TowerPinkster
Architecture · Engineering · Interiors

ADDENDUM NO. 1

DATE OF ISSUANCE:	**May 9, 2025**
PROJECT:	**2025 FEMA Safe Room Addition** **Crawford County High & Metal Schools** **Address** **Marengo, IN 47150**
OWNER:	**Crawford County Community Schools**

ARCHITECT'S PROJECT NO.: 22-131.000

ORIGINAL BID ISSUE DATE: April 14, 2025

SCOPE OF WORK

This Addendum includes changes to, or clarifications of, the original Bidding Documents and any previously issued addenda, and shall be included in the Bid. All of these Addendum items form a part of the Contract Documents. The Bidder shall acknowledge receipt of this Addendum in the appropriate space provided on the Bid Form. Failure to do so may result in disqualification of the Bid.

DOCUMENTS INCLUDED IN THIS ADDENDUM

This Addendum includes **47** pages of text and the following documents:

- Specification Sections: **08 7100, 21 0500, 23 3113** (number of pages included above)
- Drawings: **0**

GENERAL INFORMATION

A Pre-Bid Conference was held on May 6, 2025. A copy of the Agenda and Sign-In sheet is attached. A copy of the Pre-Bid Conference Guide (grant requirements) is attached.

CHANGES TO SPECIFICATIONS

ADD-1 Item No. S-1 - 08 71 00 - Finish Hardware

Add Specification Section 08 7100 – Finish Hardware in its entirety.

ADD-1 Item No. S-2 - 21 0500 - Common Work Results for Fire Suppression

Add Specification Section 21 0500 – Common Work Results for Fire Suppression in its entirety.

ADD-1 Item No. S-3 - 23 3113 – Metal Ducts

Add Section 2.10 – DOUBLE-WALL DUCT AND FITTING FABRICATION

A. Manufacturers:
   a. Allied Mechanical Services
   b. Eastern Sheet Metal
   c. Foremost
   d. LaPine Metal Products
   e. McGill AirFlow Corporation
   f. SEMCO Incorporated
   g. Universal Spiral Air
   h. Zinger Sheet Metal

B. Ducts: Fabricate double-wall ducts with an outer shell and an inner duct. Dimensions indicated on the drawings are for inner ducts.
   a. Outer Shell: Base metal thickness on outer-shell dimensions. Fabricate outer-shell 2 inches (50 mm) longer than inner duct and insulation and in metal thickness specified for single wall duct.
   b. Insulation: 1-inch (25 mm) thick fibrous glass, unless otherwise indicated. Terminate insulation where double-wall duct connects to single-wall duct or uninsulated components to reduce outer shell diameter to inner duct diameter.
      i. Thermal Conductivity (k-Value): 0.26 at 75 degrees F (0.037 at 24 degrees C) mean temperature.
   c. Solid Inner Ducts: Use the following sheet metal thicknesses and seam construction:
      i. Ducts 3 to 8 Inches (75 to 200mm) in Diameter: 0.019 inch (0.5 mm) with standard spiral-seam construction.
      ii. Ducts 9 to 42 Inches (225 to 1070mm) in Diameter: 0.019 inch (0.5 mm) with single-rib spiral-seam construction.

C. Fittings: Fabricate double-wall insulated fitting with an outer shell and inner duct.
   a. Solid Inner Ducts: Use the following sheet metal thicknesses:
      i. Ducts 3 to 34 inches (75 mm to 865 mm) in diameter: 0.028 inch (0.7 mm).

ADD-1 Item No. S-4 - 26 33213 – Engine Generators

Delete article 2.15 Outdoor Generator-Set Enclosure in its entirety.

ADD-1 Item No. S-5 - 28 3100 - Fire Detection and Alarm

Add Specification Section 28 3100 – Fire Detection and Alarm in its entirety.

CHANGES TO DRAWINGS

ADD-1 Item No. D-1 - A321-327

In all locations on the exterior perimeter of the FEMA Safe Room exterior metal panel referring to 7/8" metal furring channels, reduce the spacing between furring channels from 4'-0" on center to **2'-0" on center max**. Non-FEMA Safe Room wall metal panels can remain at 4'-0" on center max.

ADD-1 Item No. D-2 - M101D

The spiral supply ducts in Multi-Purpose Room D101 shall be double-wall ducts.

ADD-1 Item No. D-3 - M301

The rough opening of the tornado duct shroud at the 12" X 10" exhaust duct (second from elevation right) shall be 40" minimum from the edge of the rough opening for the tornado door. Maintain a minimum of 32" between the rough openings of the 12"x10" exhaust duct and the 36"x26" exhaust tornado louver. Coordinate with ductwork plans.

ADD-1 Item No. D-4 - E402

On the Electrical Panel Feeder Schedule change the EMT from 1" to **2"** to match 4/E411 for ED1A and EL1A.

ADD-1 Item No. D-5 - E411

As a clarification, 4/E111 shows (3) 2" conduits. The design intent was to use one conduit for the control wiring.

ADD-1 Item No. D-6 - E421

As a clarification, the light fixtures scheduled may be provided within a single manufacturer's product lines if the basis of specification is met or exceeded. Manufacturers not specifically listed must be approved prior to bidding.

Cooper Lighting is an acceptable lighting manufacturer.

ADD-1 Item No. D-7 - T101D

Door D103B Access Control Detail Indicator symbol: Replace "ES" (electrified strike) at the top of the diamond with **"LR"** (electrified latch retraction / panic hardware).

ADD-1 Item No. D-8 - T442

Access Control Door Schedule: Door D103B – Locking Hardware Type: Replace "ES" (electrified strike) with **"LR"** (electrified latch retraction / panic hardware).

END OF ADDENDUM.

SHIREMAN
CONSTRUCTION MANAGEMENT

May 6, 2025

PRE-BID MEETING AGENDA

Project: Crawford County High School 2025 FEMA Safe Room Addition

Subject: Pre-Bid Meeting

Location: Crawford County High School Cafeteria

Time: 4 P.M. (EDT) Local Project Time

I. Introductions:
   a. Crawford County Community Schools - Team Representatives
   b. Construction Manager - Shireman Construction Management
   c. Architect & Engineer – TowerPinkster
   d. Grant Administrator – Indiana 15 Regional Planning Commission
   e. Peer Reviewer – Primavera & Associates

II. Project Description: Crawford County High School FEMA Safe Room
   a. Infill the existing courtyard with a new addition.
      i. Hardened construction building addition for the FEMA Safe Room.
      ii. Traditional construction building addition for the Lobby / Corridor.
   b. Minor renovation work in the existing school to facilitate the FEMA Safe Room Addition.

III. Bid Outline: Registered with Tower Pinkster Architects
   1. Confirmation of Bid dates & Bid Procedures:
      A. Bid Date: **May 15, 2025, at 4:00 P.M.** (EDT) prevailing local time.
      B. Bid Location: Crawford County Schools Administration Building – 5805 E. Administration Road Marengo, IN 47140
      C. Submittals with Bids must include (2) copies of the following items:
         1) Proposal form 96 & Non-Collusion Affidavit
         2) Bid Form in Spec Book
         3) Financial Statement: AIA A-305
         4) Bid Bond 5%
            a. Acknowledge Addenda Numbers on Proposal Form.
      D. Schedule of Values & Subcontractors list: Email to Construction Manager & Architect before 2:00 P.M. (EDT) the next day, May 16th.
   2. Indiana Sales Tax Exempt (Cannot guarantee other states)
   3. Your Contract is Direct to the Owner.
   4. Shireman Construction Management is NOT a Direct Bidder. Serving as the Construction Manager.

5. It's a lump sum bid – one package only.

IV. Scheduling & Coordination
   1. Working Conditions & Special Issues:
      A. Start demolition operations this summer.
      B. Coordinate the logistics of access to the courtyard with the Construction Manager, Architect, and Owner's Representatives
      C. Building the Work while keeping the facility operating, owner will cooperate.
      D. Access to building and cranes while school is in session.

V. Administrative Issues:
   1. Post-Bid Schedule
      A. Intent is to issue the Letter of Intent in 15 days.
   2. Mobilization & Start Up.
      A. Within 10 days following Notice to Proceed

VI. Technical Issues:
   1. Note the Allowances Section
   2. Note the Retainage
   3. Note the Alternates

VII. Miscellaneous:
   1. Building Inspections prior to bidding: Call Les Smith (812) 968-0555.
   2. Note the Federal Provisions Spec Section 00 7384.
      a. Davis Bacon federal wage scale is in the Spec Book.
      b. Coordinate paperwork as required by the grant with the grant administrator.
   3. Read over the General & Supplementary Conditions very carefully. Same with the Instructions to Bidders & Supplementary Instructions to Bidders.
   4. Note the Indiana Certificate of Qualification Section.
   5. Note the Specification Section 01 4500 – Quality Control. FEMA requires additional testing beyond traditional construction projects.
      a. The Peer Reviewer, Primavera & Associates will be observing construction and will need access to testing information and results.
   6. Addenda #1 will have the Sign In Sheet.
   7. Owner will purchase the Builders Risk Insurance.

VIII. Questions.

IX. Site Tour.

Pre-Bid Conference
Crawford County Community School Corporation Safe Room

May 6, 2025

This Pre-Bid Conference Guide is to clarify the applicable requirements for all parties who will perform work or services on the project, however it does not alleviate any contracting party from other federal, state or local requirements not addressed herein.

Davis-Bacon Contract Provisions were included in the bid specifications for this project and must be included in all construction contracts, by attachment or by reference. By signing the contract, all prime contractors and subcontractors, including lower-tier subcontractors, acknowledge their understanding of the Federal Labor Standards Provisions and agreement to abide by the provisions of the document.

A federal Prevailing Wage Determination has been assigned to this project based upon the type of construction to be completed and location of the job site. It is the responsibility of the prime contractor to provide a copy of that document to any subcontractors and attach it to all subcontracts, and it becomes the responsibility of any subcontractor to provide a copy of the wage decision and attach a copy of the document to any second or third tier subcontracts.

Each contractor should review the wage decision carefully before commencing work on the project to determine if the classification of workers required to complete the contract are listed for the county in which the work will take place. If a classification is omitted from the wage decision, the contractor must notify the labor standards administrator immediately in order that a conformance rate may be requested.

After reviewing the wage decision, each contractor and subcontractor must complete a "Wage/Fringe Benefit Certification", signed by an owner or officer of the company. This form will be provided by the labor standards administrator and must be submitted prior to any grant funds being expended. The prime contractor is responsible for posting the applicable wage decision at the job site, in a place that is accessible to employees and enforcement officers. In addition, three posters are required to be posted in a visible area of the job site. Those posters include "Equal Employment Opportunity," "Notice to All Employees," "Safety and Health Protection on the Job," "Employee Polygraph Protection Act" and "Employee Rights Under the Davis Bacon Act" and will be provided by the labor standards administrator.

When work on the project begins, the Davis-Bacon and Related Acts require that workers receive no less than the prevailing wage rate plus fringe benefits, assigned by the U. S. Department of Labor and listed in the applicable wage decision assigned to this project, for the category of work which the employee performs. Payment in full must be paid at least once a week for all hours worked on the project during the pay period. Only deductions required by federal or state law or approved by the employee (such as health insurance) or court ordered (child support or garnishment) may be withheld from an employee's gross pay.

If fringe benefits are paid to an approved bona-fide fringe benefit plan, verification of those payments as well as a list of those employees covered must be provided to the labor standards administrator. The contractor must also provide a detailed calculation of how the fringe benefit hourly credit was determined.

If no fringe benefit package is provided by the contractor, the fringe benefit stated on the wage decision for that classification of work must be included in the hourly rate.

Overtime must be paid for any hours worked after 40 per week. If the overtime hours are worked on this federally assisted project, the wage rate shall be paid at 1.5 times the amount listed plus the hourly fringe benefit paid at straight time for every hour worked.

Certified Payroll Reports must be submitted to the labor standards administrator, on behalf of the Grantee, no less often than weekly. Contractors may use the WH-347 provided by the U. S. Department of Labor and included in the Federal Construction Contract Provisions, or may use a computer-generated payroll as long as it includes all of the required information. Regardless of what type of Certified Payroll Report is submitted, it must include the Statement of Compliance (same as the reverse side of the WH-347) signed by an owner or officer of the company.

The Prime Contractor is responsible for obtaining and reviewing all payrolls before submitting them to the labor standards administrator. Subcontractors should go through the Prime Contractor to submit their payrolls and request any information relative to the project. Lower-tier Subcontractors should go through the respective Subcontractor with whom they have a contractual agreement.

The Prime Contractor is responsible for the correctness and timely submission of all subcontractors' payrolls and is liable for violations or underpayments to workers by subcontractors. If violations or underpayments occur, payment to the Prime Contractor may be delayed until compliance is achieved.

If an underpayment occurs, the Prime Contractor is required to pay restitution and interest on the underpayment to be calculated on back wages or monetary relief at the rate established in the Internal Revenue Code (26 U.S.C. § 6621). The final rule also clarifies that interest will be compounded daily. This interest starts accruing on all restitution payments after one month of payroll date and adds interest to the payment which is calculated based off a quarterly rate + 3%.

In addition to examination of Certified Payroll Reports and fringe benefit plans, the labor standards administrator must conduct on-site employee interviews which include taking written statements from the employees and documenting observations of what type of work the employee was engaged in when approached for the interview. Contractors and subcontractors must not prohibit their employees from being interviewed or remove the employee from the work site in an effort to obstruct their availability to be interviewed.

Apprentices may perform work on the project and be paid less than the prevailing wage rate for the classification of work they are performing ONLY IF the contractor has provided documentation to the labor standards administrator that the Apprentice is individually registered in an apprenticeship program approved by the U. S. Department of Labor. Documentation required is a

"Certificate of Enrollment" from the approved Apprenticeship program which lists the apprentice's name, date of enrollment and percentage of the Journeyman's wages that are due the employee.

An approved Apprenticeship Program will state the proportion of apprentices the contractor can have working on the project based upon the size of his entire workforce. The number of Apprentices being utilized may never exceed the ratio of apprentice to journeyman identified by the approved Apprenticeship Program. If more than the allowable number of apprentices are utilized, those in excess of the allowable amount must be paid the full journeyman's wage rates and fringe benefits listed on the applicable wage decision.

Contractor may not employ any person under the age of 16 years old. The contractor may not enter into a subcontract with any party who is suspended or debarred from participation in federally assisted projects. Contractors may never coerce, intimidate or threaten any employee to give up any part of the compensation to which he is entitled for his work on the project.

PRE-BID MEETING SIGN-IN

Crawford County FEMA Safe Room Addition- 5-6-2025

INITIALS	NAME	REPRESENTING	EMAIL	PHONE
JAS	Jeff Shireman	Shireman Construction Management	Jeff@shireman.build	812-968-5030
	Les Smith	Shireman Construction Management	Les@shireman.build	812-968-0555
JCC	Jessica Candra	IND IS RPC	jcandra@indisrpc.org	812-367-8455
RM	RANDY MILLER	HFI	RMILLER@HARRELL-FISH.com	812 349 8305
DTS	DANIEL SHIREMAN	SHIREMAN	daniel@JLShireman.com	812-968-4475
BB	BRENDAN BROWN	TOWER PINKSTER	brendan.brown@TowerPinkster.com	502-777-0657
JY	Jason Young	jason@ipservicesllc.com	IPS	502-727-3541
RS	Rylie Smith	Twisted Electric	rapplegate57@gmail.com	812-276-5039
JKC	JOE KUERZI	CERTIFIED PROTECTION SERVICES	jkuerzijr@yahoo.com	502 551 8530
JW	JOEL WEYER	WEYER ELECTRIC	joel@weyerelectric.com	812-367-1650
JRB	JASON R BRUCE	FADGETT, INC	JBRUCE@FADGETT-INC.COM	812-946-4212
TCS	Tony Snellen	Parco Constructors	tony@parcoconstruction.com	
KMM	Kevin Mau	HAGERMAN CONST. CORP	KMAU@HAGERMANGC.com	317-448-3345
CMS	Cory Schneider	Koetter Construction	cory@thekoettergroup.com	317-370-9823
CDB	Chris Beam	Koetter Construction	cbeam@thekoettergroup.com	502-468-8891
E.L.R	Jeff Richardson	Koetter cons.	jrichardson@thekoettergroup.com	502-648-9156
CME	Chad McMS Construction	GMS Construction	chad@gmsconstruct.com	812-914-0661
AMB	Andy Berg	SEHFERT	aberg@senfutconstruction.com	812-631-1292

BW	Bobby Welp	Mehling Construction	bobbywelp@gmail.com	317-538-3833
DF	DENNY FENN	AML CONSTRUCTION	dfenn@amlinc.com	(502)815-9827
KM	Kade Meredith	KES	Kade@Keslou.com	(812)613-0934
JDK	Josh Krempp	Krempp Construction	JDK@Krempp.net	812-309-4306
MG	Matt Grass	Broken Arrow Ele. Serv.	Brokenarrowes@yahoo.com	812-309-1001
	Christopher Broughton	Crawford Co HS	cbroughton@cccs.k12.in.us	812-267-4663
	Steve Shouse	ClimAtec	sshouse@climatecllc.com	608 261 1833

JOHN KREMP	KREMPP CONST	JFK@KRCMPP.NET		512 630 10 83
Luke Wehrle	SEUFERT	LUKE@SEUFERTCONSTRUCTION.COM	612-309-0861	
Doug Mehling	Mehling Constr.	Mehling Constr.	612-631-3003	

SECTION 08 7100 - FINISH HARDWARE

PART 1 – GENERAL

1.1 WORK INCLUDED

Furnish labor, materials, equipment, special tools, supervision and services required to complete all Finish Hardware work as indicated, noted, detailed, and scheduled on the Drawings and specified herein.

1.2 OWNER VERIFICATION AND REVIEW MEETING

Contractor and hardware supplier are required to meet with the Owner to review and verify the hardware schedule and sets per door. Contractor and supplier shall be responsible for verifying door and hardware handlings, lockset operations, and keying required. All information, except for keying, shall be included in the submittals prior to being forwarded to the Architect.

1.3 KEYING MEETING

Contractor and hardware supplier are required to meet with the Owner to review and verify all requirements for keys and keying per door. Incorporate and coordinate all locking hardware in the Project to provide for a complete and unified system of keying. A complete keying schedule shall be submitted to the Architect and Owner, for approval, within seven days after the meeting. Determine cylinders and cores required to match or be compatible with any existing building master keying systems in place as per the Owner's requirements.

1.4 QUALITY ASSURANCE

A. Hardware Supplier:

1. An established firm dealing in architectural commercial door hardware, with an office, sample room, warehousing facilities and an adequate inventory.
2. Has demonstrated a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.
3. Must employ an experienced and certified Architectural Hardware Consultant (AHC), who is available to Owner, Architect, and Contractor, for consultation throughout the course of the Work.
4. Provide a competent technician to service the hardware on the job as may be required.
5. A regular franchised distributor for all materials required for this project.
6. Shall replace damaged or defective materials prior to shipment to the site. Repairs not acceptable.
7. Shall meet with the Owner to review and verify all requirements and keying required.
8. Shall conduct a comprehensive training class for the Owner's maintenance personnel prior to date of acceptance on all special application mechanical hardware provided under this Section.

B. All work to comply to the latest A.D.A. requirements.

C. All work to comply to the latest requirements of NFPA 80, NFPA 101 and NFPA 252 in providing hardware for all fire rated openings.

1.5 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI A117.1, Providing Accessibility and Usability for Physically Handicapped People.
2. ANSI/BHMA A156.1, Butts and Hinges.
3. ANSI/BHMA A156.3, Exit Devices.
4. ANSI/BHMA A156.4, Door Controls-Closers.
5. ANSI/BHMA A156.6, Architectural Door Trim.
6. ANSI/BHMA A156.7, Template Hinge Dimensions.
7. ANSI/BHMA A156.13, Locks & Latches, Mortise.
8. ANSI/BHMA A156.16, Auxiliary Hardware.
9. ANSI/BHMA A156.18, Materials and Finishes.

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

1. ASTM-E2074-2001 Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.

C. Code of Federal Regulations (CFR) Americans with Disabilities Act (ADA):

1. Latest version as adopted, approved and accepted by the State.

D. Door and Hardware Institute (DHI):

1. Keying Systems and Nomenclature.
2. Hardware for Labeled Fire Doors.
3. Sequence and Format for the Hardware Schedule.
4. Abbreviations and Symbols.

E. National Fire Protection Association (NFPA):

1. NFPA 80 Standard for Fire Doors and Windows.
2. NFPA 101 Life Safety Code.
3. NFPA 105 Recommended Practice for the Installation of Smoke-Control Door Assemblies.
4. NFPA 252 Standard Methods of Fire Tests of Door Assemblies.

F. Steel Door Institute (SDI):

1. SDI 100 Recommended Specifications for Standard Steel Doors and Frames.

G. Underwriter's Laboratories, Inc. (UL) - UL Standards for Safety:

1. UL 10C-97 Positive Pressure Fire Tests of Door Assemblies.
2. UL 228 Door Closer-Holders, With or Without Integral Smoke Detectors.
3. UL 305 Panic Hardware.

1.6 SUBMITTALS

A. Hardware Schedule:

1. Submit a complete typewritten schedule indicating every item required for each door or opening. Schedules to include, but are not limited to; the manufacturers, model numbers, materials, types, styles, sizes, handings, finishes, etc.
2. Numbering of hardware sets is to match those as indicated in the Specifications and as noted on the Door Schedule on the Drawings. Cross reference plans and schedules.
3. Include all prep of doors and frames required for hardware, including mounting heights, locations and dimensions.
4. Clearly indicate door sets altered from that specified.

B. Owner Verification and Review Meeting:

1. Submit with submittals, confirmation that the meeting was conducted with the Owner.
2. Include list of those present at the meeting.
3. Itemize all items resulting from discussions of the meeting in a "meeting minutes" format.
4. Review of set functions shall be done on a "per door" basis, and not merely by sets. Sets included herein is for the convenience of review by grouping like conditions and not intended to necessarily be representative of same function for all doors in the set. Verify with Owner.

C. Manufacturer's Product Information:

1. Furnish catalog cutsheets, drawings, and other descriptive data on all hardware items.
2. After final approval of the hardware by the Architect, furnish copies of submittals to door and frame suppliers and any other subcontractors and suppliers necessary for coordination and installation of door hardware complete.

D. Samples:

1. If requested by the Architect, submit one (1) sample of each different item of hardware for approval, accompanied by an itemized list showing where the different items are to be used, the manufacturer's number, the finish, sizes applicable, and the number required.
2. Submit a full sample ring of hardware finishes for all manufacturers included.
3. After review, the samples will be returned to the supplier.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver hardware or templates, or both to factory or to building as required by those furnishing items to which hardware is to be applied.

B. Plainly mark packages or hardware so locations of use may be ascertained without breaking the packages.

C. Deliver work so all work will progress without delay or interruption.

D. The Contractor is responsible for providing adequate locked storage space for the scheduled quantities of hardware when delivered to the job.

1.8 PROJECT CONDITIONS

A. The hardware supplier is responsible to examine the door and frame drawings and elevations to determine the suitability of hardware specified.

B. It will be this supplier's responsibility to furnish the correct hardware to fit the door and frame conditions as indicated for correct and proper operation.

1.9 WARRANTY

A. Furnish manufacturer's limited warranty covering defects in materials and workmanship for periods indicated as follows:

Door Closers: Minimum Ten years.
Locksets: Minimum Five years.
Exit Devices: Minimum Five years.
All other hardware: Minimum One year.

PART 2 - PRODUCTS

2.01 KEYING AND KEYS

A. Key, master key and grandmaster key to Owner's requirements. The key schedule will be developed by hardware supplier in cooperation with Owner's representative and Architect.

B. Provide six (6) grandmaster keys, six (6) master keys per group, and two (2) keys per lock.

C. Engrave all keys with the words **UNLAWFUL TO DUPLICATE THIS KEY**.

2.02 LOCKS, LATCHES, AND CYLINDERS

A. All cylinders must be factory keyed. Provide certification from lock manufacturer stating cylinders have been factory keyed.

B. Cylinders to have removable cores.

C. Provide construction cores on all doors as required.

D. Hardware supplier must be an authorized stocking distributor of the lock they propose to furnish.

E. Provide a cylinder for every lock requiring one, whether specifically indicated or not.

F. Unless specifically indicated otherwise, all cylinders supplied throughout the entire project are to be capable of being keyed from the same master keying system. Key cylinders in dogged panic devices, keyed removable mullions, coiling doors, overhead doors, etc. to match building master keying system.

2.03 BUTTS AND HINGES

A. Provide full mortise, ball bearing, template type hinges with flush barrel and non-removable pins.

B. Exterior hinges to be of non-corrosive metals. Painted or galvanized steel not permitted.

C. Hinges on all exterior entry doors and all doors receiving panic hardware are to be continuous type stainless steel.

D. Except where label provisions require larger or heavier hinges or where specified otherwise herein:

1. Provide 1-1/2 pairs of hinges for each door up to 7'-6".
2. Provide 2 pairs of hinges for doors over 7'-6".
3. Use 4-1/2" hinges on doors up to 3'-4" wide.
4. Use 5" hinges on doors over 3'-4" wide.

E. All hinges to be capable of 180 degree throw. Use wide throw hinges where necessary to clear jamb trim.

2.04 SURFACE OVERHEAD CLOSERS

A. In all cases, the manufacturer's recommended table of sizes is to govern the size of closers to be furnished.

B. Use through-bolts to fasten surface closers to mineral core wood and hollow metal doors.

C. Furnish special overhead closers where shown or specified.

D. Provide parallel arms, corner brackets or drop plates as required.

E. Provide 180° door swing where possible.

F. Reduced force opening to comply with latest A.D.A. Standards for closers, regardless of type or location.

2.05 FINISHES

A. All finishes are to be 626. Materials unable to have this finish applied are to have a finish to match.

2.06 HARDWARE SETS

A. Verification:

1. The following schedule is intended to describe, in general, the types and quantities of hardware required for the various types of doors and for the other parts of the building which will require hardware. Do not consider this schedule as entirely inclusive.
2. Hardware supplier is responsible for visiting the jobsite and reviewing the requirements for each installation. The supplier shall be responsible for providing all hardware as required to serve the door's intended purpose and intent, and include all costs for such in their bid.

3. Hardware supplier is responsible for coordination of all hardware items used together in conjunction with one another, mounting as required to coordinate with all doors and frames as designed, and include all costs for such in their bid.
4. Hardware supplier is responsible for conducting the Owner Verification and Review Meeting, incorporating all items into submittals, and include all costs for such in their bid.
5. Hardware supplier is responsible for conducting the Owner Keying Meeting, determining cylinders and cores required to match any existing building master keying system, provide and install compatible items and key per Owner's requirements.

B. General Requirements:

1. Provide all fire and smoke seals and gaskets as required per Code for all rated door assemblies and for all smoke partition assemblies.
2. Provide glass and materials as required to meet and maintain fire ratings for all assemblies.
3. All items as listed in hardware sets are “per door”.
4. All hardware to be mounted per ADA.

C. Acceptable Manufacturers

Hardware Item	**Manufacturer**
Hinges:	Hager, McKinney, Stanley, Bommer
Locksets/Deadbolts/Cylinders:	Best
Panic Devices:	Von Duprin, Precision
Push/Pulls:	Hager, Rockwood, Trimco
Closers:	LCN
Wall/Floor Stops:	Hager, Rockwood, Trimco, Glynn-Johnson
Overhead Stops/Holders:	Hager, Rockwood, Trimco, Glynn-Johnson
Wall/Floor Holders:	Hager, Rockwood, Trimco, Glynn-Johnson
Removable Mullions:	Detex, Sargent, Von Duprin, Dorma
Thresholds:	Hager, NGP, Pemko, Reese
Seals/Sweeps/Gaskets/Bottoms:	Hager, NGP, Pemko, Reese
Flushbolts:	Hager, Rockwood, Trimco, Glynn-Johnson, Ives
Coordinators:	Hager, Rockwood, Trimco, Glynn-Johnson, Ives
Plates:	Hager, Rockwood, Trimco, Ives
Silencers:	Hager, Rockwood, Trimco, Ives
Position Switches:	Schlage, Securitron

D. Hinges:

1. All interior hinges shall be Hager, BB1168.
2. All exterior hinges shall be Hager, BB1199, stainless steel hinge and pin.
3. All continuous hinges shall be Hager, 790-900.
4. All interior spring hinges shall be Hager, 1250.
5. All exterior spring hinges shall be Hager, 1150.

E. Locksets (Cylindrical):

1. All locksets shall be Best, 9K Series, heavy-duty cylindrical locks.
2. All locksets shall have "15" lever and "D" escutcheon.
3. All locksets shall have 2-3/4" backset with appropriate standard strike package.

4. All classrooms shall be equipped with anti-intruder capabilities that enable the doors to be locked from the inside of the room while still allowing egress from the inside without the use of a key.
5. All other conditions, function and operation as selected by Owner from all manufacturer's available.

F. Locksets (Mortise):

1. All locksets shall be Best, H Series, 45H heavy-duty mortise locks.
2. All locksets shall have "16" lever and "H" rose.
3. Provide integral deadbolt where deadbolts are identified.
4. All classrooms shall be equipped with anti-intruder capabilities that enable the doors to be locked from the inside of the room while still allowing egress from the inside without the use of a key. Rotating the inside lever shall retract both the deadbolt and latch simultaneously.
5. Deadbolts from public rooms, such as restrooms and classrooms, shall be equipped with anti-throw capabilities such that the latch cannot be thrown from the interior side of the room. In all conditions, operation from the inside shall allow the locked deadbolt to automatically unlatch when the lockset lever is operated during egress without the use of a key.
6. All other conditions, function and operation as selected by Owner from all manufacturer's available.

G. Deadbolts (Cylindrical, when no mortise set is present):

1. All deadbolts shall be Best, T Series, heavy-duty tubular locks.
2. Provide with 83T Backset and high security deadbolt.
3. Deadbolts from public rooms, such as restrooms and classrooms, shall be equipped with anti-throw capabilities such that the latch cannot be thrown from the interior side of the room. Operation from the inside shall allow the locked deadbolt to unlatch without the use of a key. Classroom function with ADA compliant turnknob.
4. All other conditions, function and operation as selected by Owner from all manufacturer's available.

H. Panic Devices:

1. All panics shall be Von Duprin, 99 Series. Type as identified in hardware sets.
2. Provide XP 99 option for two-piece latch bolt at all exterior entry door locations, unless noted specifically to not provide them. The tapered section of the latch bolt recedes and the remaining section forms a 90 degree angle to the strike pad, making the latch more secure to entry.
3. Provide "#06" lever trim on all devices, unless indicated otherwise.
4. Provide cylinders for all panic devices to be compatible for brand of locksets provided.
5. Provide Cylinder Dogging on all devices.
6. Provide vertical rod and latch guards for all surface-mounted vertical rod devices.
7. Provide fire rated devices for all rated doors assemblies.
8. Exterior panic doors to have universal latch function, adjustable in the field for operation as desired.
9. All other conditions, function and operation as selected by Owner from all manufacturer's available.
10. Strikes to have roller.
11. Latch bolts to have deadlatching.
12. Provide removable mullion for any pair of doors where panic devices are used, whether scheduled or not, and whether frame is existing or new.

I. Electrified Panic Devices:

1. All electrified panics shall be Von Duprin, 99 Series.

2. Provide equal to Von Duprin EL Electric Latch Retraction option to allow for a control station actuator (key switch, credential reader, etc.) to remotely unlatch and retract the latch bolt.
3. Provide SD-EL Special Center Case Dogging for cylinder dogging capability.
4. Provide "#06" lever trim on all devices, unless indicated otherwise.
5. Provide cylinders for all panic devices to be compatible for brand of locksets provided and/or for building's master keying system.
6. Provide equal to Von Duprin EPT-2 Power Transfer.
   Provide equal to Von Duprin 900-2RS option for 2 relay EL panic device control board.
   Provide equal to Von Duprin 900-BB option for battery backup.
   Provide equal to Von Duprin 900-FA option for input of a normally closed fire alarm contact to the fire alarm system.
7. Provide equal to Von Duprin E996L electrified Lever Trim with cylinder operation for night latch function on all devices, unless indicated otherwise.
8. Field convertible between Fail-Safe and Fail-Secure. Upon loss of power, the panic device trim shall fail to Fail Secure condition so that the door remains in a locked position to maintain security to the building and spaces.

J. Push/Pulls:

1. All push plates to be Hager, A40R, size: 6"x16", brass.
2. All pulls to be Hager, 9G, brass.
3. All flush cup pulls to be Hager, 17N, brass.

J. Surface Closers:

1. Push side condition: shall be LCN, 4110 Series (reduced force ADA cylinder), parallel arm.
2. Pull side condition: shall be LCN, 4010 Series (reduced force ADA cylinder), non-parallel arm.
3. Mounting shall be on the inside face of the door, interior to the room.
4. All covers shall be metal.
5. All finishes shall be powder coat aluminum.
6. Provide hold open functions where specified. All hold opens to be adjustable set up to 180 degrees.
7. Provide concealed closer in lieu of surface closer where a closer is used in conjunction with overhead stops/holders.

K. Concealed Closers:

1. All concealed closers shall be LCN, 2030 Series (reduced force ADA cylinder), concealed arm.
2. Unit shall be concealed in tube within head of door frame. Arm shall be concealed within door.
3. All finishes shall be powder coat aluminum.
4. Provide hold open functions where specified. All hold opens to be adjustable set up to 180 degrees.
5. Provide concealed closer in lieu of surface closer where a closer is used in conjunction with overhead stops/holders.

L. Stops:

1. All wall stops shall be Hager, 236W.
2. All floor stops shall be Hager, 241F; 243F if high stop condition is required.
3. All heavy-duty floor stops shall be Hager, 269F.
4. Wall stop with holder shall be Hager, 256W.

5. Floor stop with holder shall be Hager, 268F.
6. Provide stops or bumpers wherever an opened door strikes any part of building construction, whether indicated or not. Generally, provide wall mounted stops for all doors.
7. Furnish floor dome type where wall type cannot be used.
8. Furnish heavy-duty floor stops at all exterior entry and panic doors, whether indicated or not.

M. Overhead Stops/Holders:

1. All overhead stops shall be Glynn-Johnson, 90 Series.
2. Set units for combination of stop and hold open functions.
3. Coordinate installation with closers for proper operation and performance.
4. Provide concealed closer in lieu of surface closer where a closer is used in conjunction with overhead stops/holders.

N. Wall/Floor Holders:

1. All wall holders shall be Hager, 327W.
2. All floor holders shall be Hager, 327F.

O. Removable Mullions:

1. All removable mullions shall be Detex, 90KR, rim cylinder.
2. Cylinders compatible with those for locksets.
3. Finish painted to match frame.
4. Provide removable mullion for any pair of doors where panic devices are used, whether scheduled or not, and whether frame is existing or new.

P. Thresholds:

1. Aluminum, saddle-type.
2. Fully ADA compliant, 1/4" maximum height.
3. Span entire width and depth of opening.

Q. Seals/Sweeps/Gaskets/Bottoms (used for Weatherstripping):

1. Vinyl, Neoprene, EPDM, TPE (thermoplastic elastomer), or silicone.
2. Full length and width of opening at each condition.
3. Provide weatherstripping seal sets at entire perimeter jambs and head of all exterior doors, whether scheduled or not.
4. All weatherstripping sets shall be determined by the door hardware supplier as appropriate to the application and able to provide a weather-tight and weather-proof seal, while allowing proper operation of the door and all other hardware.
5. Provide bottoms on all exterior doors, whether scheduled or not.
6. All bottoms shall be Hager, 772S, mil finish aluminum.

R . Silencers:

1. Furnish door silencers for each single interior door and each pair of doors.
2. Omit silencers at smoke doors and at sound proof or light proof doors.

S. Flushbolts:

1. All flushbolts shall be Hager, 283D.

T. Coordinators:

1. All coordinators shall be Trimco, 3094 Series.
2. Stop mounted type with filler bar.
3. Width as required for opening.
4. Provide coordinator for any pair of doors where astragal is used, whether scheduled or not.

U. Plates:

1. All kick plates shall be Hager, 220S; height=10", length=2" less than door.
2. All armor plates shall be Hager, 220S; height=36", length=1" less than door.
3. All plates to have countersunk screws.
4. Provide kick plates on the interior side of all doors in a restroom, custodial or janitorial room, mechanical or electrical room, laundry room or other such utility space, whether scheduled or not.
5. Provide armor plates on both sides of all crash or impact doors, whether scheduled or not.

2.07 HARDWARE FOR TORNADO RESISTANT ASSEMBLIES

A. Hollow Metal Tornado Doors and Frames are specified in 08 3490. Basis of Design is Steelcraft, Paladin Series Doors and Frames.

B. Hardware specified for tornado resistant assembles have been tested with Section 08 3490 basis of design products.

C, Hardware supplier shall coordinate and provide equivalent products which are approved hardware / accessories of the submitted prescriptive door assembly opening by Intertek or UL public listing for the labeled tornado-resistant assembly, communicating compliance with FEMA P-361 2021 guidelines and ICC 500-2020 standards.

D. Products for Tornado Resistant Assemblies:

1. Surface Vertical Rod (SVR) Panic Devices: Von Duprin WS9927 Series.
   a. Provide “06” Lever Trim with function as indicated; verify function with Owner.
   b. Provide devices with anti-intruder function as indicated on the hardware sets which enables the doors to be closed and locked from the inside of the room, allow egress from the inside without the use of a key, and remain lock upon re-closing without relocking by key. Equal to Von Duprin -2SI with Double Cylinder, “06” Lever Trim, and security indicator. No cylinder dogging permitted at these devices.
   c. Only compression springs shall be used in devices, latches, and outside trim and/or controls.
   d. Provide cylinders for all panic devices, unless specifically indicated otherwise.
   e. Provide cylinders for all panic devices to be compatible with brand of locksets provided for building’s mater keying system.
   f. Provide fire rated devices for all rated door assemblies.

g. Exit devices shall be tested to ANSI/BHMA A156.3 test requirements by a BHMA certified laboratory. A written certification showing successful completion of a minimum of 1,000,000 cycles shall be provide upon request.
h. Touch pad shall extend a minimum of one half of the door width. Maximum unlatching force shall not exceed 15 pounds. End cap will have three-point attachment to the door.
i. Provide roller strikes for all surface-mounted vertical rod devices.
j. All devices to incorporate a security dead-latching feature.
k. Provide with rod guard on bottom surface vertical rod.
l. Provide with ES-LGO Series ADA bottom latch guar cover.

2. Continuous Hinges: Ives 700
   a. Refer to 2.06, B for additional notes and requirements.

3. Surface Mounted Closers: LCN 4110 Series (4111 cylinder).
   a. Refer to 2.06, J for additional notes and requirements.

4. Electromagnetic Door Holders: LCN SEM 7800
5. Kick Plates: Ives 8400
   a. Refer to 2.06, U for additional notes and requirements.

6. Thresholds: Zero International
   a. Must not impede or affect the function of the opening or latching hardware.
   b. Must grout full in area around strike to secure strike in slab.
   c. Refer to 2.06, P for additional notes and requirements.

7. Seals/Gaskets/Sweeps/Bottoms (weatherstripping or Fire/Smoke Seals): Zero International
   a. Must not impede or affect the function of the opening or latching hardware.
   b. Refer to 2.06, Q for additional notes and requirements (excluding items 1 & 2).

2.08 HARDWARE SCHEDULE

Hardware Set #1 – Tornado Doors, Fire Rated, Pair, Panic:
(D102, D105, D113, D140)
All items included in 2.07, D.
Stops
Kick Plates (both sides of door)
Fire/Smoke Seals
Omit electromagnetic door holders at Door D140.

Hardware Set #2 – Interior Doors, Pair, Panic:
(D101A, D101B, D103A)
Continuous Hinges
Cylinders
Panic Devices
Closers
Stops
Removable Mullion (keyed)
Kick Plates (both sides of door)

Sound Seals

Hardware Set #3 – Interior Doors, Pair, Panic, Access Control:
(D103B)
Continuous Hinges
Cylinders
Electrified Panic Device
Panic Device
Closers
Stops
Removable Mullion (keyed)
Kick Plates (both sides of door)
Sound Seals
Power Transfer
Access Control System (Specified in Section 28 1400)

Hardware Set #4 – Fire Rated Interior Doors, Pair, Panic:
(D127)
Continuous Hinges
Cylinders
Panic Devices
Closers
Stops
Removable Mullion (keyed)
Kick Plates (both sides of door)
Smoke Seals

Hardware Set #5 – Fire Rated Interior Door, Single:
(D126)
Hinges
Lockset (classroom)
Cylinder
Closer
Stop
Kick Plates (both sides of door)
Smoke Seals

Hardware Set #6 – Interior Door, Single:
(D104, D106, D107, D114, D115, D116, D118)
Hinges
Lockset (storeroom)
Cylinder
Stop
Kick Plates (both sides of door)
Silencers

Hardware Set #7 –Interior Door, Single, Panic:
(D101C)
Continuous Hinges
Cylinders
Panic Device
Closer
Stop
Kick Plates (both sides of door)
Sound Seals

Hardware Set #8 – Interior Door, Pair:
(D108)
Continuous Hinges
Lockset (storeroom, active leaf)
Flush Bolts (top and bottom of inactive leaf)
Cylinders
Stops
Kick Plates (both sides of door)
Silencers

Hardware Set #9 – Interior Door, Single:
(D109, D110, D111, D112)
Hinges
Mortise Lockset (privacy)
Cylinder
Occupied Indicator
Stop
Kick Plates (both sides of door)
Silencers

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install finishing hardware as recommended by the National Builders Hardware Association.

B. Only use fasteners supplied by the manufacturer. Provide fasteners of suitable size, quantity, type and finish to secure hardware in position for heavy use and long life.

C. Hardware for application on metal surfaces:

1. Made to standard templates.
2. Fastening harmonized with hardware as to material and finish.
3. Fastenings with approved type anchors according to the manufacturer.
4. In general, ends of through-bolts shall be countersunk.

D. Mount hardware in accordance with current state and federal accessibility standards and guidelines.

E. Install hardware per manufacturers instructions and in compliance with:

1. NFPA-80.
2. NFPA-101.
3. NFPA-105.
4. NFPA-252.
5. ANSI A117.1.

F. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

G. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

H. Drill and countersink units that are not factory prepared for anchorage fasteners.
Space fasteners and anchors in accordance with industry standards.

I. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section “Joint Sealers”.

J. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.02 FIELD QUALITY CONTROL

A. Material supplier to inspect hardware after installation and before final acceptance in order to ensure that hardware has been properly installed. If there are any discrepancies the material supplier is to provide the Architect, General Contractor and Installer with a written report detailing any and all discrepancies. All discrepancies are to be corrected prior to final acceptance unless otherwise directed by the Owner.

3.03 ADJUSTING AND CLEANING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit.

B. Immediately prior to Substantial Completion replace all construction cores.

C. Tag all keys.

D. Check each key and each lockset to verify proper working order.

E. Lubricate and adjust all hardware to provide smooth operation.

F. Clean all hardware per manufacturer's instructions after installer makes final adjustments and prior to final acceptance, remove all mortar, drywall mud, paint overspray, foreign materials, labels, markings, soil, oils, etc. Polish all locksets, plates, and other hardware.

G. Clean adjacent surfaces soiled by hardware installation

H. Replace, at no cost to Owner, items that cannot be cleaned to manufacturer's level of new finish quality or that cannot be adjusted to operate freely and smoothly or as intended for the application made.

I. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.

SUBMITTAL CHECKLIST

1. Hardware Schedule.
2. Owner Verification and Review Meeting.
3. Manufacturer's Product Information.
4. Samples.

END OF SECTION 08 7100

SECTION 21 0500 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Sleeve-seal systems.
3. Sleeves.
4. Escutcheons.
5. Grout.
6. Fire-suppression equipment and piping demolition.
7. Painting and finishing.
8. Supports and anchorages.

1.2 QUALITY ASSURANCE

A. Provide fire-suppression systems, equipment, and materials in accordance with NFPA and other applicable codes and regulations, and with authorities having jurisdiction.

B. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

C. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

D. Electrical Characteristics for Fire-Suppression Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to

prevent damage during shipment, storage, handling, and up to substantial completion. Coordinate deliveries of mechanical materials and equipment to minimize construction site congestion.

1.4 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for fire-suppression installations.

B. Coordinate installation of required supporting devices and sleeves with structural components.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 21 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

C. All grooved joint couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.

1. All castings used for coupling housings, fittings, valve bodies, etc., shall include listing/approval stamp, label, or other markings made to specified standards.

2.2 JOINING MATERIALS

A. Refer to individual Division 21 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch(3.2-mm) maximum thickness unless thickness or specific material is indicated.
   a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
   b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.3 SLEEVE-SEAL SYSTEMS

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

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Plastic.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.4 SLEEVES

A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

D. Galvanized-Steel-Sheet Sleeves: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

2.5 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Cast-Brass Type: With polished, chrome-plated or rough-brass finish and setscrew fastener.

C. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

D. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

E. Split-Casting Brass Type: With polished, chrome-plated or rough-brass finish and with concealed hinge and setscrew.

F. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed or exposed-rivet hinge, and spring-clip fasteners.

G. Recessed pendent sprinklers in ceilings. Surface pendents or extended escutcheon types are not acceptable.

2.6 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 FIRE-SUPPRESSION DEMOLITION

A. Refer to Division 01 Section "Execution" and Division 02 Section "Selective Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove fire-suppression systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Equipment to Be Removed: Disconnect and cap services and remove equipment.
3. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
4. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON INSTALLATION REQUIREMENTS

A. Install piping according to the following requirements and Division 21 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved.

1. Drawings are diagrammatic with no attempt made to show every ell, tee, transition, fitting, or appurtenance. Provide installations that are complete in every detail, compliant with all applicable codes, and as required to provide a fully functional and operational system even though every item is not specifically indicated.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Select system components with pressure rating equal to or greater than system operating pressure.

3.3 ESCUTCHEON INSTALLATION

A. Install escutcheons for penetrations of walls, ceilings, and finished floors according to the following:

1. Escutcheons for New Piping:
   a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
   b. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with white polyester coated head and escutcheon.
   c. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with white polyester coated head and escutcheon.
   d. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated or rough-brass finish.
   e. Bare Piping in Equipment Rooms: One-piece, cast-brass or split-casting brass type with polished, chrome-plated or rough-brass finish.
   f. Bare Piping in Equipment Rooms: One-piece, stamped-steel type[or split-plate, stamped-steel type with concealed hinge] [or split-plate, stamped-steel type with exposed-rivet hinge].

2. Escutcheons for Existing Piping:
   a. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting brass type with white polyester coated head and escutcheon.
   b. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting brass type with white polyester coated head and escutcheon.
   c. Bare Piping in Unfinished Service Spaces: Split-casting brass type with polished, chrome-plated or rough-brass finish.
   d. Bare Piping in Equipment Rooms: Split-casting brass type with polished, chrome-plated or rough-brass finish.

3.4 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 07 9200 "Joint Sealants."

C. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07 8413 "Penetration Firestopping."

3.5 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.6 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Interior Partitions:
   a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.
   b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-sheet sleeves.

3.7 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 21 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

E. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.8 PAINTING

A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.9 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor fire-suppression materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.10 GROUTING

A. Mix and install grout for fire protection installations.

1. Clean surfaces that will come into contact with grout.
2. Provide forms as required for placement of grout.
3. Avoid air entrapment during placement of grout.
4. Cure placed grout.

3.11 INSTALLATION OF ACCESS DOORS

A. Where lay-in ceilings are used, the access to ceiling space is provided through the removable ceiling panels. Where access is required to valves, pipes, dampers or other devices in spaces above non-removable ceilings or in chases, the Contractor requiring the access doors shall provide access doors. Access doors required in rated walls and ceiling shall bear the same rating. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

1. Set frames accurately in position and securely attached to supports, with face panels plumb and level in relation to adjacent finish surfaces.
2. Adjust hardware and panels after installation for proper operation.

3.12 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 21 0500

SECTION 28 3100 - FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section. Failure to consult these documents shall not relieve the Contractor of the requirements therein.

1.2 SUMMARY

A. This Section includes fire alarm systems with manual stations, detectors, signal equipment, controls, and devices.

B. Architectural engineer shall provide general code compliant fire alarm layouts so that the contractor may reasonably estimate scope, cost and general rough-in requirements.

C. Related Sections include the following:

1. Division 08 Section "Door Hardware".

1.3 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

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

1.4 SYSTEM DESCRIPTION

A. General: Digital-addressable system with manual and automatic alarm initiation; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Shop Drawings shall be prepared by persons with the following qualifications:
   a. Trained and certified by manufacturer in fire alarm system design.

b. Fire alarm certified by NICET, minimum Level III.

2. Wiring Diagrams: Detail wiring and differentiate between manufacturer-installed and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified.
3. Battery: Sizing calculations.
4. Floor Plans: Indicate final outlet locations and routings of raceway connections.
5. Alarm Characteristics: Indicate the visual strobe candela and audible sound level requirements to satisfy NFPA 72 and the Authority having jurisdiction.
6. Device Address List: Coordinate with final system programming.
7. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
8. Ductwork Coordination Drawings: Plans, sections, and elevations of ducts, drawn to scale and coordinating the installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, the detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer’s written recommendations.
9. Voice/Alarm Signaling Service: Equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.

C. Operating Instructions: For mounting at the FACP.

D. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

E. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Comply with NFPA 72.

F. Maintenance Data: For fire alarm systems to include in maintenance manuals specified in Division 01. Comply with NFPA 72.

G. Submissions to Authorities Having Jurisdiction: In addition to distribution requirements for Submittals specified in Division 01 Section "Submittal Procedures," make an identical submission to authorities having jurisdiction, (Department of Labor & Economic Growth, Office of Fire Safety, P.O. Box 30254, Lansing, Michigan, 48909). Include copies of annotated Contract Drawings as needed to depict component locations to facilitate review. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Architect for review.

H. Certificate of Completion: Comply with NFPA 72.

I. Comply with NFPA 20 for fire pump installations.

J. Inspector’s qualifications for the smoke control system.

K. Smoke control system’s test results.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is a trained and certified representative of the FACP manufacturer for both installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: A firm experienced in manufacturing systems similar to those indicated for this Project and with a record of successful in-service performance. Per the requirements of the Michigan Bureau of Fire Services (or local AHJ) all of the following must be met.

1. Manufacturer shall be responsible for layout of new and/or alterations to existing fire alarm equipment, specialties, and accessories, and repair and servicing of equipment shall be performed only by a qualified installer experienced in such work; with a minimum of 5 previous projects similar in size and scope to this project; be familiar with all precautions required; and has complied with all the requirements of the authority having jurisdiction. Manufacturer shall provide all equipment required to meet the sequence of operations required by the code. Coordinate system design with architectural and mechanical systems including, but not limited to door holds, smoke dampers and duct detectors required for a code compliant system.
2. Manufacturer/installer shall follow project specifications and standards to provide a complete code compliant system installation. It is the general contractor or construction manager's responsibility to provide supervision to all subcontractors to ensure a proper installation according to the code and project specifications.
3. Installer's responsibilities include designing, fabricating, and installing fire alarm systems and providing professional engineering services needed to assume engineering responsibility.
4. Certifying Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a NICET Level III or IV certified layout technician.

C. Source Limitations: Obtain fire alarm system components through one source from a single manufacturer.

D. Compliance with Local Requirements: Comply with applicable building code, local ordinances and regulations, and requirements of authorities having jurisdiction.

E. Comply with NFPA 72.

1.7 SEQUENCING AND SCHEDULING

A. Existing Fire Alarm Equipment: Maintain fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire alarm equipment "NOT IN SERVICE" until removed from the building.

B. Equipment Removal: After acceptance of the new fire alarm system, remove existing disconnected fire alarm equipment and restore damaged surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products that work with the existing Simplex fire alarm system::

1. Simplex

2.2 FUNCTIONAL DESCRIPTION OF SYSTEM

A. Control of System: By the FACP.

B. System Supervision: Automatically detect and report open circuits, shorts, and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.

C. Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one device are not altered by subsequent alarm, supervisory, or trouble signals. An alarm signal is the highest priority. Supervisory and trouble signals have second- and third-level priority. Higher-priority signals take precedence over signals of lower priority, even when the lower-priority condition occurs first. Annunciate and display all alarm, supervisory, and trouble signals regardless of priority or order received.

D. Noninterference: A signal from one device shall not prevent the receipt of signals from other devices.

E. System Reset: All devices are manually resettable from the FACP after initiating devices are restored to normal.

F. Transmission to Remote Alarm Receiving Station: Automatically route alarm, supervisory, and trouble signals to a remote alarm station by means of a digital alarm communicator transmitter and telephone lines.

G. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevent alarm capability reduction when a single ground or open circuit occurs in an initiating device circuit, signal line circuit, or notification-appliance circuit.

H. Loss of primary power at the FACP initiates a trouble signal at the FACP. The FACP indicates when the fire alarm system is operating on the secondary power supply.

I. Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, automatic alarm operation of a smoke or flame or heat detector, or operation of a sprinkler flow device initiates the following:

1. Notification-appliance operation.
2. Identification at the FACP and the remote annunciator of the device originating the alarm.
3. Transmission of an alarm signal to the remote alarm receiving station.
4. Unlocking of electric door locks in designated egress paths.
5. Release of fire and smoke doors held open by magnetic door holders.
6. Shutdown of fans and other air-handling equipment serving area when alarm was initiated.
7. Closing of smoke dampers in air ducts of system serving area where alarm was initiated.
8. Open normally closed contact tied to lighting control system to turn on emergency lighting.
9. Recording of the event in the system memory.

J. Alarm Silencing, System Reset and Indication: Controlled by switches in the FACP.

1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.
2. Subsequent alarm signals from other devices reactivate notification appliances until silencing switch is operated again.

K. Water-flow alarm switch operation initiates the following:

1. Notification-appliance operation.
2. Flashing of the device location-indicating light for the device that has operated.

L. Elevator (when building is equipped) shall be connected to fire alarm system to allow for voice communication to fire fighter control panel from inside elevator. Provide all code compliant components, relays, wiring, programing and anything else necessary for a code compliant system. Coordinate elevator contractor and AHJ.

M. Smoke detection for detectors with alarm verification initiates the following:

1. Audible and visible indication of an "alarm verification" signal at the FACP.
2. Activation of a listed and approved "alarm verification" sequence at the FACP and the detector.
3. Recording of the event in the system memory.
4. General alarm if the alarm is verified.
5. Cancellation of the FACP indication and system reset if the alarm is not verified.

N. Sprinkler valve-tamper switch operation initiates the following:

1. A supervisory, audible, and visible "valve-tamper" signal indication at the FACP and the annunciator.
2. Flashing of the device location-indicating light for the device that has operated.
3. Recording of the event in the system memory.
4. Transmission of supervisory signal to remote alarm receiving station.

O. Fire-pump power failure, including a dead-phase or phase-reversal condition, initiates the following:

1. A supervisory, audible, and visible "fire-pump power failure" signal indication at the FACP and the annunciator.
2. Recording of the event in the system memory.
3. Transmission of trouble signal to remote alarm receiving station.

P. Fire-pump running condition, initiates the following:

1. A supervisory, audible, and visible "fire-pump running” signal indication at the FACP and the annunciator.
2. Recording of the event in the system memory.
3. Transmission of trouble signal to remote alarm receiving station.

Q. Fire-pump alternate power supply condition, initiates the following:

1. A supervisory, audible, and visible "alternate power source supplying fire-pump” signal indication at the FACP and the annunciator.
2. Recording of the event in the system memory.
3. Transmission of trouble signal to remote alarm receiving station.

R. Generator: Provide connection to emergency generator system and provide status as indicated in the fire alarm control panel section to monitor and display the following:

1. Generator in Fault Mode
2. Generator in Manual Mode
3. Generator is running

S. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system initiates the following:

1. A supervisory, audible, and visible "sprinkler trouble" signal indication at the FACP and the annunciator.
2. Flashing of the device location-indicating light for the device that has operated.
3. Recording of the event in the system memory.
4. Transmission of trouble signal to remote central station.

T. Remote Detector Sensitivity Adjustment: Manipulation of controls at the FACP causes the selection of specific addressable smoke detectors for adjustment, display of their current status and sensitivity settings, and control of changes in those settings. Same controls can be used to program repetitive, scheduled, automated changes in sensitivity of specific detectors. Sensitivity adjustments and sensitivity-adjustment schedule changes are recorded in system memory.

U. Removal of an alarm-initiating device or a notification appliance initiates the following:

1. A "trouble" signal indication at the FACP and the annunciator for the device or zone involved.
2. Recording of the event in the system memory.
3. Transmission of trouble signal to remote alarm receiving station.

V. Printout of Events: On receipt of the signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble), and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including the same information for device, location, date, and time. Commands initiate the printout of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

W. FACP Alphanumeric Display: Plain-English-language descriptions of alarm, supervisory, and trouble events; and addresses and locations of alarm-initiating or supervisory devices originating the report. Display monitoring actions, system and component status, system commands, programming information, and data from the system's historical memory.

2.3 MANUAL PULL STATIONS

A. Description: Fabricated of metal or plastic, and finished in red with molded, raised-letter operating instructions of contrasting color.

1. Double-action mechanism requires two actions, such as a push and a pull, to initiate an alarm. Break glass/plastic stations are not acceptable.
2. Station Reset: Key or wrench operated; double pole, double throw; switch rated for the voltage and current at which it operates.
3. Indoor Protective Shield: 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. Integral Addressable Module: Arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.

2.4 SMOKE DETECTORS

A. General: Include the following features:

1. Operating Voltage: 24-V dc, nominal.
2. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
3. Plug-in Arrangement: Detector and associated electronic components are mounted in a module that connects in a tamper-resistant manner to a fixed base with a twist-locking plug connection. Terminals in the fixed base accept building wiring.
4. Integral Visual-Indicating Light: LED type. Indicates detector has operated.
5. Sensitivity: Can be tested and adjusted in-place after installation.
6. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
7. Remote Controllability: Unless otherwise indicated, detectors are analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

B. Photoelectric Smoke Detectors: Include the following features:

1. Sensor: LED or infrared light source with matching silicon-cell receiver.
2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.
3. Integral Thermal Detector: Fixed-temperature type with 135 deg F (57 deg C) setting.

C. Beam-Type Smoke Detector: Each detector consists of a separate transmitter and receiver with the following features:

1. Adjustable Sensitivity: More than a six-level range, minimum.
2. Linear Range of Coverage: 330 feet (100 m), minimum.
3. Tamper Switch: Initiates trouble signal at the central FACP when either transmitter or receiver is disturbed.
4. Separate Color-Coded LEDs: Indicate normal, alarm, and trouble status. Any detector trouble, including power loss, is reported to the central FACP as a composite "trouble" signal.
5. Detectors with prism reflectors are not acceptable.

D. Duct Smoke Detector: Photoelectric type.

1. Photoelectric Smoke Detectors:
   a. Sensor: LED or infrared light source with matching silicon-cell receiver.
   b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot(0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors shall 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. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.

8. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit. Motor shutdown wiring by Temperature Control Supplier.

2.5 OTHER DETECTOR

A. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or rate of rise of temperature that exceeds 15 deg F (8.3 deg C) per minute, unless otherwise indicated.

1. Mounting: Plug-in base, interchangeable with smoke detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

B. Carbon Monoxide Detector: Provide in all boiler rooms and any other rooms required by code. Provide UL listed carbon monoxide detector connected and monitored by fire alarm system.

2.6 NOTIFICATION APPLIANCES

A. Description: Equip for mounting as indicated and have screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.

B. Chimes, High-Level Output: Vibrating type, 81 dB minimum rated output.

C. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns produce a sound-pressure level of 90 dB, measured 10 feet (3 m) from the horn. Beige or Ivory color.

D. Visible Alarm Devices: Xenon strobe lights listed under UL 1971 with clear or nominal white polycarbonate lens. Mount lens on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch (25-mm-) high letters on the lens. Beige or Ivory color.

1. Rated Light Output: 15, 30, 75, or 110 candela, as required to satisfy NFPA 72 requirements.
2. Strobe Leads: Factory connected to screw terminals.
3. Strobes shall be sychronized.

E. Voice/Tone Speakers:

1. High-Range Units: Rated 2 to 15 W.
2. Low-Range Units: Rated 1 to 2 W.
3. Mounting: Flush, semirecessed, surface, or surface-mounted; bi-directional as indicated.
4. Matching Transformers: Tap range matched to the acoustical environment of the speaker location.

F. Fire Connection Strobe: Provide all required connections to the strobe/horn associated with the fire fighters hose connection on the exterior of the building. Provide 120V power from nearest panel for devices provided by sprinkler system supplier. Connect to emergency power when available.

2.7 PROGRAMMER/TESTOR

A. Provide a programmer/testor for any fire alarm system requiring such a device for programming and maintenance of signal initiation devices. Furnish unit complete with carrying case and instructions.

2.8 NOTIFICATION APPLIANCE CIRCUIT (NAC) EXTENDER PANELS

A. Provide NAC panels as required to support notification appliances.

B. Provide layout of proposed NAC panel locations prior to installation.

2.9 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, reset, and test.

1. Mounting: Flush cabinet, NEMA 250, Class 1.

B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LEDs permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

C. Where main FACP is installed in electrical room, remote annunciator panel shall be capable of making voice announcements.

2.10 EMERGENCY POWER SUPPLY

A. General: Components include lead acid battery, charger, and an automatic transfer switch.

1. Battery Nominal Life Expectancy: 20 years, minimum.

B. Battery Capacity: Comply with NFPA 72.

1. Magnetic door holders are not served by emergency power. Magnetic door holders are released when normal power fails.

C. Battery Charger: Solid-state, fully automatic, variable-charging-rate type. Provide capacity for 150 percent of the connected system load while maintaining batteries at full charge. If batteries are fully discharged, the charger recharges them completely within four hours. Charger output is supervised as part of system power supply supervision.

D. Integral Automatic Transfer Switch: Transfers the load to the battery without loss of signals or status indications when normal power fails.

2.11 GUARDS FOR PHYSICAL PROTECTION

A. Description: Welded wire mesh of size and shape for the manual stations, smoke detectors, and audio/visual devices located in school gymnasiums, multi-purpose rooms and locker rooms.

1. Factory fabricated and furnished by the manufacturer of the device.
2. Finish: Paint of color to match the protected device.

2.12 WIRE

A. Non-Power-Limited Circuits: Copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 16 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.

B. Power-Limited Circuits: NFPA 70, Types FPL, FPLR, or FPLP, as recommended by manufacturer.

2.13 GENERATOR CONNECTION

A. Provide connection to emergency generator system and provide status as indicated in the fire alarm control panel section.

2.14 BREAKER LOCK DEVICE

A. Provide breaker circuit lockout device on branch circuits feeding any fire alarm equipment including fire alarm panels and NAC panels. Utilize Elock fire alarm circuit lockout kit #ELOCK-FA and a red placard indicating “FIRE ALARM / EMERGENCY CIRCUIT INSIDE”.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Install fire alarm system in accordance with manufacturer’s installation drawings and instructions.

B. Connecting to Existing Equipment: Verify that existing fire alarm system is operational before making changes or connections.

1. Connect new equipment to the existing control panel in the existing part of the building.
2. Expand, modify, and supplement the existing control equipment as necessary to extend the existing control functions to the new points. New components shall be capable of merging with the existing configuration without degrading the performance of either system.

C. Manual Pull Stations: Mount semiflush in recessed back boxes.

D. Water-Flow Detectors and Valve Supervisory Switches: Connection for each sprinkler valve station required to be supervised.

E. Ceiling-Mounted Smoke Detectors: Not less than 4 inches from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 30 feet apart in any direction.

F. Wall-Mounted Smoke Detectors: At least 4 inches, but not more than 12 inches, below the ceiling.

G. Smoke Detectors near Air Registers: Install no closer than 60 inches.

H. Duct Smoke Detectors: Comply with manufacturer's written instructions.

1. Verify that each unit is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
2. Install sampling tubes so they extend the full width of the duct.

I. Audible Alarm-Indicating Devices: Install chimes and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Combine audible and visible alarms at the same location into a single unit.

J. Visible Alarm-Indicating Devices: Install adjacent to each alarm chime or alarm horn.

K. Device Location-Indicating Lights: Locate in public space near the device they monitor.

L. Horn/strobe at Fire Fighter's Hose Connection: Connect horn/strobe located on the exterior of the building associated with the sprinkler system.

M. FACP: Surface mount with tops of cabinets not more than 72 inches above the finished floor.

N. Annunciator: Install with the top of the panel not more than 60 inches above the finished floor.

O. Provide smoke detectors where required for all FACP and NAC panels.

P. Provide power to all FACP and NAC panels. Connect to emergency power when available.

3.2 WIRING INSTALLATION

A. Install wiring according to the following:

1. NECA 1.
2. TIA/EIA 568-A.

B. **Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceway and Boxes for Electrical Systems."**

1. **Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.**

C. Wiring Method:

1. Install wiring in raceways except in accessible ceiling spaces and in gypsum-board partitions where cable wiring method may be used. Route the fire alarm cable in cable tray system when available.

Wiring run in ceiling space where there is no tray or conduit, support independently of other systems with dedicated low voltage rings / hooks. No zip ties or support from other systems or conduits allowed.

2. Conceal cables and raceways except in unfinished spaces.
3. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
4. Fire-Rated Cables: Use of 2-hour fire-rated fire alarm cables, NFPA 70 Types MI and CI, is not permitted.
5. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or raceway as signaling line circuits.

D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signal from other floors.

H. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

I. Provide handle clamps on all circuit breakers feeding fire alarm system components. Handle clamps shall lock the circuit breaker in the “ON” position.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 26 Section Identification for Electrical Systems."

B. Install instructions frame in a location visible from the FACP.

C. Install circuit breaker lockout kit and plackard on panels indicating where emergency fire alarm circuits are fed from.

3.4 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a #8 AWG ground wire from main service ground to the FACP.

B. Ground cable shields and equipment according to system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

C. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.

D. Install grounding electrodes of type, size, location, and quantity as indicated. Comply with installation requirements in Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Ground equipment and conductor and cable shields. For audio circuits, minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and connections and to supervise pretesting, testing, and adjustment of the system. Report results in writing.

B. Pretesting: After installation, align, adjust, and balance the system and perform complete pretesting. Determine, through pretesting, the compliance of the system with requirements of Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones, and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.

C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of witnesses to preliminary tests.

D. Final Test Notice: Provide a minimum of 10 days' notice in writing when the system is ready for final acceptance testing.

E. Minimum System Tests: Test the system according to procedures outlined in NFPA 72. Minimum required tests are as follows:

1. Verify the absence of unwanted voltages between circuit conductors and ground.
2. Test all conductors for short circuits using an insulation-testing device.
3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on record drawings.
4. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.
5. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.

6. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
7. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications.
8. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.
9. **[Test smoke control operation startup and shutdown.]**

F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets Specifications and complies with applicable standards.

G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log on the satisfactory completion of tests.

H. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.

I. Provide certification of the fire alarm installation. Submit required documents to the Michigan Department of Labor & Economic Growth, Office of Fire Safety.

3.6 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:

1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, adjusting, and maintaining equipment and schedules. Provide a minimum of 8 hours' training.
2. Training Aid: Use the approved final version of the operation and maintenance manual as a training aid.
3. Schedule training with Owner, through Architect, with at least seven days' advance notice.

3.8 ON-SITE ASSISTANCE

A. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three requested visits to Project site for this purpose.

END OF SECTION 28 3100