Unfinished Areas: Exposed.
2. Conduit and Device Backboxes in Finished Areas: Concealed in walls, ceiling spaces, electrical shafts or closets, in finished areas, except as noted on the Drawings.
3. Provide escutcheon plates on either side of the wall at exposed conduit wall penetrations.

E. Seal penetrations of walls, floors, and ceilings around conduit(s) in accordance with Section 07 92 00, Joint Sealants, restoring walls, floors, and ceilings to their original condition, fire resistance, and integrity.

F. Paint pull boxes, junction boxes, conduit bodies, and terminal cabinets “fire engine red” prior to installation. Provide touch-up painting, of normally visible pull boxes, junction boxes, and terminal cabinets prior to final acceptance testing.

G. Ground conduit by approved ground clamps, and in accordance with NEC requirements.

H. Mount end-of-line resistors on terminal blocks.

I. Install detection and alarm wire in separate conduits. Route outgoing and return conductors for each supervised circuit separately as required by NFPA 72.

J. Minimum Separation of Outgoing and Return Conduits: 1 foot vertically and 4 feet horizontally.

3.04 IDENTIFICATION

A. Paint junction, terminal, and pulling box covers red and identify with engraved labels by zone and circuit that it contains.

B. Provide engraved alphanumeric identification for detection and terminal devices keyed to posted operations and maintenance instructions.

3.05 CONDUCTORS

A. Requirements apply to fire alarm system conductors, including all signaling line, initiating device, indicating appliance, releasing function, remote signaling, ac and dc power and grounding/shield drain circuits.

B. Conductors:

1. New; do not use wire that has scrapes, nicks, gouges or crushed insulation.
2. Install in conduit.
3. Continuous between devices and between devices and intermediary terminal cabinets.
4. Low voltage conductors shall be minimum size 14 AWG. Smaller conductors are allowable where shown on approved Shop Drawings as part of a manufacturer's specific communications cable (such as, addressable system.
5. In accordance with requirements of NEC, Article 760 for power limited service.

C. Splices in conductors are specifically prohibited.

D. Types:

1. Conductors, Except AC Power Conductors and Grounding Conductors: Solid copper or bunch tinned (bonded) stranded copper.
2. Stranded copper conductors are acceptable for ac power conductors and grounding conductors only.

E. Terminations, including field connections to supervisory resistors, diodes, relays or other devices shall be to numbered terminals or terminal strips and readily accessible for inspection, service, testing and maintenance.

1. Terminations shall be within junction boxes, device backboxes, terminal cabinets, control panels or other suitable metal enclosures.
2. Terminals and terminal strips shall be suitable for the size and number of conductors connected to them.
3. Uniquely number each conductor termination with durable plastic tags or uniquely identifiable by a combination of numbers and color codes. Show conductor numbers on Contractor's Record Drawings (floor plans and detailed wiring diagrams) in a manner allowing ready identification of conductor terminations.
4. Wire nuts are prohibited.
5. Where pigtail devices are factory provided with wires too short to be connected to terminal strips (such as, solenoids), provide soldered and taped connections.

F. Control Panel Wiring:

1. Fully dressed and bundled with nylon tie wraps at 3-inch intervals.
2. Route bundled wiring parallel to terminal strips within control panels, with individual conductors turned out at 90 degree angles to their associated terminal connections.

3. Bundle AC power conductors and route separately from low voltage conductors. Maintain a minimum 2-inch separation between AC power conductors and low voltage conductors wherever possible.
4. Size control cabinets to accommodate the requirements of this section.
5. Do not use control panels as raceways. Do not route conductors that do not terminate within a control panel through that control panel.

G. Separate conductors into the following categories:

1. Low voltage circuits that serve devices.
2. AC power circuits.

H. Install each category of conductors in physically separated, dedicated conduits, and isolate each category except at common associated control equipment. Further segregate conductors as necessary to conform to fire alarm system manufacturer's recommendations and as necessary to prevent electrical crosstalk between conductors installed in common conduits.

I. Wiring: THHN or TFFN stranded. Use of multi-conductor twisted pair or similar wiring is not permitted.

J. Install as power limited circuits in accordance with NFPA 72, and NEC, Article 760.

K. Conductors looped around terminals are prohibited.

L. Wire nut splices are prohibited.

M. T-tapping of circuits is prohibited.

N. Circuits shall be megger tested to voltage rating of their insulation before final terminations are made.

3.06 OVERVOLTAGE AND SURGE PROTECTION

A. Install SPD for fire alarm control panel in accordance with manufacturer's requirements.

3.07 REPAIR/RESTORATION

A. Touch up scratches, mars, and dents, incurred during shipment or installation of equipment.

B. If required because of extensive damage, as determined by Engineer, refinish entire assembly.

C. Keep covers on smoke detectors until areas have been thoroughly cleaned.

3.08 TESTS AND INSPECTION

A. In accordance with Section 01 91 14, Equipment Testing and Facility Startup, and NFPA 72.

B. Demonstrate entire system meets performance requirements specified in Article System Description.

C. Perform tests in presence of code-enforcement authorities, Owner and Engineer.

D. Individually field test each smoke detector prior to installing device at its designated location to confirm operating condition after shipping and storage. Maintain a dated log indicating system address, type of device, sensitivity and initials of technician performing test, using test equipment specifically designed for that purpose, and submit as part of final acceptance documentation. After testing detection devices, base shall be labeled with system address, date, and initials of installing technician. Labeling shall not be visible after installation is complete.

E. Test wiring runs for continuity, short circuits, and grounds before system is energized. Take resistance, current, and voltage readings as work progresses and document results.

1. Maintain a systematic record of all readings using schedules or charts of tests and measurements. Include readings, dates, and witnesses on the logging form.
2. Notify Fire Marshal and Owner before start of any required tests. Correct items found at variance with the Drawings or Specification during testing or inspection.
3. Deliver test reports to Fire Marshal and Owner as completed.

F. Prepare final as-built Sequence of Operations Matrix (See Supplement at End of Section) referencing each alarm input to every output function affected as a result of an alarm, trouble, or supervisory condition on that. For outputs programmed using more complex logic functions involving “any”, “or”, “not”, “count”, “time”, and “timer” statements; reflect complete output equation in matrix.

G. Prepare complete listing of device labels for alphanumeric annunciator displays and logging printers prior to acceptance test.

1. Test system wiring to demonstrate correct system response and correct subsequent system operation in event of:
   a. Open, shorted, and grounded intelligent analog signaling line circuit.
   b. Open, shorted, and grounded network signaling line circuit.

c. Open, shorted, and grounded conventional initiating device circuits.
d. Primary power or battery disconnected.
e. Intelligent device removal.
f. Incorrect device address.

2. Demonstrate system evacuation alarm indicating appliances as follows:
   a. Alarm notification appliances actuate as programmed.
   b. Audibility and visibility at required levels.
3. System indications shall be demonstrated as follows:
   a. Correct message display for each alarm input, at control panel, each remote alphanumeric LCD display.
4. Demonstrate system onsite and offsite reporting functions as follows:
   a. Correct alarm custom message display, address, device type, date and time transmitted, for each alarm input.
   b. Correct trouble custom message display, address, device type, date and time transmitted, for each alarm input.
   c. Trouble signals received for disconnect.
5. Demonstrate secondary power capabilities as follows:
   a. Disconnect system primary power for a period of time as specified herein; at end of period, confirm alarm condition shall be created and system performance as specified for required duration.
   b. Restore system primary power for 48 hours and confirm that system-charging current is normal trickle charge for fully charged battery bank.
   c. Check system battery voltages and charging currents at fire alarm control panel using test codes and LCD displays

H. If system fails to perform as specified and programmed during acceptance test, test will be terminated at discretion of acceptance inspector.

1. Retest system, correcting deficiencies and providing test documentation to acceptance inspector.
2. If software changes are required during acceptance test, provide a utility program to compare edited program with original and furnish a printed list of changes and the system functions, inputs, and outputs affected by changes. Retest items listed as changed before resuming acceptance test. Submit printed list and log of successful retesting of changed elements before scheduling completion of acceptance test.
3. Acceptance inspector may elect to require complete acceptance test to be performed again if, in their opinion, modifications to system hardware or software warrant complete retesting.

I. Upon completion of tests, complete and provide the following:

1. NFPA 72, Record of Completion, and Inspection and Testing Form.
2. Certification that final system meets UL.

3.09 MANUFACTURER'S SERVICES

A. Furnish manufacturer's representative in accordance with Section 01 43 33, Manufacturers' Field Services.

B. Provide manufacturer's services necessary to provide Manufacturer's Certificate of Proper Installation per Section 01 43 33, Manufacturers' Field Services.

END OF SECTION