

**TO ALL CONTRACTORS**

The following are clarifications and/or changes to the Plans and Specifications, dated October 27, 2021, for the above-named Project, to be Bid on January 11, 2022 @ 2:00 PM

**ENCLOSURE:** Certification Pages.

**Architectural:** *New Documents:* Attachment to 00 21 13  
*Revised Sections:* 01 11 00, 08 11 13, 08 71 00, 08 81 10, 09 21 16, 09 30 00, 09 65 13, and 09 91 00.  
*New Sections:* 01 45 23, 01 45 23 Appendix, 10 14 20, 10 14 22  
*Revised Drawings:* A2.1, A3.1, A3.2, A8.1, A11.2, and A13.1.

**Mechanical:** *Complete New Revised Sections:* 23 05 30 and 23 82 33.  
*Revised Drawings:* M2.1, M5.1, M5.2, and M9.1.

**Electrical:** *Revised Drawings:* ED.1, E2.1, E3.1, E4.1, E6.1 and E8.1.

**INTRODUCTORY INFORMATION**

1. Document 00 01 05 of the Project Manual:
  - a. Refer to Certification Page, included as an enclosure with this Addendum.
2. Document 00 21 13 of the Project Manual:
  - a. **Add New Attachment to** Document 00 21 13 - (Questions and Answers, Dated 12/29/2021) to the Project Manual, included as an enclosure with this Addendum.

**ARCHITECTURAL SPECIFICATIONS**

3. Section 01 11 00 of the Specifications:
  - a. **Delete** Section 01 11 00 in its entirety and replace with Revised Section 01 11 00, included as an enclosure with this Addendum. Refer to **Bold** and **Italic** items within Section.
4. Section 01 45 23 of the Specifications:
  - a. **Add New** Section 01 45 23, included as an enclosure with this Addendum.
  - b. **Add New** Section 01 45 23 Appendix, included as an enclosure with this Addendum.
5. Section 08 11 13 of the Specifications:
  - a. **Delete** Section 08 11 13 in its entirety and replace with Revised Section 08 11 13, included as an enclosure with this Addendum. Refer to **Bold** and **Italic** items within Section.

6. Section 08 71 00 of the Specifications:
  - a. **Delete** Section 08 71 00 in its entirety and replace with Revised Section 08 71 00, included as an enclosure with this Addendum. Refer to **Bold** and **Italic** items within Section.
7. Section 08 81 10 of the Specifications:
  - a. **Delete** Section 08 81 10 in its entirety and replace with Revised Section 08 81 10, included as an enclosure with this Addendum. Refer to **Bold** and **Italic** items within Section.
8. Section 09 21 16 of the Specifications:
  - a. **Delete** Section 09 21 16 in its entirety and replace with Revised Section 09 21 16, included as an enclosure with this Addendum. Section has been completely revised.
9. Section 09 30 00 of the Specifications:
  - a. **Delete** Section 09 30 00 in its entirety and replace with Revised Section 09 30 00, included as an enclosure with this Addendum. Refer to **Bold** and **Italic** items within Section.
10. Section 09 65 13 of the Specifications:
  - a. **Delete** Section 09 65 13 in its entirety and replace with Revised Section 09 65 13, included as an enclosure with this Addendum. Refer to **Bold** and **Italic** items within Section.
11. Section 09 91 00 of the Specifications:
  - a. **Delete** Section 09 91 00 in its entirety and replace with Revised Section 09 91 00, included as an enclosure with this Addendum. Refer to **Bold** and **Italic** items within Section.
12. Section 10 14 20 of the Specifications:
  - a. **Add New** Section 10 14 20, included as an enclosure with this Addendum.
13. Section 10 14 22 of the Specifications:
  - a. **Add New** Section 10 14 22, included as an enclosure with this Addendum.

#### ARCHITECTURAL DRAWINGS

14. Sheet A2.1 of the Drawings:
  - a. Replace Sheet A2.1 with Revised Sheet A2.1 , Revision 2, (clouded revision(s)), included as an enclosure with this Addendum.
15. Sheet A3.1 of the Drawings:
  - a. Replace Sheet A3.1 with Revised Sheet A3.1 , Revision 2, (clouded revision(s)), included as an enclosure with this Addendum.

16. Sheet A3.2 of the Drawings:
  - a. Replace Sheet A3.2 with Revised Sheet A3.2 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.
17. Sheet A8.1 of the Drawings:
  - a. Replace Sheet A8.1 with Revised Sheet A8.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.
18. Sheet A11.2 of the Drawings:
  - a. Replace Sheet A11.2 with Revised Sheet A11.2 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.
19. Sheet A13.1 of the Drawings:
  - a. Replace Sheet A13.1 with Revised Sheet A13.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.

**MECHANICAL SPECIFICATIONS**

20. Section 23 05 30 of the Specifications:
  - a. **Delete** Section 23 05 30 in its entirety and replace with New Revised Section 23 05 30, **(REFER TO ENTIRE SECTION FOR CHANGES)**, included as an enclosure with this Addendum.
21. Section 23 82 33 of the Specifications:
  - a. **Delete** Section 23 82 33 in its entirety and replace with New Revised Section 23 82 33, **(REFER TO ENTIRE SECTION FOR CHANGES)**, included as an enclosure with this Addendum.

**MECHANICAL DRAWING**

22. Sheet M2.1 of the Drawings:
  - a. Replace Sheet M2.1 with Revised Sheet M2.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.
23. Sheet M5.1 of the Drawings:
  - a. Replace Sheet M5.1 with Revised Sheet M5.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.

24. Sheet M5.2 of the Drawings:
- a. Replace Sheet M5.2 with Revised Sheet M5.2 , Revision 1, (clouded revision(s), included as an enclosure with this Addendum.
25. Sheet M9.1 of the Drawings:
- a. Replace Sheet M9.1 with Revised Sheet M9.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.

**ELECTRICAL DRAWINGS**

26. Sheet ED.1 of the Drawings:
- a. Replace Sheet ED.1, Revision 1, with Revised Sheet ED.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.
27. Sheet E2.1 of the Drawings:
- a. Replace Sheet E2.1, Revision 1, with Revised Sheet E2.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.
28. Sheet E3.1 of the Drawings:
- a. Replace Sheet E3.1, Revision 1, with Revised Sheet E3.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.
29. Sheet E4.1 of the Drawings:
- a. Replace Sheet E4.1, Revision 1, with Revised Sheet E4.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.
30. Sheet E6.1 of the Drawings:
- a. Replace Sheet E6.1, Revision 1, with Revised Sheet E6.1 , Revision 2, (clouded revision(s), included as an enclosure with this Addendum.
31. Sheet E8.1 of the Drawings:
- a. Replace Sheet E8.1 with Revised Sheet E8.1 , Revision 1, (clouded revision(s), included as an enclosure with this Addendum.

**END OF ADDENDUM**

19039.2

DOCUMENT 00 01 05

CERTIFICATION PAGE

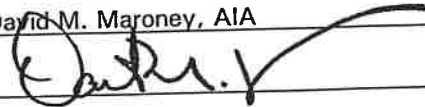
PROJECT:

CROOKED LAKE ELEMENTARY SCHOOL  
HVAC REPLACEMENT/DEFERRED MAINTENANCE - PHASE 3  
2939 Bunker Lake Boulevard Northwest  
Andover, Minnesota 55304

ARCHITECT'S CERTIFICATION:

I hereby certify that this Plan, Specification, or Report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.

Name David M. Maroney, AIA

Signature 

Date October 27, 2021 License No. 20992

STRUCTURAL ENGINEER'S CERTIFICATION:

I hereby certify that this Plan, Specification, or Report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Name Timothy G. LaBissoniere, PE

Signature 

Date October 27, 2021 License No. 21387

MECHANICAL ENGINEER'S CERTIFICATION:

I hereby certify that this Plan, Specification, or Report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Name Blayne J. Parkos, PE

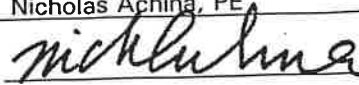
Signature 

Date October 27, 2021 License No. 46630

ELECTRICAL ENGINEER'S CERTIFICATION:

I hereby certify that this Plan, Specification, or Report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Name Nicholas Achina, PE

Signature 

Date October 27, 2021 License No. 40408

END OF DOCUMENT

**ATTACHMENT TO DOCUMENT 00 21 13**

**QUESTIONS AND ANSWERS**

Questions received from bidders through [purchquotes@ahschools.us](mailto:purchquotes@ahschools.us) and associated responses are provided for clarification to the bids, as of 12/29/2021.

**Question 1:** Product Substitution Request from MLAZGAR Associates.

Response: Fixture Substitution Request approved. Refer to Schedule on Sheet E8.1.

**Question 2:** Product Substitution Request from W.R. Meadows, Inc., "INDUROSHINE".

Response: Substitution Request Not Approved. No performance criteria provided which indicates that it meets the requirements of 03 35 37, Article 2.01, Paragraph B.

**Question 3:** "After reviewing the structural drawings, it has come to our attention that you are specifying aluminum grating with a galvanized steel structure. Galvanized steel is known to deteriorate aluminum after an extended period of time. We suggest switching the grating to galvanized steel to eliminate this concern."

Response: Per Section 05 50 00, Article 1.01, Paragraph A, 7, Contractor shall provide isolation materials where dissimilar materials are joined together.

**END OF ATTACHMENT**

**SECTION 01 11 00**

**SUMMARY OF WORK**

**PART 1 - GENERAL**

**1.01 SUMMARY**

**A. Section Includes:**

1. Project Information.
2. Work Covered by Contract Documents:
  - a. Work Includes
  - b. Type of Contract
3. Contractor Access and Use of Existing Site.
4. Communications Between Workers and Staff, Students and Public
5. Specifications and Drawing Conventions.
6. Additional Requirements

**1.02 PROJECT INFORMATION**

**A. Project Identification:**

1. Project Title: **Crooked Lake Elementary School  
HVAC Replacement and Deferred Maintenance - Phase 3**
2. Project Locations: 2939 Bunker Lake Boulevard Northwest  
Andover, Minnesota 55304
3. Project Number: 19039.2

**B. Owner:**

1. Name/Address: Anoka-Hennepin School District 11  
2727 North Ferry Street,  
Anoka, MN 55303

**C. Architect/Engineer:**

1. Name/Address Armstrong, Torseth, Skold & Rydeen, Inc. (ATS&R)  
8501 Golden Valley Road, Suite 300  
Minneapolis, MN 55427-4414
2. Telephone Number: 763-545-3731
3. Fax Number: 763-525-3289

**SECTION 01 11 00**

4. Representatives:

- a. Project Architect: David A. Maroney, AIA
- b. Mechanical Engineer: Blayne J. Parkos, PE
- c. Electrical Engineer: Nicholas Achina, PE

D. **Architect's Consultants:**

1. Structural Engineer:

- a. Name/Address: IMEG Corporation  
12755 Highway 55, Suite 100  
Minneapolis, MN 55441
- b. Telephone Number: 763-545-9196
- c. Fax Number: 763-541-0056
- d. Representative: Timothy G. LaBissoniere, PE

**1.03 WORK COVERED BY CONTRACT DOCUMENTS**

- A. **Work Includes:** The Work of the Project as defined by the Contract Documents consists of Crooked Lake Elementary School HVAC Replacement and Deferred Maintenance – Phase 3, located at 2939 Bunker Lake Boulevard Northwest, Andover, Minnesota 55304, as represented in the Contract Documents prepared by Armstrong, Torseth, Skold & Rydeen, Inc., Architects and Engineers, Minneapolis, Minnesota and their Consultants.
- B. **Type of Contract:** Project will be constructed under a Single Prime Contract.
- C. **Related Work:** Testing, adjusting, and balancing work, related to mechanical systems will be performed under separate direct contracts with Owner.

**1.04 WORK BY OWNER**

- A. **Casework:** Owner will furnish and install all new casework and related countertops, backsplash, filler panels, scribe strips where noted on Floor Plans and as shown on Casework Elevations. Provide in Contract sinks and fixtures noted in Owner provided casework as indicated in Mechanical Documents. Provide in Contract vinyl base as specified in Section 09 65 13 on Owner provided casework.

- 1. ***Mechanical chases and other plastic laminate surfaces and fabrications are furnished and installed by Owner.***
- 2. ***Seat cushions noted are provided in-Contract, per Section 12 52 19. Benches underneath seat cushions are furnished and installed by Owner.***
- 3. ***High pressure laminate surfaces (FRL) noted, are provided in-Contract, per Section 06 40 25.***

***Subparagraphs 1, 2, and 3 added in Addendum No. 3.***

- B. **Commissioning, Testing and Balancing:** Commissioning, Testing, and Balancing of Mechanical Systems will be under Separate Contract by Owner.



**1.05 CONTRACTOR'S ACCESS AND USE OF EXISTING SITE**

- A. **General:** Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of these Specifications.
- B. **Owner Occupancy:**
1. During the entire construction period, the Owner will be occupying or using non-construction affected portions of the existing building and site.
  2. Contractor shall confine operations at Project site and within existing building as coordinated with the Owner so that the Owner's operations are not impacted.
  3. If Contractor's operations will affect Owner's operations and usage of site, Contractor shall give Owner ample notification to coordinate and schedule operations in order to minimize impact on Owner. Schedule work around Owner's occupancy schedule if possible to include scheduling work before or after the Owner's occupancy schedule, weekends, and when site and building are not occupied.
  4. Project commencement and completion is during the summer, and therefore Contractor will have access to site during normal business hours, unless required to work around Owner's occupancy schedule.
- C. **Site Access and Parking:**
1. Coordinate site access and parking restrictions for Project related personnel with Owner.
  2. Project personnel shall use designated driveways to access site and park in designated locations only.
- D. **Delivery of Materials:**
1. Coordinate with Owner, site access points, drive routes, delivery time restrictions, and delivery locations with Owner.
  2. Keep driveways, parking areas, loading areas, and entrances serving premises clear and available to Owner, Owner's staff, and emergency vehicles at all times.
  3. Schedule deliveries at times when Owner's operations will be least impacted and minimize use of driveways and entrances by construction operations.
  4. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- E. **Building Access:**
1. Construction personnel shall use only designated and Owner approved entrances for access into driveway.
  2. Construction personnel shall be restricted to designated access routes within existing building to access areas of work.

**SECTION 01 11 00**

3. Maintain building exits and exit routes as required by governing authorities.
4. If Contractor finds it necessary to perform work during times when the Owner is not occupying the building, coordinate and make arrangements with the Owner to obtain access. Contractor shall maintain building security.

**F. Storage of Materials On-Site:**

1. Exterior storage of materials shall be within enclosed containers if possible.
2. When a construction fenced area is noted, store construction materials within fenced area.
3. Exterior storage of materials, if required, shall be in area noted on Drawings or as coordinated and approved by Owner if a designated location has not been pre-determined.
4. Consolidate material storage to minimize space required.
5. If possible, do not have materials delivered to site before they are needed for installation.
6. If Owner will allow storage of materials within building, coordinate with Owner specific location(s) for interior storage which will minimize disruption of Owner's operations and protect building occupants from injury and access to materials.
7. Contractor is responsible for the protection and safekeeping of products and equipment stored on Project site, and for using means and methods that will protect the Owner's personnel and public from injury.
8. Store and protect materials and equipment using means and methods which will protect products from damage as required by product manufacturers.

**G. Temporary Facilities:** Refer to Specification Section 01 50 14 for requirements and restrictions associated with temporary facilities.

**H. Waste and Trash Removal:**

1. Owner's existing on-site trash receptacles shall not be used for disposal of construction related waste and trash.
2. Contractor shall provide appropriate trash receptacles to receive waste materials generated by construction operations as specified.
3. Contractor to coordinate, with Owner, location(s) that are acceptable for dumpsters or trash receptacles.

**I. Identification of Construction Personnel:** Construction related personnel shall maintain visible employer identification badges at all times while on Project site.

**J. Tobacco/Drug/Alcohol/Fire Arm Restrictions:**

1. Entire site to be tobacco free, drug free, alcohol free, and fire arm free.

**SECTION 01 11 00**

2. Smoking tobacco, chewing tobacco, drugs, alcohol, and fire arms shall not be brought on or used on Owner's property at any time.
3. Owner's property is defined as the area within the property line around the entire school site.
4. Contractor shall be responsible for posting signs and enforcement of these requirements.

**K. Damage to Owner's Property:**

1. Contractor is responsible for protecting from damage caused by construction operations the existing Project site, building, and building contents which are beyond the construction limits for the Project and site to remain unaffected by the Work.
2. Repair or replace existing finishes, fixtures, materials, equipment, and construction which is to remain and was intended to be unaffected by the Work, which is damaged during construction operations associated with the Project.
3. Patching or replacement of Owner's existing property that was to remain but that is damaged by the Work shall be equal to or a better quality than the condition or quality of the property that was damaged, or shall be restored to match surrounding existing conditions before damage occurred as acceptable to Owner and Architect/Engineer.

**L. Existing Utility Interruptions:** Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services in accordance with requirements indicated:

1. Notify Owner not less than (2) days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

**M. Noise, Vibration, and Odors:** Coordinate with Owner, operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than (2) days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

**N. Condition of Existing Building:**

1. Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period.
2. Repair damage caused by construction operations.

**1.06 COMMUNICATIONS BETWEEN WORKERS AND STUDENTS, STAFF, AND PUBLIC**

- A. Communications With Students:** No communication between workers and students on Project site shall take place. Questions or comments initiated by students shall be ignored. If a problem develops with a student or group of students, report problem to Project Superintendent, who in turn shall report it to School District representative.

**SECTION 01 11 00**

- B. **Communications With Staff and Public:** Questions and comments initiated by staff or public shall be referred to School District representative. Be polite but do not make any attempts to answer questions or respond to comments initiated by staff or public.

**1.07 SPECIFICATION AND DRAWING CONVENTIONS**

- A. **Specification Content:** Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall", "shall be", or "shall comply with", depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. **Division 01 - General Requirements:** Requirements of Sections in Division 01 apply to the Work of all sections in the Specifications.
- C. **Drawing Coordination:** Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specification sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations, which are defined in Section 01 42 13 of the Specifications.

**1.08 ADDITIONAL REQUIREMENTS**

- A. **Advertising:** Contractors, Subcontractors, Suppliers, and Vendors or agents thereof associated with the Work of the project shall not use in their external advertising, marketing programs or other promotional efforts, any data, pictures, or other representation of the District except on the specific, written authorization, in advance, of the District's Department of Public Relations.
- B. **Health and Safety Requirements:** Workers shall follow applicable health and safety requirements from authorities having jurisdiction, including Federal CDC guidelines, Minnesota Department of Health guidelines, and State of Minnesota Executive Orders.

**PART 2 - PRODUCTS** Not Used

**PART 3 - EXECUTION** Not Used

**END OF SECTION**

**SPECIAL TESTING AND INSPECTION SERVICES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

A. **Section Includes:** Administrative and procedural requirements where quality control services are the Owner's responsibility in coordination and cooperation with the Contractor's responsibilities. The following are included in this Section:

1. References
2. Definitions
3. Selection and Payment of Testing Agency
4. Testing Agency Services
5. Contractor's Responsibilities
6. Special Inspections
7. Cooperation With Testing Laboratory Personnel
8. Specimens
9. Schedule For Testing and Inspections

B. **Related Sections:**

1. Section 01 33 00: Submittal Procedures; Submission of manufacturer's instructions.
2. Section 01 78 00: Closeout Submittals; Project Record Documents.
3. Individual Specification Sections: Inspections and testing required and standards for testing.

**1.02 REFERENCES**

A. **American Society for Testing and Materials (ASTM):**

1. ASTM C1093, Standard Practice for Accreditation of Testing Agencies for Unit Masonry
2. ASTM D3740, Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
3. ASTM E329, Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

B. **International Building Code (IBC)**

C. **Minnesota State Building Code**

**1.03 DEFINITIONS**

A. **Testing:** Evaluation of systems, primarily requiring physical manipulation and analysis of materials, in accordance with approved standards.

B. **Inspection:** Evaluation of systems, primarily requiring observation and judgment.

**SECTION 01 45 23**

C. **Testing Agency:** An independent testing agency that Owner enters into a separate contract with to provide specific inspections and testing to ensure compliance with requirements of the Contract Documents and Building Code.

1. Testing agency shall be authorized to operate in the state in which Project is located and familiar with requirements and testing methods specified in the Contract Documents.
2. Testing equipment shall be calibrated at reasonable intervals by devices of accuracy traceable to either the National Bureau of Standards or to accepted values of natural physical constants.

**1.04 SELECTION AND PAYMENT OF INSPECTION AND TESTING AGENCY**

A. **General:**

1. Owner will contract with, and pay for services of, an independent inspection and testing agency to perform the inspection and testing specified in this Section.
2. Contractor shall reimburse Owner for retesting required when initial testing shows that materials or procedures are defective, or do not meet requirements of the Contract Documents.
3. If exploratory work is required to determine cause of defects, cost of such work shall be paid for by the Contractor responsible for such work, if work is found to be defective, in Architect/Engineer's judgment. If Contractor is not at fault, cost will be paid for by Owner.

**1.05 TESTING AGENCY SERVICES**

A. **Independent Testing:** Owner will employ, and pay costs for services of, an independent testing agency to perform specified testing and inspections. Employment of testing agency by Owner shall not relieve Contractor of its obligation to perform work in accordance with requirements of the Contract Documents.

B. **Testing Laboratory Requirements:**

1. Conduct test on samples that are obtained by testing agency personnel, and those submitted by Contractor, when required.
2. Provide quality personnel at site. Cooperate with Architect and Contractor in performance of services.
3. Perform specified inspection, sampling, and testing of material and construction in accordance with specified standards.
4. Ascertain that materials and mixes meet requirements of the Contract Documents.
5. Promptly notify Architect and Contractor, in writing, of observed irregularities or non-conformance of Work or products.
6. Perform additional inspections and tests required by Architect/Engineer.
7. Attend Pre-Construction Meeting and progress meetings, if notified by Architect or Contractor.

**SECTION 01 45 23**

C. **Testing Laboratory Reports:** After each inspection and test, testing laboratory will promptly submit copies of testing laboratory report to Architect, Structural Engineer, Contractor, and if required to local authorities having jurisdiction.

D. **Reports:** Testing agency shall prepare and submit certified written reports that include the following:

1. Testing Company Name
2. Name of Individual(s) Conducting Inspection or Test
3. Individual's Certification(s)
4. Materials Inspected or Tested (explicit identification shall be used)
5. Date of Inspection or Testing
6. Location in the Project
7. Results of Sample Taking, Testing, or Inspection
8. Statement of Conformance or Non-Conformance With Specifications
9. Remedial Action, if applicable
10. Follow-Up Tests and Inspections, required after remedial action
11. Interpretation of Test Results, when requested by Architect

E. **Testing Agency Responsibilities:**

1. Cooperate with Architect and Contractor in performance of duties and services.
2. Provide qualified personnel to perform required tests and inspections.
3. Notify Architect and Contractor promptly of irregularities or deficiencies observed in Work during performance of its services.
4. Determine location from which test samples will be taken and in which in-situ tests are conducted.
5. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work meets with, or deviates from, requirements.
6. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.
  - a. Testing agency shall distribute copies of tests to Architect/Engineer, Owner, Contractor, Structural Engineer, building official, and Owner's consultants.
7. Observation and testing services shall assist in verification of certain aspects of Work for compliance with requirements of the Contract Documents. These services shall not relieve Contractor of its responsibility to meet requirements of the Contract Documents.

F. **Limits of Testing Agency Authority:**

1. Agency may not release, revoke, alter, or embellish requirements of the Contract Documents.
2. Agency may not approve or accept any portion of the Work.
3. Agency may not assume or perform any duties of the Contractor.
4. Laboratory has no authority to stop the Work.

## 1.06 CONTRACTOR'S RESPONSIBILITIES

### A. **General:** Contractor responsibilities include the following:

1. Schedule and coordinate pre-construction and construction testing and observation.
2. Provide safe access to testing and observation areas, and secure and protect samples and testing equipment.
3. Provide necessary scaffolding, lifts, enclosures, temporary heat, and other resources required by Owner's observation or testing agencies in order to perform their work.
4. Make repairs required due to testing or observation procedures.
5. Provide and transport to Owner's testing facility, materials to be tested if directed or specified.
6. Include submittal of proposed mix designs when required.
7. Cooperate with testing agency personnel.
8. Provide incidental labor and facilities to provide access to the Work to be tested, to obtain and handle samples at Project site or at source of products to be tested, to facilitate tests and inspections; and to store and cure test samples.

### B. **Coordination:** Contractor to coordinate sequence of activities to accommodate required quality assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

### C. **Cooperation:** Contractor shall cooperate with Owner's testing agency. Furnish samples of materials, design mixes, equipment, tools, storage, and assistance as required.

### D. **Schedule of Tests and Inspections:** Contractor to submit a schedule of tests, inspections, and similar quality control services required by the Contract Documents.

1. Distribution: Contractor to distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of Work where tests and inspections are required.

## 1.07 SPECIAL INSPECTIONS

### A. **Special Inspections Required by Building Code:** Owner will arrange, and pay costs for, special inspections required by IBC 2015, Section 110, and as modified by Minnesota State Building Code, as they apply to work of this Contract.

### B. **Compliance:** Independent testing agency shall indicate compliance or non-compliance with the Contract Documents.

1. Submit a final signed report stating whether Work requiring special inspections was, to the best of its knowledge, in conformance with approved Contract Documents and applicable workmanship provisions of the Code.



**SECTION 01 45 23**

**PART 2 - PRODUCTS**

Not Used

**PART 3 - EXECUTION**

**3.01 COOPERATION WITH TESTING LABORATORY PERSONNEL**

- A. **Access to Work:** Inspectors and other representatives of testing agency shall have access to the Work. Contractor shall provide facilities for such access in order that testing, inspecting, and obtaining samples may be done properly.
- B. **Tested or Exempt Materials:** Materials shipped by Contractor from source of supply prior to having satisfactorily passed testing and inspection by testing agency, or prior to receipt of notice from testing agency that such testing and inspection will not be required, shall not be incorporated in Project.

**3.02 TAKING SPECIMENS**

- A. **Selection of Specimens and Samples:**
  - 1. Field specimens and samples for testing, unless otherwise indicated in Contract Documents, shall be selected and taken by testing agency inspector, not by Contractor.
  - 2. Sampling equipment and personnel shall be provided by testing agency.
  - 3. Delivery of specimens and samples to testing agency shall be performed by testing agency personnel.

**3.03 SCHEDULE FOR TESTING AND INSPECTIONS**

- A. **Establishing Schedule:**
  - 1. By advance discussion with testing agency, Contractor shall determine time required for testing agency to perform site inspections, to perform tests, and to issue reports of each of its findings.
  - 2. Provide required times within Contractor's Construction Schedule for inspections, testing, and issuance of related reports.
  - 3. Revising Schedule: When changes to Contractor's Construction Schedule are necessary during construction, coordinate such changes of schedule with testing agency.
- B. **Adherence to Schedule:** When testing agency is ready to test in accordance with determined schedule, but is prevented from testing or taking sample specimens due to incompleteness of Project work, extra charges for testing attributable to a resulting delay may be charged to Contractor and Owner will adjust Contract Sum accordingly.

**END OF SECTION**

Crooked Lake ES HVAC Replacement/Deferred Maintenance - Phase 3  
 Enclosure with Addendum No. 3  
 19039.2

Structural Tests and Special Inspections  
 Program Summary Schedule

Project Name \_\_\_\_\_ Project Number \_\_\_\_\_  
 Location \_\_\_\_\_ Permit Number \_\_\_\_\_ (1)  
 \_\_\_\_\_

Technical (2) Assigned [Section] [Article]		Description (3)	Type of Inspector (4)	Report Frequency (5)	Firm (6)

Notes: This schedule shall be filled out and included in the Structural Tests and Special Inspections Program.

- (1) Permit Number to be provided by the Code Official.
- (2) Referenced to the specific Technical Scope Section and Article in the program.
- (3) Use descriptions per the International Building Code(IBC), Chapter 17, as adopted by the State of Minnesota.
- (4) Special Inspector - Technical, Special Inspector - Structural.
- (5) Weekly, monthly, per test/inspection, per floor, etc.
- (6) Firm contracted to perform services.

**ACKNOWLEDGMENTS**

Each appropriate representative shall sign below:

Owner: _____	Firm: _____	Date: _____
Contractor: _____	Firm: _____	Date: _____
Architect _____	Firm: _____	Date: _____
SER: _____	Firm: _____	Date: _____
SI-S: _____	Firm: _____	Date: _____
SI-T: _____	Firm: _____	Date: _____
TA: _____	Firm: _____	Date: _____
F: _____	Firm: _____	Date: _____

If requested by Architect/Engineer of Record or Code Official, the individual names of all prospective special inspectors and the work they intend to observe shall be identified.

Legend: SER = Structural Engineer of Record Agency  
 SI-T = Special Inspector- Technical TA = Testing  
 SI-S = Special Inspector - Structural F = Fabricator

Accepted for the Building Department By: \_\_\_\_\_ Date: \_\_\_\_\_

**SECTION 08 11 13**

**STEEL FRAMES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

**A. Section Includes:**

1. Provide non-rated hollow metal (steel) door frames for wood doors ***and hollow metal framed windows and sidelites.***

***Subparagraph revised in Addendum No. 3***

2. Provide anchors to secure steel frames to adjacent construction.

**B. Related Sections:**

1. Section 06 20 00: Install steel frames.
2. Section 08 14 16: Flush solid core wood doors.
3. Section 08 71 00: Hardware for doors.
4. Section 08 81 00: Glazing for interior steel doors and frames.
5. Section 09 91 00: Project site painting of steel frames.

**1.02 REFERENCES**

**A. ASTM International**

**1.03 SUBMITTALS**

- A. General Requirements:** Provide submittals in accordance with 01 33 00.

**B. Shop Drawings:**

1. Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures.
2. Indicate opening identification number (same as on Contract Documents), frame types, metal gauges, door swings, glazing cutouts and stops, and undercuts when applicable.
3. Indicate locations of field splice joints on frames that are too large for total shop/factory assembly to allow for shipment and access into building to installation location. Include details necessary to provide proper site assembly and concealment of field joints.

- C. Samples:** If requested by Architect, submit a sample of each frame type showing corner joint, typical reinforcements for hardware, plaster guards (mortar guards), and floor anchors.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications:** Not less than 5 years experience in production of specified products.

- B. Product Qualifications:** Provide steel frames manufactured by a single firm specializing in production of this type of work.

**SECTION 08 11 13**

- C. **Finish Hardware Coordination:** Coordinate with hardware supplier, the proper placement and preparation for hardware items with frame fabrication. Secure necessary hardware templates and hardware information from hardware supplier.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. **General Requirements:** Deliver, store, and handle hollow metal work in a manner to prevent damage.
- B. **Packing and Shipping:** Properly package items to protect against damage in shipping. Include all fastenings for each item.
- C. **Storage and Protection:** Store steel frames to not be exposed to adverse environmental elements.
- D. **Marking:** Mark each item with appropriate heading and door number in accordance with Drawings and approved Hardware Schedule.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. **Acceptable Manufacturers for Steel (Hollow Metal) Frames:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - 1. Ceco Door Products, an ASSA ABLOY Group Company, Milan, TN
  - 2. Curries Company, an ASSA ABLOY Group Company, Mason City, IA
  - 3. West Central Supply, Inc., Rapid City, SD
  - 4. Pioneer Industries, Carlstadt, NJ
  - 5. Security Metal Products Corporation, Hawthorne, CA
  - 6. Steelcraft, an Ingersoll-Rand Company, Cincinnati, OH

**2.02 MATERIALS AND FABRICATION FOR WELDED STEEL (HOLLOW METAL) FRAMES**

- A. **General Fabrication Requirements for Frames:**
  - 1. Fabricate and shop assemble frames into complete units.
  - 2. Provide for field joints only if required to allow for transport to site and for routing through building to installation location.
- B. **Materials:**
  - 1. Interior Frames:
    - a. **Standard Frame Material:** Fabricate frames from cold rolled steel in accordance with requirements of ASTM A1008.
    - b. **Galvanized (Zinc Coated) Frame Material:** Where indicated fabricate interior frames from cold rolled steel in accordance with requirements of ASTM A653, Commercial Steel (CS), Type B; with not less than G60 (Z180) or A60 (ZF180) zinc-iron alloy (galvannealed) coating designation.
    - c. **Gauge:** Frames 4 feet or less in overall width to be 16 gauge. Frames over 4 feet in width to be 14 gauge.

**SECTION 08 11 13**

**C. Frame Fabrication:**

1. Design: Welded units with integral trim of sizes, profile, and jamb depths indicated. Knocked-down frames are not acceptable.
2. Joints and Corners: Manufacturers have option to provide one or more of the following:
  - a. Saw-mitered, including stops, and continuously arc welded on backside with exposed welds ground and finished smooth. Filled joints are not acceptable.
  - b. Machine-mitered with jamb tabs interlocking slots in head member continuously welded on backside, including faces of frame, with full penetration weld through to face with exposed welds ground and finished smooth. Filled joints are not acceptable.
  - c. Frames for multiple or special openings shall have mullion or rail members which are closed tubular shapes having no visible seams and joints. Arc weld and grind smooth joints between faces of abutting members. Fill butted joints with a paintable material such as 3M Construction Markets, Fast & Firm, or approved equal.
3. Depth of Built-In and Removable Stops: Not less than 5/8 inch.

**D. Frame Provisions For Hardware:**

1. Factory mortise, reinforce, drill, and tap frames for door hardware attachment.
2. Receive hardware or templates from hardware supplier and prepare frames for hardware installation. Frame manufacturer is responsible for proper fit and performance of installed hardware.
3. Frame Reinforcement For Hardware: Factory install reinforcement in frames for doors. Provide adequate size and strength of reinforcement to accommodate hardware and to support door.
  - a. Hinge Reinforcement: Not less than 7 gauge (0.179 inch by minimum 10 inches long).
  - b. Strike Clips: Not less than 16 gauge (0.0598 inch) by 12 inches long.
  - c. Reinforcement For Closer or Door Stop/Holder: Not less than 12 gauge (0.1046 inch). Provide continuous across head of all door frames.

**E. Frame Anchors:**

1. Jamb Anchor Material:
  - a. Frame in Interior Wall: Steel sheet in accordance with ASTM A591, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
2. Jamb Anchors for Frames in Steel Stud Framed Partitions: Provide steel jamb anchors of suitable design of not less than 18 gauge, welded inside each jamb.

**SECTION 08 11 13**

3. Quantity of Jamb Anchors: Provide an anchor in each jamb of frame adjacent to wall construction for each 2 feet of frame height or fraction thereof.
  4. Base Anchors (Floor Anchors): Not less than 12 gauge steel, securely welded to inside of each jamb, with (2) holes provided at each jamb for anchorage to floor.
- F. **Removable Stops:** Not less than 16 gauge steel with butt type corner joints. Secure removable stops to frame with cadmium or zinc coated countersunk sheet metal screws spaced at not more than 16-inch centers.
- G. **Spreader:** At door openings in frames, provide a not less than 16 gauge steel channel spreader temporarily arc welded to foot of both jambs to secure and brace frames during shipping and handling.
- H. **Bumpers (Door Silencers):**
1. Provide (3) bumpers on lock/latch side of single door frames.
  2. Delete bumpers where weatherstripping or smoke gasket will be installed.
  3. Provide plastic plugs in bumper holes to keep hole clear until bumper is installed after finish painting is completed.
  4. Model SR64 as manufactured by Ives or equal.

**2.03 FINISHING AND SHOP PAINTING FOR STEEL MATERIALS**

- A. **Finishing:** After fabrication, remove tool marks and surface imperfections and dress exposed faces of welded joints smooth.
- B. **Preparation For Priming:**
1. Remove rust, grease, and other impurities by chemically treating members to ensure maximum primer adhesion.
  2. Prepare exposed surfaces of zinc coated members as recommended by primer product manufacturer to ensure maximum primer adhesion.
- C. **Application of Primer:**
1. Apply a coat of manufacturer's standard rust-inhibiting baked-on primer, in accordance with ANSI A221.1, covering both inside and outside surfaces (including within enclosed or to be enclosed spaces) of frames and stops.
  2. Apply a coat of baked-on primer, covering exposed surfaces of frames and stops having a zinc (galvanized) coating.
  3. Fully cure primer before shipping products.

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

**A. Verification of Conditions:**

1. Verify that openings are plumb, level, clean and provide a solid anchoring surface.
2. Do not install frames until conditions are satisfactory.

**3.02 INSTALLATION - GENERAL**

**A. General Installation Requirements:**

1. In accordance with product manufacturer's recommendations.
2. Install assemblies plumb, level, and free of warp and twist.
3. Maintain dimensional tolerances and alignment with adjacent work.
4. Install sufficient anchorage devices to securely and rigidly fasten frame to building construction.

**3.03 INSTALLATION OF STEEL FRAMES**

**A. Setting Frames:**

1. Remove frame spreader bars before frames are installed.
2. Set frames to maintain scheduled dimensions.
3. Hold frame head level and maintain jambs plumb and square.
4. Provide bracing to hold frame in position until frame is secured to adjacent wall.

**B. Frame Anchorage:**

1. Unless otherwise specified, installer of adjacent wall shall securely anchor frame to wall construction.
  - a. Frame installer shall provide anchorage when installing frame in an opening in an existing wall.
2. Set and secure anchors to maintain alignment, elevation, and tolerances of frame and to prevent loosening of assembly when subject to operational loading.
3. Remove bracing after frame is securely anchored to adjacent wall.

**3.04 REPAIR**

- A. **General Requirements:** Repair damaged or defective materials as approved by Architect, or remove and install new material.

**3.05 CLEANING**

A. **Cleaning and Prime Coat Touch-Up:**

1. Promptly after installation, thoroughly clean metal surfaces of dirt and stains caused during installation.
2. Remove metal filings from Work.
3. Remove rust and sand smooth areas where prime coat has been damaged. Touch-up these areas using same primer as applied by fabricator.
4. Touch-up shall not be obvious after finish painting.

**END OF SECTION**



**HARDWARE**

**PART 1 - GENERAL**

**1.01 SUMMARY**

**A. Section Includes:**

1. Provide door hardware, using Hardware Groups located at end of this Section as a guide, for the following:
  - a. Flush Solid Core Wood Doors
2. Provide door hardware which may not be specified in Hardware Groups, but is noted to be provided under Part 2 of this Section; or not noted, but is required to provide the noted hardware for a complete door installation.
3. Provide required accessories and components to properly install door hardware specified for each door application.
4. Provide fasteners to secure finish hardware in place which are appropriate for application or substrate being anchored to.
5. Where items of hardware not definitely or correctly specified are required for completion of the work, submit a statement of such omission, error or other discrepancy to the Architect. Submit such statement not less than the specified number of days before date for receipt of bids, requesting that clarification be issued by Addendum. If a request for clarification is not submitted, furnish such items in type and quality established by this Specification as appropriate for the service intended. Furnish items which will comply with requirements of authorities having jurisdiction if such requirements are more stringent than those specified, as approved by Architect.
6. Unless otherwise indicated, provide products of only one manufacturer for each type of hardware.
7. Construction Locking: Provide construction cores and keys as specified.

**B. Related Sections:**

1. Section 02 41 19: Removal of hardware, from doors being removed and not being reused, to be retained by Owner
2. Section 06 20 00: Installation of hardware for doors
3. Section 08 11 13: Steel (hollow metal) Frames
4. Section 08 14 16: Flush Solid Core Wood Doors

- C. Related Work:** Owner will furnish, key, and install permanent interchangeable cores in locks and will return construction locking cores and keys to Contractor.

**1.02 SUBMITTALS**

- A. **General Requirements:** Provide submittals in accordance with Section 01 33 00.
- B. **Hardware Schedule:**
  - 1. Promptly after award of a contract for supply of hardware, submit for review, electronic copies of a detailed, vertical type Hardware Schedule. A horizontal type Hardware Schedule is not acceptable.
    - a. Itemize hardware in the Hardware Schedule in the same sequence and format established by the Hardware Groups located at the end of this Section.
    - b. List and describe each opening separately, including door numbers, room designations, degree of swing, and hand.
    - c. List related details, including dimensions, door and frame material, and other conditions affecting hardware.
    - d. List hardware items, including manufacturer's name, quantity, product name, catalog number, size, finish, attachments, and related details where applicable.
  - 2. Resubmit corrected Hardware Schedule when required to resubmit schedule.
- C. **Manufacturer's Literature:** Submit (1) copy of manufacturer's literature for hardware items intended to be furnished.
- D. **Templates:**
  - 1. Hardware Supplier shall provide necessary templates, or physical hardware item, to trades requiring them in order that they may cut, reinforce or otherwise prepare their material or product to receive hardware item.
  - 2. If physical hardware item is required by a manufacturer, Hardware Supplier shall ship such hardware via prepaid freight in sufficient time, as coordinated with manufacturer requiring hardware item, to prevent delay in execution of Project Work.
- E. **American National Standards Institute (ANSI) Requirements:** If requested by Architect, each hardware manufacturer shall issue a letter of compliance which states that products furnished meet ANSI Standards and that they have been tested and are of grades required for this Project.
- F. **Contract Closeout Submittals:** Submit in accordance with Section 01 78 00.
  - 1. **Operation and Maintenance Data:** Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

**1.03 QUALITY ASSURANCE**

- A. **Hardware Supplier's Qualifications:** Company specializing in the supply of door hardware, approved by each hardware item manufacturer, having not less than 5 years experience and having an Architectural Hardware Consultant to properly handle, detail, and service hardware in a satisfactory manner.
- B. **Hardware Manufacturer Qualifications:** Companies specializing in manufacturing door hardware with not less than 5 years experience.
- C. **Regulatory Requirements:** In accordance with requirements of regulatory authorities having jurisdiction.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. **Packing and Shipping:** Properly package hardware items, including hardware fastening materials, to protect them against damage during shipping.
- B. **Marking of Materials:** Mark packaging for each hardware item with appropriate heading and door number in accordance with final Hardware Schedule.
- C. **Acceptance at Site:** Verify hardware items, including fastening material types, and quantities at the time of delivery.
- D. **Storage and Protection:** Provide secure storage space to protect against loss and damage.

**PART 2 - PRODUCTS**

**2.01 HINGES**

- A. **Acceptable Manufacturers:** As follows or approved equal:

	<u>Bommer</u>	<u>Hager</u>	<u>McKinney</u>	<u>Stanley</u>
1. Type 3	BB5000	BB1279	TA2714	FBB179

- B. **Regulatory Specifications and Standards:**

- 1. Type 3: ANSI A8112

- C. **Description:**

- 1. Type 3: Full mortise, 5-knuckle ball bearing, standard weight, 0.134 gauge for 4 1/2 inch by 4 1/2 inch, steel with steel pin.

- D. **Hinge Pin Tip Style:** Flat button type.

- E. **Hinge Quantities, Sizes, and Types By Location:** As specified in the Hardware Groups.

## **2.02 CYLINDRICAL LOCKSETS AND LATCHSETS**

### **A. General:**

1. Heavy duty traffic cylindrical lever locksets meeting requirements of ANSI/BHMA A156.2, Series 4000, Grade 1, and ANSI A117.1 Accessibility Code.
2. Lock chassis to accommodate 1 3/4 inch to 2 1/2 inch door thickness.
3. Lockset to be non-handed.
4. Lockset to have separate anti-rotation through-bolts with no exposed mounting screws.
5. Levers to be solid cast with no plastic inserts.
6. Levers to operate independently with separate return springs.
7. Backset to be 2 3/4 inches.
8. UL listed.

### **B. Acceptable Manufacturers:** As follows, no substitutions:

1. Schlage Commercial Lock Division, by Allegion plc, ND Series
  - a. Lever Design: Sparta, Curved Return

### **C. Lock Functions:** As noted in Door Hardware Schedule.

### **D. Strikes:**

1. Furnish sufficient lip length of strike plates to project beyond, but by not more than 1/8 inch beyond, face of frame or face of inactive door leaf at a pair of doors.
2. Furnish box type strikes.
3. Furnish ANSI A115.2 strikes for hollow metal doors.

## **2.03 LOCK CYLINDERS AND HOUSINGS**

### **A. General:** Cylinders to be tubular type, constructed of brass, bronze, stainless steel or nickel silver.

### **B. Lock Cylinders and Housings:** BHMA/ANSI A156.5, Grade 1:

1. Cylinder/SFIC Housing: Best Access Systems or Schlage, and shall accept Best 7-pin, Small Format Interchangeable Core (SFIC).
  - a. Contractor to furnish and install cylinders/housings where applicable, and where not noted, but required.

**C. Construction Cores:**

1. Provide construction cores (during construction period) that are replaceable by permanent cores.
2. Construction cores shall not be part of Owner's permanent keying system.
3. Provide construction master keys as directed by Contractor.

**D. Cores By Owner:** Owner will furnish and install keyed cores for all doors.

**2.04 EXIT DEVICES AND AUXILIARY ITEMS**

**A. Acceptable Manufacturers:**

1. The following Exit Device is the basis of design:
  - a. Von Duprin, Inc., Indianapolis, IN, 99 Series
2. The following Exit Device is an acceptable alternate manufacturer:
  - a. Precision Hardware, Inc., dorma/KABA, APEX 2000 Series

**B. Reference Standards:** Exit devices shall meet requirements of following standards:

1. ANSI A156.3, 1984, Grade 1
2. UL Listed For Accident Hazard and Fire Exit Hardware
3. NFPA 101, Life Safety Code, Chapter 5 - Means of Egress
4. UL Listed For Safety Requirements and Listed For Fire Rated Doors

**C. General Design and Fabrication Requirements:**

1. Latch Bolt Deadlocking
2. Non-Handed
3. Field Sizeable
4. Minimum 3/4 Inch Throw for Latch Bolt
5. Touch pad in dogged position shall not extend beyond end cap assembly.
6. End cap assembly shall not protrude beyond face.
7. Provide manufacturer's standard strike.
8. Provide concealed vertical cable exit devices, less bottom latch, unless otherwise noted in Hardware Schedule.

**D. Lever Trim:**

1. Type: Von Duprin Breakaway Lever Trim, Series 996L
2. Operation: When unlocked, unit operates as a normal lever trim. When locked, lever feels locked, but will break to 90-degree down position when more than 35 pounds of torque is applied. When 65 pounds of torque or more is applied beyond initial breakaway of the lever, an easily replaced shear pin breaks.
3. Lever Style: Selected by Architect, to match existing, adjacent doors.

**E. Dogging:** Keyed cylinder type, with key cylinder furnished under this Section.

## 2.05 SURFACE CLOSERS

A. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows, no substitutions:

1. LCN Closers, 4040XP Series

B. **General Requirements:**

1. Description: Closers to be non-handed and non-sized, with 2-inch maximum case projection, non-ferrous covers, and separate adjusting valves for latching speed, closing speed, and back check.
2. Closers For Wide Doors: Equip closers for doors over 36 inches wide with coil spring power adjustment of 50 percent, plus reversible foot to increase latching power and 70-degree adjustable back check.
3. Closer Accessories:
  - a. Furnish parallel arms, corner brackets, drop plates, and other accessory items required by each separate installation location condition.
  - b. Furnish hold-open type arms when indicated in Hardware Groups.
4. Door Swing: Where wall and door frame conditions permit, furnish closers that will allow door to swing 180 degrees.
5. Closer Location: Furnish closer type for mounting on push side of door, unless otherwise indicated in Hardware Groups.
6. Closer Arm: Furnish heavy duty type; Extra Duty Arm (EDA) by LCN or equal by other acceptable closer manufacturer.
  - a. Where closer is installed on a door also having a surface mounted overhead stop, furnish shoe, bent closer arm, and spacers/fillers as necessary to accommodate hardware and door frame conditions.

## 2.06 DOOR STOPS AND HOLDERS

A. **General Requirements:** Unless otherwise indicated in Hardware Groups, furnish wall mounted bumpers to stop each door leaf. If a wall bumper type stop is not applicable, furnish overhead door stop or wall stop, as indicated in Hardware Groups or required to stop door.

B. **Wall Bumper - Wrought Aluminum Base, Concave Rubber Bumper:**

1. Acceptable Manufacturers: As follows or approved equal:
  - a. Burns Manufacturing, Inc., No. 575
  - b. Hager Companies, No. 236W and 237W
  - c. Ives, No. WS406/407 CCV
2. Description: Wrought aluminum base, concave rubber bumper, concealed attachment. Furnish appropriate method of fastening bumper as dictated by wall construction to receive wall bumper.

**2.07 PROTECTIVE TRIM**

**A. Kick Plates:**

1. Acceptable Manufacturers: As follows or approved equal:
  - a. Burns Manufacturing, Inc., Kick Plates
  - b. Hager Companies, No. 193S
  - c. Hiawatha, Inc., Kick Plates
  - d. Ives, Equivalent Product
2. Description: 16 B and S gauge (0.050 inch thick) stainless steel, square corners, bevel all 4 edges, with countersunk fastener holes.
3. Size: 10 inches high by 2 inches less than door width (LDW).

**2.08 HARDWARE FINISHES**

**A. Finish For Door Hardware:**

- |                                       |                                       |
|---------------------------------------|---------------------------------------|
| 1. Butt Hinges:                       | US26D                                 |
| 2. Locksets and Latchsets             | US26D                                 |
| 3. Closers                            | ALUM Powder Coat (Aluminum; BHMA 689) |
| 4. Exit Devices                       | US26D, With US32D Push Bar            |
| 5. Wall Bumpers                       | US28                                  |
| 6. Kick Plates                        | US32D                                 |
| 7. Misc. (Unless Otherwise Indicated) | US26D                                 |

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

- A. **General Requirements:** Refer to Section 06 20 00 for hardware installation requirements.

**3.02 HARDWARE GROUPS**

- A. **General Requirements:** Hardware Groups listed are considered to be a guide only for use by hardware supplier in preparing a Hardware Schedule.
- B. **Conflicts:** Furnish hardware for doors indicated on Drawings and Door Schedules, but not included in a Hardware Group. Furnish hardware appropriate for door location, function, size, weight, and label requirements.

**\*\*\* REFER TO FOLLOWING FOR HARDWARE GROUPS \*\*\***

**SECTION 08 71 00**

**GROUP 1**

Door(s): **135B, 135C**

<u>Item</u>	<u>Quantity</u>	<u>Manufacturer</u>	<u>Model</u>
Hinge	3	Hager	BB1279 4 1/2 x 4 1/2
Lockset	1	Schlage	ND70BD
Wall Bumper	1	Ives	WS406/407 CCV

***Hardware Group 1 Revised in Addendum No. 3***

**GROUP 2**

Door(s): 133

<u>Item</u>	<u>Quantity</u>	<u>Manufacturer</u>	<u>Model</u>
Hinge	3	Hager	BB1279 4 1/2 x 4 1/2
Exit Device	1	Von Duprin	CD99L
Cylinder - Locking	1		
Cylinder - Dogging	1		
Closer	1	LCN	P4040XP-CUSH
Kick Plate	1	Hiawatha	10" x 2" LDW

***Hardware Group 2 deleted in Addendum No. 3***

**GROUP 3**

Door(s): 134, 134B

<u>Item</u>	<u>Quantity</u>	<u>Manufacturer</u>	<u>Model</u>
Hinge	Existing to Remain		
Lockset	Existing to Remain		
Wall Bumper	1	Ives	WS406/407 CCV

Notes:

1. Relocate existing doors, frames, and hardware, except provide new hardware as scheduled.

***Hardware Group 3 Revised in Addendum No. 3***

**END OF SECTION**



**SECTION 08 81 10**

**INTERIOR GLAZING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

**A. Section Includes:**

1. Provide glass and glazing noted at interior Wood Doors *and hollow metal framed openings.*  
  
*Subparagraph 1 revised in Addendum No. 3*
2. Provide 1/4-inch clear tempered glass (GL1) for interior glazed openings, except where other glass types are noted.
3. Provide materials for proper setting and glazing of glass materials provided under this Section.

**B. Related Sections:**

1. Section 08 14 16: Flush Solid Core Wood Doors.

**1.02 REFERENCES**

- A. **American National Standards Institute (ANSI):** ANSI Z97.1, Safety Performance Specifications and Methods of Testing For Safety Glazing Used in Buildings
- B. **American Society for Testing and Materials (ASTM):**
  1. ASTM C1036, Flat Glass
  2. ASTM C1048, Heat-Treated Flat Glass - Kind FT Coated and Uncoated Glass
  3. Insulating Glass Unit Performance and Evaluation: ASTM E2190
- C. **Consumer Products Safety Commission (CPSC):** CPSC16CFR1201, Safety Standard For Architectural Glazing Materials

**1.03 QUALITY ASSURANCE**

- A. **Glazing Standards:** In accordance with requirements of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual", except where more stringent requirements are indicated.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. **Protection:** Protect glass and glazing materials during delivery, storage, and handling in accordance with manufacturer's directions and as required to prevent edge damage to glass and damage to glass and glazing materials from effects of moisture, including condensation, temperature changes, direct exposure to sun, and from other causes.

**PART 2 - PRODUCTS**

**2.01 GLAZING PRODUCTS**

**A. Applicable Standards For Glass Materials:**

1. Flat Glass Standard: ASTM C1036
2. Tempered Glass Standard (FT): ASTM C1048
3. Insulating Glass Unit Performance and Evaluation: ASTM E2190

**B. 1/4-Inch Clear Tempered Glass (GL-1):**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Viracon, Inc., Owatonna, MN
  - b. Oldcastle Glass , Albertville, MN
  - c. PPG Industries, Inc., Pittsburgh, PA
  - d. Guardian Industries Corporation, Northville, MI
2. Description: Tempered glass shall be 1/4-inch thick clear float tempered safety glass meeting requirements of ASTM C1048 (FT). Flat Polish Exposed edges of butt glazed glass.

**2.02 GLAZING MATERIALS**

**A. Glazing Tape:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. 3-M, No. 1202
  - b. PPG Industries, No. 1072
  - c. Parr, "Alumilastic"
  - d. Tremco Glazing Systems, No. 440
2. Description:
  - a. Tape to be pre-shimmed of color as selected by Architect.
  - b. Tape to be molded around continuous non-stretchable strands to prevent stretching and tape distortion.

**B. Setting Blocks:** Neoprene of 70 to 90 durometer hardness.

**PART 3 - EXECUTION**

**3.01 PREPARATION**

- A. General Requirements:** Surfaces shall be clean, dry, and free of frost.
- B. Metal:** Clean surfaces in accordance with tape manufacturer's directions.
- C. Wood:** Surfaces to be finished before start of glazing.

**3.02 INSTALLATION**

**A. General Installation Requirements:**

1. Material: Follow glazing materials manufacturer's recommendations for proper installation.
2. Glazing Tapes: Set horizontally at head and sill first, using full length pieces that will reach entire length of opening. Next set vertical strips at jambs and butt joints tightly.
3. Setting Blocks: Set blocks of proper length and width at quarter points to obtain proper bearing and minimum specified bite.

**B. Glazing Interior Wood and Steel Doors and Frames:**

***Paragraph B revised in Addendum No. 3***

1. Set glass on setting blocks and glaze by using glazing tape continuous on both faces of glass.
2. Glazing tape shall hold glass secure, prevent rattle, be neatly cut at corners, and present a neatly filled space which is flush with top of stop.

**3.03 CLEANING AND PROTECTION**

**A. General Requirements:**

1. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass or other methods as needed. Do not apply markers to glass surface. Remove non-permanent labels from glass and clean surfaces.
2. Protect glass from contact with contaminating substances resulting from construction operations. If contaminants do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
3. Examine glass surfaces at frequent intervals during construction for build-up of dirt, scum, alkaline deposits, stains, or other contaminants. Remove as recommended in writing by glass manufacturer.
4. Remove and replace glass that is broken, chipped, cracked, or abraded, or that is damaged from natural causes, accidents, and vandalism, during construction period.

**END OF SECTION**

**SECTION 09 21 16**

**GYPSUM BOARD ASSEMBLIES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

**A. Section Includes:**

1. Provide light-gauge steel stud framing that is 20 gauge and lighter, which is associated with gypsum drywall work.
2. Provide components for supporting furring, bracing, and suspending gypsum drywall panels, including but not limited to hanger wire, steel carrying channels, furring channels, and resilient channels.
3. Provide gypsum board, where noted for interior applications and related finishing, to provide a suitable surface to receive final finish, to include the following:
  - a. Abuse Resistant Gypsum Board: Provide abuse resistant gypsum board for all wall surfaces which are exposed.
  - b. Regular Gypsum Board: Provide regular gypsum board where gypsum board is noted on Drawings, unless otherwise indicated or specified.
4. Provide sound attenuation insulation material within gypsum board partitions and where partitions terminate at structure above.
5. Provide acoustical sealants associated with gypsum board partitions as specified.
  - a. Refer to Section 07 92 00 and sections in Divisions 21, 22, 23, 26, 27, and 28, for other sealants related to openings through gypsum board surfaced walls.
6. Provide anchorage, fasteners, bracing, and required components for securing gypsum drywall assemblies in place.
7. Provide trim associated with gypsum drywall work.
8. Provide joint finishing for gypsum drywall work.
9. Provide internal wood nailers between steel stud framing or approved equivalent method that will serve as an anchorage base for fixtures, equipment, casework, and items which mount, attach, or anchor to gypsum drywall assemblies. Coordinate locations with parties requiring an anchorage base. Coordinate with Owner for anchorage of items which will be furnished and installed by Owner.
10. Where indicated, adhere abuse resistant gypsum board over concrete masonry unit walls.

**B. Related Sections:**

1. Section 09 91 00: Finish painting of exposed gypsum board surfaces.

**1.02 SUBMITTALS**

- A. **General Requirements:** Provide submittals in accordance with Section 01 33 00.
- B. **Product Data:** Submit for each type of product provided.

**1.03 QUALITY ASSURANCE**

- A. **Single Manufacturer Limitations:** Each type of gypsum board material shall be manufactured by (1) manufacturer and installed by (1) installer who shall be responsible for the finished installation and performance of installed systems.

**1.04 DELIVERY, STORAGE, AND HANDLING**

A. **Packing and Shipping:**

- 1. Deliver materials to site in original, unopened packages with manufacturer's labels intact and legible.
- 2. Handle materials with care to prevent damage. Remove damaged or deteriorated materials from site.

B. **Storage and Protection:**

- 1. Store and protect metal framing in accordance with requirements of AISI "Code of Standard Practice".
- 2. Store materials inside, under cover, stack flat off floor, and keep dry.
- 3. Stack sheet materials to prevent long lengths being placed over short lengths.
- 4. Avoid overloading floor systems.
- 5. Store adhesives and joint treatment materials in dry areas and protect against freezing.

**1.05 PROJECT CONDITIONS**

A. **Environmental Conditions:**

- 1. **Temperature:** In areas receiving gypsum board, maintain temperature range between 55 degrees F and 70 degrees F for not less than (24) hours before, during, and continuous after installation of gypsum board and joint treatment application.
- 2. **Ventilation:**
  - a. Provide ventilation during and following adhesive and joint treatment application.
  - b. Use temporary air circulators in enclosed areas lacking natural ventilation.
  - c. Under slow drying conditions, allow additional drying time between coats of joint treatment.
  - d. Protect installed materials from drafts during hot, dry weather.

## PART 2 - PRODUCTS

### 2.01 GYPSUM BOARD PRODUCTS

- A. **Size:** Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. **Acceptable Manufacturers:** As follows or approved equal unless otherwise indicated for a particular product:
1. CertainTeed Corp
  2. G-P Gypsum Corporation, a Georgia-Pacific Company
  3. National Gypsum Company, Gold Bond® BRAND
  4. United States Gypsum Company
- C. **Regular Gypsum Board:** 5/8 inch thick, unless otherwise indicated on Drawings or specified, in maximum available lengths with ends cut square and tapered edges, in accordance with ASTM C1396.
- D. **Abuse Resistant Gypsum Board:**
1. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
    - a. CertainTeed Corp, ProRoc® Extra Abuse Type X with M2Tech®
    - b. G-P Gypsum Corporation, ToughRock® Fireguard® Abuse Guard® Gypsum Board
    - c. National Gypsum Company, Gold Bond® BRAND Hi-Abuse XP® Gypsum Board Type X With Sporgard™
    - d. United States Gypsum Company, SHEETROCK® Brand Abuse-Resistant Interior Gypsum Panels
    - e. United States Gypsum Company, FIBERROCK® Brand Abuse-Resistant Panels; 5/8-Inch (unless otherwise noted on Drawings or specified), Type FRX-G listed in UL
  2. **Description:** 5/8 inch thick, in maximum available lengths with ends cut square and tapered edges. When tested by an independent lab, in accordance with ASTM C1629, needs to achieved a Level 2 for Surface Abrasion Resistance.

### 2.02 INTERIOR LIGHT-GAUGE STEEL FRAMING

- A. **Stud Framing:** Meeting requirements of ASTM C645, C-channel, roll-formed from hot-dip galvanized steel; in accordance with ASTM A1003 and A653, G40 or equivalent corrosion resistant coating.
1. Provide 20 gauge stud framing where walls will receive abuse resistant, gypsum board.
- B. **Stud Track:** Form from steel sheet in accordance with ASTM A568 with a zinc coated (galvanized) finish in accordance with ASTM A525. Provide in same gauge as studs which track is receiving, of size appropriate for stud width.

### 2.03 METAL FRAMING ACCESSORIES

- A. **Hat-Shaped Furring Member (Screw Furring Channels):** Galvanized steel designed for screw attachment of gypsum wallboard, hat-shaped, 1 1/4-inch face width by 7/8-inch depth.
- B. **Z-Shaped Furring Channels (Z-Furring):** Hot-dip galvanized steel, Z-shaped, 1 1/4-inch wide and 3/4-inch wide flange widths of depth as required to receive thickness of insulation specified or called for on Drawings.
- C. **Hanger and Tie Wire:** Class 1, zinc-coated (galvanized) and low-carbon steel wire in accordance with ASTM A641.
  - 1. Hanger Wire: Not less than 8 gauge.
  - 2. Tie Wire: Not less than 16 gauge.
- D. **Furring Channel Clips:** Preformed galvanized wire used to attach hat-shaped furring members to carrying channels.

### 2.04 GYPSUM BOARD TRIM ACCESSORIES

- A. **General Requirements:** Form trim accessories from zinc-coated (galvanized) sheet steel in accordance with ASTM C1047, unless otherwise indicated.
- B. **Metal Corner Bead:**
  - 1. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
    - a. ClarkDietrich Building Systems, 103 Deluxe® Bead
    - b. National Gypsum Company, "Wallboard Corner Bead"
    - c. United States Gypsum Company, "USG SHEETROCK® Brand 103 Dur-A-Bead"
  - 2. **Description:** Hot-dip galvanized steel with perforated flanges which are the appropriate width for thickness of gypsum board as recommended by manufacturer.
- C. **Metal Casing Bead:**
  - 1. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
    - a. ClarkDietrich Building Systems, Metal Trims M20A and M20B
    - b. National Gypsum Company, "No. 100 Wallboard Casing"
    - c. United States Gypsum Company, "Sheetrock Metal Trim 200-A"
  - 2. **Description:** U-shaped or J-shaped galvanized steel channel casing of appropriate size for thickness of gypsum board.

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**D. Control Joints:**

1. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. ClarkDietrich Building Systems, 093 Control Joint
  - b. United States Gypsum Company, "Sheetrock Zinc Control Joint 093"
2. **Description:** V-shaped roll-formed zinc with removable tape protecting a 1/4-inch wide opening for relief of expansion and contraction stresses in gypsum drywall.

**2.05 FINISHING MATERIALS**

- A. **Joint Compound:** Ready mixed products in accordance with ASTM C475, as manufactured by or approved by the gypsum board product manufacturer.
1. For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
  2. **Embedding and First Coat:** For embedding tape and first coat on joints, fasteners, and trim flanges, use setting type taping compound.
    - a. Use setting type compound for installing paper faced metal trim accessories.
  3. **Fill Coat:** For second coat, use drying type, all purpose compound.
  4. **Finish Coat:** For third coat, use drying type, all purpose compound.
- B. **Joint Reinforcing Tape:** Cross-fibered paper tape with light precreased fold in accordance with ASTM C475.

**2.06 ACOUSTICAL MATERIALS**

**A. Sound Attenuation Insulation (Acoustical Insulation):**

1. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Johns Manville Formaldehyde-Free™ Thermal and Acoustical Fiber Glass Insulation "Unfaced"
  - b. Johns Manville Formaldehyde-Free Fiber Glass Sound Control Insulation for Interior Walls "Unfaced"
  - c. Knauf Insulation, Acoustical EcoBatt or Quietherm Insulation with ECOSE® Technology
  - d. Owens Corning EcoTouch™ Insulation With PureFiber® Technology "Unfaced"
2. **Description:** Paperless, formaldehyde-free, semi-rigid, spun mineral fiber blankets or batts of thickness specified or indicated on Drawings.



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3. Code/Standard Compliance:

- a. In accordance with ASTM C665 Mineral Fiber Insulation Type 1.
- b. Surface Burning Characteristics (Fire Hazard Classification): When tested in accordance with ASTM E84 not more than 25 flame spread or 50 smoke developed.
- c. Non-combustible when tested in accordance with ASTM E136.

**B. Acoustical Sealant:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Hilti, Inc., "CP 506 Smoke and Acoustic Sealant"
  - b. Tremco, Inc., "Acoustical Sealant"
  - c. United States Gypsum Company, SHEETROCK® Brand Acoustical Sealant
2. Description and Performance Requirements: Synthetic rubber base, non-hardening, non-skinning, non-staining, non-bleeding, approved by gypsum board manufacturer for use as an acoustical sealant.

**C. Acoustical Spray:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Hilti, Inc., "CP 572 Smoke and Acoustic Spray"

**D. Pre-Formed Mineral Wool Strips and Plugs:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Hilti, Inc., "CP 767 Pre-Formed Mineral Wool Speed Strips"
  - b. Hilti, Inc., "CP 767 Pre-Formed Mineral Wool Speed Plugs"

**2.07 MISCELLANEOUS MATERIALS**

**A. Fasteners For Interior Gypsum Board:** Type, length, and design as recommended by manufacturer for each application.

1. Screws: In accordance with ASTM C1002.
2. Nails: In accordance with ASTM C514.

**B. Wood Blocking:** Not less than 2 inches nominal thickness, any commercial softwood species, Standard and Better or Stud Grade, fire retardant pressure treated to provide a UL fire hazard classification of not more than 15 or provide ClarkDietrich Building Systems, Danback™ Fire Treated Wood Backing Plate.

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C. **Acoustical Putty Pads:** Provide acoustical putty pads by one of following manufacturers:

1. Specified Technologies Inc. (STI)
2. 3M Fire Protection Products Division
3. W. R. Grace Construction Products
4. Hilti, Inc.

**PART 3 - EXECUTION**

**3.01 PREPARATION**

A. **Protection:** Protect adjacent surfaces from damage and stains caused by work of this Section.

**3.02 GENERAL INSTALLATION REQUIREMENTS**

A. **General Requirements:**

1. **Installation and Finishing Standards:** Install and finish gypsum board materials in accordance with ASTM C840 and latest printed directions of gypsum board system manufacturer.
2. **Wet Gypsum Board:** Remove gypsum board which becomes damp or wet during construction or which after installation shows evidence of having been damp or wet and install new as directed by Architect.
3. **Isolation of Gypsum Board:**
  - a. Maintain a 1/4-inch wide space between edges of gypsum board and masonry.
  - b. Maintain a 1/2-inch wide space between edges of gypsum board and concrete.
4. **Workmanship:** Finished partitions shall be plumb, neat in appearance, and free from defects, with horizontal lines level.

B. **Description of Gypsum Board Surfaced Steel Stud Partitions:** Unless otherwise indicated on Drawings.

1. **Non-Fire Rated Non-Acoustic Partitions:** Single layer of 5/8-inch gypsum board, of type specified for location, applied on 3 5/8-inch wide steel stud framing, or other width framing as indicated on Drawings, spaced 16 inches on center.
2. **Non-Fire Rated Acoustic Partitions:** Single layer of 5/8-inch gypsum board, of type specified for location, applied on each side of 3 5/8-inch wide steel studs, or other width studs as indicated on Drawings, spaced 16 inches on center, with sound attenuation blanket insulation filling entire space between studs for full height of the partition, from floor to underside of building structure.

C. **Termination at Top of Partitions:**

1. Run stud framed partitions from floor to underside of roof deck and floor structure as applicable.
  - a. Frame around building structural elements which are present, and mechanical and electrical amenities that interfere with continuation of framing.

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2. Install gypsum board full height, to underside of roof deck and floor structure, on both sides of partitions, unless otherwise indicated.
  3. Seal joint between top of metal stud framed partitions and building structure above with acoustical insulation, sealant or other type of filler approved by Architect to impede sound transfer as determined by conditions and code requirements.
- D. **Locations of Joints in Gypsum Drywall Work:** Install gypsum board that will minimize number of end joints.
- E. **Maintaining Acoustical Performance of Wall Assemblies:**
1. Provide sound attenuation blanket (acoustical insulation) between stud framing for partitions from floor to underside of roof deck and floor structure as applicable. Fill stud cavities with acoustical insulation so no voids exist.
  2. Where structural members (beams, joists, and similar components), mechanical elements (ducts, piping, and other items), and electrical elements (conduit, wiring, and other items) penetrate a steel stud/gypsum drywall partition, frame around penetrating element as close as practical with steel stud framing and gypsum drywall. Fill voids between framing and penetrating elements solid with acoustical insulation, and spray surface of insulation with acoustical spray or seal with acoustical sealant on both sides as applicable.
  3. Where steel stud/gypsum drywall partitions terminate at underside of steel deck, fill voids of deck flutes with pre-formed mineral wool strips and plugs or acoustical insulation and apply acoustical spray on both sides.
  4. Isolate drywall construction from abutting concrete, masonry, and other dissimilar product surfaces.
    - a. Provide metal edge trim on edge of gypsum board where joint is exposed, as recommended by gypsum board system manufacturer.
  5. Acoustical Putty Pads: Install putty pads on electrical boxes in walls with sound attenuation batts in stud cavities.
  6. Acoustical Sealant Installation:
    - a. Using acoustical sealant, thoroughly seal cracks and openings, including those at wall, ceiling, and floor joints, and around electrical outlet boxes and other wall openings and penetrations, for a complete installation consistent with wall sound transmission loss requirements.
      - 1) Do not place openings back-to-back on opposite faces of wall. Stagger openings, such as electrical devices, sufficiently between stud spaces.

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- b. Provide (3) continuous caulking beads in each of the following locations:
  - 1) Between bottom stud tracks and floor structure.
  - 2) Between top track and building structure, where partition is noted to extend to structure above.
  - 3) Where a stud abuts a dissimilar metal material or abuts concrete or masonry.
- c. Provide a continuous caulking bead between edge of gypsum board and abutting adjacent building materials.

**F. Inspection of Cavities and Chases:**

- 1. Remove debris and foreign materials from cavities and chases prior to inspection by Architect and enclosure.
- 2. Do not apply gypsum board which encloses cavities and chases, until after cavities, chases, and utility services within have been inspected by Architect.
- 3. Installation of gypsum board which encloses a cavity or chase without first allowing inspection by Architect will result in gypsum board installer being required to remove a sufficient portion of installed gypsum board to allow for an inspection and then provide related patching at their expense.

**3.03 INSTALLATION OF STEEL STUD FRAMING**

**A. General Steel Stud Framing Installation:**

- 1. Install steel stud framing in accordance with ASTM C754 and C840 requirements that apply to framing installation, unless otherwise indicated.
- 2. Installation of Tracks/Channels: Anchor at floor and to structural elements at top with suitable fasteners.
  - a. Locate anchors at floor 2 inches from each end and spaced not more than 24 inches on center.
- 3. Stud Framing Installation:
  - a. Placing: Position studs vertically, engaging floor and top tracks/channels, spaced not over 16 inches on center, unless otherwise noted.
    - 1) Place studs in direct contact with hollow metal frame jambs, abutting partitions, partition corners, and construction elements.
  - b. Splicing: Where required, splice studs with 8-inch nested lap and one positive attachment per stud flange. Avoid splicing wherever possible.
  - c. Stud Anchorage: Anchor studs to track/channel flanges with screws.

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4. Bracing: Provide horizontal bracing within steel stud framed partitions as follows:
  - 1) 0 to 10-Foot Height: (1) Row at Center Span
5. Fixture and Equipment Attachment:
  - a. Provide fire retardant treated 2-inch by 4-inch wood blocking, or heavier if required, between studs as indicated on Drawings and as necessary to provide suitable anchorage for fixtures, equipment, and furnishings which anchor into or hang from steel stud framed partitions.
    - 1) For anchorage of base cabinet casework only, to adjacent metal stud framed walls, Contractor has option to provide continuous 6-inch wide strips of 16 gauge galvanized steel sheet fastened to face of steel studs as coordinated with casework installer.
  - b. Coordinate proper location, type, and sizes for blocking with manufacturer, supplier or installer of items requiring anchorage.
  - c. Refer to Drawings and coordinate with Owner for Owner furnished or provided items which anchor to walls, and coordinate with manufacturer, supplier or installer of items requiring anchorage for proper location for blocking.

**3.04 GENERAL GYPSUM BOARD INSTALLATION**

- A. **Single Layer Non-Fire Rated Application:** For parallel or vertical application of gypsum board, fasten panels to steel framing using 1-inch Type S screws spaced 12 inches on center at edges and in field of panel.

**3.05 INSTALLATION OF WALLBOARD DIRECT TO MASONRY WALLS**

- A. **General Requirements:** Install where noted on Drawings.
- B. **Adhesive:** As recommended by gypsum board manufacturer.
- C. **Environmental Requirements:** Maintain room temperature uniformly between 50 degrees F and 70 degrees F during application and until adhesive has thoroughly dried or set.
- D. **Substrate Requirements:**
  1. Substrate shall be dry and free of dust, loose particles, oil, grease, and other foreign materials.
  2. Surfaces shall be plumb, straight, and in one plane.
  3. Wherever an existing wall surface to receive direct applied gypsum wallboard has a painted finish, mechanically sand surface to remove the greatest portion of painted surface to expose substrate. Thoroughly clean wall surface to provide for suitable adhesion of adhesive.
  4. Test adhesive to each substrate condition before starting installation.

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**E. Gypsum Board Panel Installation:**

1. Application of Adhesive: Apply 2-inch to 2 1/2-inch diameter daubs of adhesive 1/2 inch thick, 16 inches on center in both directions. Provide a row of adhesive daubs a maximum of 2 inches from edges of panels. Do not apply more adhesive to wall surface than can be covered with gypsum board within (15) minutes.
2. Relief at Floor: Provide 1/2-inch space between floor and gypsum board to prevent potential wicking of moisture.
3. Installing Gypsum Board Panels: Hand press each panel tight to wall making certain that daubs are in positive contact with panel. If necessary provide temporary support for panels by using concrete nails driven through a small block of nominal 1-inch lumber. Provide additional nails if required to hold panels straight, plumb, and in alignment. Remove nails after adhesive is dry.
4. Provide bugle head screws spaced 24 inches on center.
5. Joints: Butt panels tight to each previously positioned panel to ensure flush joints.
6. Finishing: Fill fastener holes and finish joints with tape and joint compound.

**3.06 ACCESSORY INSTALLATION**

**A. General Requirements:**

1. Install accessories in accordance with manufacturer's recommendations.
2. Treat metal accessories with not less than (2) coats of joint compound in the same manner as joints. Feather joint compound out from 8 to 10 inches on both sides of corners.
3. Install corner beads at external corners. Use longest practical lengths. Neatly fit and secure corner beads over external corners.
4. Install metal trim where gypsum board abutts dissimilar materials, and at other locations indicated, unless detailed otherwise.

**B. Control Joints:** Unless otherwise indicated, provide control joints in gypsum board surfaces at the following locations:

1. At edges of gypsum board surfaces where they abut dissimilar material surfaces, using casing bead, except at floors where a base will be installed over the joint.
2. Where a building expansion or control joint occurs.
3. Where support framing, furring, or suspension system changes direction.
4. Wall/Partition Control Joints:
  - a. Locate at not more than 30 feet in either direction.
  - b. Vertically from both corners of less than ceiling height openings to ceiling from door frames; to floor and to ceiling from borrowed light (window) frames, and similar openings.

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5. Maximum permitted area of gypsum board surface without a control joint is 2,500 square feet when there is relief at area perimeter or 900 square feet when there is no relief.

**3.07 FINISHING GYPSUM BOARD**

**A. General Requirements:**

1. Finishing shall include taping and finishing joints with joint compound and filling depressions.
2. Sand after application of final joint treatment coat and leave surface smooth and ready for finishing Work by other trades.

**B. Mixing Joint Compound:** Mix compound in accordance with manufacturer's instructions.

**C. Taping Joints:**

1. Center tape over joint and embed in sufficient amount of compound under tape to provide proper bond.
2. Apply not less than (2) coats of compound over tape and feather out at edges.

**D. Taping Inside Corners:**

1. Reinforce inside corner angles with tape folded to conform to angle and embed in joint compound.
2. Coat inside corners with not less than (1) coat of compound and feather out at edges.

**E. Screw Head Dimples:** Apply (3) coats of compound at screw head dimples, sand, and feather out all around.

**F. Flanges of Corner Bead:** Apply not less than (3) coats of compound at flanges of corner bead and feather out from 8 to 10 inches on both sides from exposed metal nose of flange.

**G. Finish of Interior Gypsum Board Work:** At joints and interior angles, embed tape in joint compound with three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Apply joint compound smooth and free of tool marks and ridges.

**H. Finish Levels in Interior Gypsum Board Work:** Finish levels specified below are as defined in Document GA-214 published by the Gypsum Association. All finish levels may not apply to this Project.

1. Level 0: No taping, finishing, or accessories required.
  - a. Use above suspended ceilings and within concealed spaces, unless the assembly is fire rated, sound rated, sound or smoke controlled, or the space serves as a mechanical system air plenum.
2. Level 1: At joints and interior angles embed tape in joint compound. Leave surface free of excess joint compound. Tool marks and ridges are acceptable.
  - a. Use where gypsum wallboard is not exposed and is a part of a sound controlled assembly with acoustical insulation.

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3. Level 3: At joints and interior angles embed tape in joint compound with (2) separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Apply joint compound smooth and free of tool marks and ridges.
  - a. Use where gypsum board is a base for FRL Panels specified under Section 06 40 25.
4. Level 4: At joints and interior angles embed tape in joint compound with (3) separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. Apply joint compound smooth and free of tool marks and ridges.
  - a. Use where gypsum wallboard is exposed and is to receive a painted finish.

**3.08 CLEANING**

**A. General Requirements:**

1. Remove debris, waste, and rubbish resulting from gypsum wallboard work from work areas on a daily basis and from site on a regular basis.
2. Remove spackling debris from adjacent wall and floor surfaces in work areas upon completion of work.
3. Broom clean work areas upon completion of work in a given area, as work progresses.

**END OF SECTION**



TILING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Provide tile work indicated on Drawings, as specified and as follows:
  - a. **PCT** Wall Base Tile, located at base of benches, or elsewhere indicated or required. Patch to match existing.
  - b. **CT** Corridor Wall Tile, located at benches, or elsewhere indicated or required. Patch to match existing.

***Subparagraphs a. and b. revised in Addendum No. 3***

2. Provide mortar setting materials for tile installation.
3. Provide tile grouting for tile installation.
4. Provide waterproof membrane and crack isolation system:
  - a. Over movement joints (expansion joints, control joints, construction joints, and other movement type joints; and
  - b. Provide at other locations, as required or recommended by product manufacturers, in order to achieve a complete installation, which will meet the specified warranty.
5. Provide sealants related to tile systems.
6. Prepare substrate to receive new tile as follows: Provide proper preparation of substrate surface to provide complete bonding of new tile setting mortar or waterproofing membrane system.
7. ***Provide sealants related to tile systems.***
  - a. ***Exposed Vertical Edges of Tile***
  - b. ***Exposed Horizontal Edges of Tile***
  - c. ***Outside Corners; where tile on both sides of corner***

***Paragraph 7 added in Addendum No. 3***

1.02 DEFINITIONS

- A. **General:** Definitions in ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. **Caliber Range:** An acceptable size range for tiles to be used in the same installation.
- C. **Calibrated Tile:** Tiles that have been sorted to meet a manufacturer's stated caliber range.
- D. **Large Format Tile:** Tile which has a dimension which is 12 inches or greater.

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- E. **Porcelain Tile:** A ceramic tile that has a water absorption of 0.5 percent or less that is generally made by the pressed or extruded method. Does not include materials with very little or no crystallinity, such as glass tile (Class P1, E1, or O1).
- F. **Module Size:** Actual tile size plus joint width indicated.
- G. **Face Size:** Actual tile size, excluding spacer lugs.

**1.03 SUBMITTALS**

- A. **General Requirements:** Provide submittals in accordance with Section 01 33 00.
- B. **Product Data:** Submit manufacturer's Product Data and installation instructions for each product provided.
- C. **Samples For Initial Selection:**
  - 1. **Tile Samples:** Submit samples of tiles specified to Architect, as soon as possible, for color selection.
  - 2. **Sealant Samples:** Submit (2) copies of sealant manufacturer's color samples for each type of sealant, for color selection.
- D. **Warranty:** Submit a copy of warranty.

**1.04 QUALITY ASSURANCE**

- A. **Source Limitation Tile:**
  - 1. Obtain tile of each type and color or finish from one source or producer.
  - 2. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. **Source Limitations for Setting and Grouting Materials:** Underlayment, waterproofing/crack isolation membrane, setting materials, and grouting materials for tiling shall be by same manufacturer.
- C. **Installer Qualifications:** Company specializing in the installation of tile and having the experience in installing the products and work specified within this Section. Installing Contractor shall be prepared to provide documented experience with installations of similar scope, materials and design.
- D. **Pre-Installation Conference:**
  - 1. Prior to commencing tiling work, arrange and conduct a Pre-Installation Conference on-site to discuss conformance with the requirements of the Specification and site conditions.
  - 2. Representatives for the Owner, Architect, Contractor, tile installer, tile manufacturer, installation system manufacturer, and other parties who may be affected by tiling work should attend.

**1.05 DELIVERY, STORAGE, AND HANDLING**

**A. Packing and Shipping:**

1. Deliver materials in manufacturer's original sealed containers with labels legible and intact, identifying brand name and contents.
2. Meet requirements of ANSI A137.1 for labeling tile packages.

**B. Storage and Protection:**

1. Store tile and cementitious materials on elevated platforms, in a dry location, under cover, in a manner to prevent damage or contamination.
2. Store liquid materials in unopened containers and protect from freezing.

**1.06 PROJECT CONDITIONS**

- A. Environmental Limitations:** Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at levels indicated in referenced standards and manufacturer's written instructions for products being installed.

**1.07 WARRANTY**

- A. Contractor Warranty:** Contractor warrants the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for a minimum period of 5 years.

**B. Manufacturer Warranty:**

1. Manufacturer of adhesives, mortars, grouts, and other installation materials shall provide a written warranty of minimum 25 years, which covers materials and labor.
2. Manufacturer of installation products shall warrant that installation system, for a minimum period of 25 years (effective from date of Substantial Completion):
  - a. Will not transfer cracks from substrate when subjected to in-plane movement of cracks up to 1/8 inch;
  - b. Will not allow water intrusion to the membrane; and
  - c. Will maintain bond between tile and approved substrate, under normal use.

**1.08 MAINTENANCE MATERIALS**

**A. General Requirements:**

1. Furnish to Owner, not less than 3 percent of total of each type, size, and color of tile and trim units installed.
2. Neatly package and clearly label extra materials for storage.

**PART 2 - PRODUCTS**

**2.01 PRODUCTS - GENERAL**

- A. **ANSI Ceramic Tile Standard:** Provide tile that meets requirements of ANSI A137.1 for types, compositions, and other characteristics indicated.
  - 1. Provide tile in accordance with standard grade requirements unless otherwise indicated.
- B. **ANSI Standards for Tile Installation Materials:** Provide materials in accordance with ANSI A108.02, ANSI standards referenced in this Section, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. **Factory Blending:** For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from (1) package show same range in colors as those taken from other packages and match approved samples.

**2.02 PORCELAIN CERAMIC TILE**

- A. **General:** If porcelain is part of a pattern, verify when ordering tile that the calibers will work together.
- B. **Applicable Standard:** ANSI A137.1, Ceramic Tile
- C. **Porcelain Ceramic Tile (Wall Base Tile):**
  - 1. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows, no substitutions:
    - a. Crossville, "Shades", Distributed by Virginia Tile
  - 2. **Size:** 6 inch by 24 inch.
  - 3. **Color Selection:** As selected by Architect

**2.03 CERAMIC TILE**

- A. **Applicable Standard:** *ANSI A137.1., Ceramic Tile*
- B. **Ceramic Tile (Corridor Wall Tile):**
  - 1. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows, no substitutions:
    - a. Dal Tile, Color Wheel Linear
  - 2. **Size:** 4 inch by 16
  - 3. **Color Selection:** As selected by Architect

**Article 2.03 added in Addendum No. 3**

**2.04 INSTALLATION SYSTEM MATERIALS**

- A. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
1. Custom Building Products:
    - a. Waterproofing/Crack Isolation Membrane, ANSI A118.10: RedGuard Waterproofing and Crack Prevention Membrane
    - b. Thin-Set Mortar, ANSI A118.4: MegaFlex Crack Prevention Mortar
    - c. Medium Bed Mortar, ANSI A118.4: ProLite Tile and Stone Mortar
    - d. Non-Sag Mortar Medium Bed Mortar, ANSI A118.15: ProLite Tile and Stone Mortar
    - e. Polymer Modified Unsanded Grout, ANSI A118.7: Prism Grout
  2. Laticrete International, Inc.:
    - a. Waterproofing/Crack Isolation Membrane, ANSI A118.10: LATICRETE® Hydro Ban™
    - b. Thin-Set Mortar, ANSI A118.4: 4-XLT
    - c. Medium Bed Mortar, ANSI A118.4: 4-XLT or 255 MultiMax
    - d. Non-Sag Mortar Medium Bed Mortar, ANSI A118.15: 254 Platinum
    - e. Polymer Modified Unsanded Grout, ANSI A118.7: PermaColor™
  3. Mapei Corporation:
    - a. Waterproofing/Crack Isolation Membrane, ANSI A118.10: Mapelastic™ AquaDefense
    - b. Thin-Set Mortar, ANSI A118.4: Ultraflex 3
    - c. Medium Bed Mortar, ANSI A118.4: Kerabond T/Keralastic
    - d. Non-Sag Mortar Medium Bed Mortar, ANSI A118.15: Kerabond T/Keralastic
    - e. Polymer Modified Unsanded Grout, ANSI A118.7: Ultracolor Plus
  4. TEC Specialty Products, Inc.:
    - a. Waterproofing/Crack Isolation Membrane, ANSI A118.10: HydraFlex Waterproofing Crack Isolation Membrane
    - b. Thin-Set Mortar, ANSI A118.4: 3N1-Performance Mortar or SuperFlex
    - c. Medium Bed Mortar, ANSI A118.4: 3N1-Performance Mortar

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- d. Non-Sag Mortar Medium Bed Mortar, ANSI A118.15: 3N1-Performance Mortar
- e. Polymer Modified Unsanded Grout, ANSI A118.7: Power Grout®

**2.05 SEALANT**

- A. **General Requirements:** As selected by Architect. Architect has option to select from products of all acceptable manufacturers to obtain color(s) desired.
- B. **Mildew-Resistant Silicone Rubber Sealant:**
  - 1. Applicable Standard: In accordance with ASTM C920, Type S, Grade NS, Class 25.
  - 2. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
    - a. GE Silicones, "Sanitary 1700 Silicone Sealant"
    - b. Dow Corning Corporation, "786 Mildew-Resistant Silicone Sealant"
    - c. Laticrete International, Inc., "Latasil"
    - d. TEC Specialty Products, Inc., "AccuColor 100™ 100% Silicone Sealant"
    - e. Custom Building Products, "Commercial 100% Silicone Caulk"
    - f. Mapei Corporation, "Mapesil 100% Silicone Caulk"
  - 3. Description: Silicone rubber based, 1-part elastomeric sealant, compounded specifically for mildew resistance and recommended by manufacturer for interior joints in wet areas.
- C. **Miscellaneous Caulking/Sealant Related Materials:** Joint Cleaner, Joint Primer, Bond Breaker Tape, and/or Sealant Backer Rod (Sealant Back-Up): As recommended/approved by sealant manufacturer.

**2.06 MISCELLANEOUS MATERIALS**

- A. **Underlayment:**
  - 1. General: If required by manufacturer, provide a factory prepared non-shrinking, fast setting, crack resistant adhesive compound, capable of being brought to a feather edge and containing no ferrous metal or oxides. Provide product which is compatible with substrate surface and with tile setting mortar and meet manufactures warranty.
  - 2. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
    - a. Custom Building Products, "LevelQuik Rapid Setting Self-Leveling Underlayment With LevelQuik® Latex Primer".
    - b. Laticrete International, Inc., "86 LatasiLevel With Laticrete® Admix and Primer".
    - c. Mapei Corporation, Ultraplan 1 Plus With Primer L or Primer T (Fast Setting, Self-Leveling Underlayment).
    - d. TEC Specialty Products, Inc., "EZ Level® Premium Self-Leveling Underlayment With TEC® Multipurpose Primer".

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- B. **Temporary Protective Coating:** Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
  - 1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- C. **Tile Cleaner:** A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

**2.07 MIXING MORTARS AND GROUT**

**A. General Requirements:**

- 1. Mix mortars and grouts in accordance with referenced standards and mortar and grout manufacturer's written instructions.
- 2. Add materials, water, and additives in accurate proportions.
- 3. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

**2.08 FINISHING AND EDGE PROTECTION METAL PROFILES FOR TILING**

**A. Acceptable Manufacturers:** *Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows:*

- 1. *Schluter Systems, LP, Plattsburgh, NY*

**B. Exposed Tile Edge and Outside Corner Protection:**

- 1. **Product:** *Schluter Systems, "Jolly"*
- 2. **Description:** *L-shaped profile with 1/8-inch wide top section, and vertical wall section that together form the visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.*
- 3. **Material and Finish:** *Satin nickel anodized aluminum.*

**Article 2.08 added in Addendum No. 3**

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

**A. Verification of Conditions:**

1. Examine substrates, areas, and conditions where tile will be installed, with Contractor present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - a. Verify that substrates for setting tile are firm, dry, clean, free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards.
2. Verify that items to be installed in or behind tile have been completed.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations. If not coordinated, adjust joint locations in consultation with Architect.
4. Do not commence tile installation until satisfactory conditions exist. Installation of tile shall indicate Contractor's acceptance of substrate.

**3.02 PREPARATION**

**A. Protection:** Protect adjoining work surfaces before tile installation work begins.

**B. Preparation of Existing Surfaces:** Prepare existing wall substrate surfaces in accordance with TCNA recommended methods, and as recommended by manufacturers of mortar/adhesive tile setting products and/or leveling compound products to be used, to provide proper adhesion/bonding of tile.

**C. Preparation of Tile:** Clean and remove from tile any coatings, including kiln release agent and other substances, soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

**D. Preparation of Walls:**

1. Remove coatings and other substances that are incompatible with tile-setting materials.
2. Provide substrates for wall tile, installed with thin-set mortar, that meets flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
  - a. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use products specifically recommended by tile-setting material manufacturer.
  - b. Remove protrusions, bumps, and ridges by sanding or grinding.

**E. Tile Blending:**

1. For tile exhibiting color variations within ranges approved during tile selection, verify that tile has been factory blended and packaged so tile taken from any package has same range of colors as those taken from other packages and that they match approved samples.



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2. If tiles are not factory blended, either return them to manufacturer for blending or blend tiles at Project site before starting installation.

F. **Preparation of Existing Surfaces:** Prepare existing painted/glazed wall substrate surfaces as recommended by TCNA to provide proper adhesion of new tile-setting bed products.

**3.03 INSTALLATION OF TILE - GENERAL**

A. **Substrate Tolerances:** Wall areas are to be level and plumb with no variations exceeding 1/4 inch in 10 feet and 1/16 inch in 1 foot for both substrate and finished tile surface. In accordance with TCNA Surface Tolerance notes.

B. **Tile Installation Standards:**

1. Meet requirements of applicable parts of ANSI A108 Series, "Specifications for Installation of Ceramic Tile", which apply to specified types of setting and grouting materials and to methods specified under ceramic tile installation paragraphs.
2. Meet requirements of TCNA "Handbook for Ceramic Tile Installation" for applicable TCNA installation methods specified under ceramic tile installation paragraphs.

C. **Manufacturer's Recommendations and Directions:** Use products in accordance with recommendations and directions of each manufacturer.

D. **Cutting and Fitting:**

1. Keep tile cuts to a minimum, never smaller than 1/2 the tile size and always on outer edges of field.
2. Accurately form intersections and returns.
3. Perform cutting and drilling of tile without marring visible surfaces.
4. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints.
5. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
6. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated.
7. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

E. **Jointing Pattern:**

1. Lay tile in grid pattern, unless otherwise indicated or directed.
2. Lay out tile work and center tile field in both directions in each space or on each wall, unless otherwise indicated, directed, or approved.

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3. Adjust tile layout if necessary and approved, to minimize tile pieces that are less than 1/2 of a tile. Align joints when tiles of adjoining base, wall, and trim are same size/length.
  4. Provide uniform joint widths, unless otherwise indicated or approved.
  5. For tile mounted sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets is not apparent.
- F. **Joint Width:** Install tile with joint width that is recommended by manufacturer of tile being installed.
- G. **Expansion Joints:**
1. Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, in horizontal and vertical tile surfaces in accordance with applicable TCNA Handbook installation method and/or as approved by Architect.
  2. Form joints during installation of setting materials, mortar bed, and tile.
  3. Do not saw-cut joints after installing tile.
  4. Where joints occur in concrete substrate, locate joints in tile surface directly above.
  5. Prepare joints and apply sealant as specified in this Section.
- H. **Wall Tile Lippage:** Tile lippage to be no more than 1/32 inch for wall tile grout joints.
- I. **Tile Trim:** Secure tile trim by thoroughly coating back with thin-set bonding material.
- J. **Large Format Tile:** Back butter large format tile while installing.

**3.04 INSTALLATION OF WALL TILE**

- A. **Tile Over Regular Gypsum Board:** Where wall tile is noted to be installed over gypsum wallboard on steel stud framing in dry areas, use TCNA Handbook Installation Method W243 as specified. Dry areas shall be defined as spaces or rooms where plumbing fixtures are not present.
- B. **Installation of Wall Tile Over Existing Concrete/Masonry Substrate:**
1. Prepare surface of existing substrate as specified in this Section.
  2. Install tile in accordance with TCNA Handbook Installation Method W202I.
  3. Install tile using latex Portland cement mortar.
    - a. **Mortar Type:**
      - 1) Thin Set Mortar: Use with tile up to 12-inch by 12-inch nominal size.
      - 2) Non-Sag Medium Bed Mortar: Use with tile 12-inch by 12-inch and larger nominal size.
  4. Grout joints using polymer modified unsanded grout.

**3.05 INSTALLATION OF BASE TILE**

**A. General Requirements:**

1. Standard: Thin-set installation using latex Portland cement mortar, in accordance with TCNA Handbook Installation Method W202I.
2. Preparation: Thoroughly clean wall surface and prime as necessary before applying setting bed.
3. Mortar: Install tile using mortar as specified for wall tile. Apply a continuous setting bed over entire surface to receive tile. Dab method or any method producing voids behind tile is not acceptable.

**3.06 GROUTING JOINTS**

- A. **Grouting Joints:** Grout joints full depth of tile down to setting bed and flush to exposed surface edges of tile.
- B. **Grout Joint Widths:** As recommended by tile manufacture.
- C. **Grout Colors:** As selected by Architect, in multiple colors if desired, to match existing adjacent tile work.

**3.07 INSTALLATION OF SEALANT FILLED MOVEMENT JOINTS**

**A. General Requirements:**

1. Provide appropriate joint types where shown or as recommended in TCNA Handbook Installation Method EJ171 unless otherwise modified within this Section.
2. Install removable divider strips of same depth as finished tile system, including setting bed.
3. Remove strips after grouting and curing operations are complete.

**B. Location of Sealant Joints:**

1. Locate joints not more than 25 feet in each direction.
  - a. Interior Tile Exposed to Direct Sunlight or Moisture: Install joints at not more than 12 feet in each direction.
  - b. Above-Grade Concrete Slab Substrate: Install joints at not more than 12 feet in each direction.
  - c. Exterior Tile: Install joints not more than 12 feet in each direction

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2. Provide joints where tile abuts restraining surfaces, such as perimeter walls, dissimilar curbs, columns, pipes, and ceilings and where changes occur in backing materials.
3. Expansion joints, control joints, and construction cold joints in structure should continue through tilework.
4. Joints between tile walls/base and tile floors.

**C. Sealant Joint Installation:**

1. Locate expansion joints in tile over all cold joints and saw-cut control joints in substrate, if any.
  - a. Construct joints in tile and setting materials to be same width as joints in substrate.
2. To ensure that location of joints in tile align with joints in substrate, construct joints in tile during installation of mortar beds and tile, rather than saw-cutting joints after installation.
3. Keep expansion joint cavities open and free of dirt, debris, mortar, and grout materials.
  4. Set compressible back-up strip when mortar is placed or utilize removable wood strip to provide space for back-up after mortar has cured.
5. Install sealant after grout is dry. Follow sealant manufacturer's recommendations.

**3.08 CLEANING AND PROTECTING**

**A. Cleaning:** On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

**B. Protecting:**

1. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls.
2. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

**END OF SECTION**

**RESILIENT BASE AND TRANSITIONS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

**A. Section Includes:**

1. Provide resilient base where indicated on Drawings:
  - a. Where VB is noted on Room Finish Schedule, provide new resilient base to all walls in the indicated Room.
  - b. Provide resilient base on casework.
2. ***Provide Resilient Edge Strips where new polished concrete finish is provided adjacent to existing Vinyl Tile (VT) or Terrazzo finish in corridors. Field verify existing dimensions to provide appropriate height of edge strip.***

***Subparagraph 2 revised in Addendum No. 3***

**1.02 SUBMITTALS**

- A. **General Requirements:** Provide submittals in accordance with Section 01 33 00.
- B. **Product Data:** Submit (2) copies of manufacturer's technical data and installation instructions for each type of product specified.
- C. **Samples:** Submit samples of colors and patterns available in specified products from proposed manufacturers.

**1.03 QUALITY ASSURANCE**

- A. **Installer Qualifications:** Use skilled installers who are trained and experienced in necessary crafts and are familiar with specified requirements and methods needed for proper installation of products provided under this Section.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. **Packing and Shipping:** Deliver materials to site and store in original, unopened containers with labels intact and legible at time of use.
- B. **Storage and Protection:**
  1. Store materials in strict accordance with manufacturer's recommendations.
  2. Protect materials before, during, and after installation, and protect previously installed work and materials by other trades.
- C. **Replacements:** Remove damaged products and furnish new products as directed by Architect.

**1.05 PROJECT CONDITIONS**

**A. Environmental Requirements:**

1. Maintain temperature of not less than 65 degrees F in spaces to receive resilient flooring for at least (40) hours prior to installation, during installation, and for not less than (48) hours after installation.
2. Maintain temperature of not less than 55 degrees F in areas where work is completed.
3. Moisture content of substrate surfaces shall be within limits recommended by manufacturer of products being installed.

**PART 2 - PRODUCTS**

**2.01 VINYL BASE (VB)**

**A. Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Burke Flooring Products, Division of Burke Industries, San Jose, CA
2. Flexco (USA), Inc., Tuscumbia, AL
3. Johnsonite, Inc., Chagrin Falls, OH
4. Roppe Corporation, Fostoria, OH
5. VPI Floor Products Division, Sheboygan, WI

**B. Standard:** In accordance with ASTM F1861, Type TV (thermoplastic vinyl) for vinyl cove base, Group 2 (layered), Style A (straight) or Style B (cove).

**C. Description:** Vinyl wall base.

1. Gauge: 1/8 inch.
2. Height: 4 1/2 inches, unless otherwise indicated.
3. Lengths: Coils in manufacturer's standard length.
4. Style: Style B (cove) base.
5. Color: Equivalent to Tarkett "Moon Rock WG"

**2.02 MISCELLANEOUS MATERIALS**

**A. Resilient Edge Strips (Reducers):**

1. Acceptable Manufacturers: Subject to the requirements of the contract documents, approved manufacturers are as follows or approved equal:
  - a. Tarkett, "RRS-XX-D"

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2. Description: 1/8-inch thick, homogeneous vinyl or rubber composition, tapered edge, not less than 1 inch wide.
  3. Color: Equivalent to Tarkett "Moon Rock WG"
- B. **Adhesives:** Water resistant low VOC emitting type as recommended by material manufacturer to suit material and substrate conditions.

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

A. **Installation Area Conditions:**

1. Install resilient base after finishing operations, including painting, have been completed.
2. Moisture content of concrete slabs, building air temperature, and relative humidity to be within limits recommended by material manufacturer.

B. **General Requirements:**

1. Install base in lengths as long as practical.
2. Use preformed corner units at outside .
3. Miter or cope base material to construct inside corners.
4. Tightly bond base to substrate throughout length of each piece with continuous contact at horizontal and vertical surfaces.
5. On masonry surfaces or other similar irregular surfaces, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

C. **Installation of Resilient Edge Strips:**

1. Install resilient edge strips at edges of resilient flooring which would otherwise be exposed.
2. Place resilient edge strips tightly butted to flooring and secure to substrate using adhesive.

**3.02 CLEANING**

A. **General Requirements:**

1. Thoroughly clean resilient base just before inspection for Substantial Completion.
2. Remove excess adhesive and other surface blemishes from resilient base and from adjacent surface materials, using neutral type cleaners recommended by base manufacturer.

**END OF SECTION**

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**PAINTING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

A. **Exterior Work:** Examine Drawings and Specifications completely for items to be site finished. Item to be included, but not limited to, are as follows:

1. Metals: Paint only metal items noted or scheduled to be painted on Drawings.

B. **Interior Work:** Examine Drawings and Specifications completely for items to be site finished. Items to be included, but not be limited to, are as follows:

1. Wall Surfaces: Paint wall surfaces noted to be painted on Drawings. Refer to Room Finish Schedule.

a. Concrete Masonry Units - Vinyl Acrylic Eggshell Finish.

b. Gypsum Drywall - Vinyl Acrylic Eggshell Finish.

c. ***Provide primer beneath FRL Panels specified under Section 06 40 25.***

***Subparagraph c added in Addendum No. 3***

2. Ceiling Drops and Soffits: Paint exposed gypsum board and plaster ceiling drops and soffits.

a. Paint surfaces of existing ceiling drops and soffits if indicated to be painted on Drawings or if adjacent to a new or existing ceiling of similar materials that is to be painted.

3. Metals: Unless otherwise indicated, paint exposed metal items included in the following list. Do not paint items which are stainless steel, copper, or unprimed anodized aluminum, or which are an architectural, mechanical, or electrical item indicated on Drawings or specified as "not to be site painted":

a. Hollow Metal Steel Doors and Frames.

4. Mechanical and Electrical Products: Unless specified as "not to be site painted", paint exposed products, in finished rooms, which are built into, mounted on, or hung from wall or ceiling surfaces.

5. Miscellaneous Painting: Provide painting when noted on Drawings but not included in Specifications. Examine Drawings thoroughly.

~~C. **Related Work:**~~

~~1. **Painting of Sprinkler Piping:** Sprinkler Contractor to paint sprinkler piping exposed within finished rooms.~~

~~2. **Pipe Marking:** Color coding and pipe identification marking/labeling shall be performed by Mechanical and Sprinkler Contractor(s).~~

***Paragraph C deleted in Addendum No. 3***



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**1.02 REFERENCES**

- A. **The Master Painters Institute (MPI):** MPI Gloss and Sheen Standards
- B. **Society for Protective Coatings (SSPC):** SSPC SP12, Surface Preparation Specification, No. 12

**1.03 DEFINITIONS**

- A. **Gloss and Sheen Levels:** When a Gloss Level is used by Architect to denote a specific gloss and sheen for a coating in the Contract Documents, Color Schedule or other correspondence relating to this Project, the following schedule shall apply:

**The Master Painters Institute (MPI) Gloss and Sheen Levels:**

		GLOSS AT 60 DEGREES	SHEEN AT 85 DEGREES
Gloss Level 1	A traditional matte finish - flat	Maximum 5 units	Maximum 10 units
Gloss Level 2	A high side sheen flat 'velvet like' finish	Maximum 10 units	10-35 units
Gloss Level 3	A traditional 'eggshell-like' finish	10-25 units	Minimum 35 units
Gloss Level 4	A 'satin-like' finish	20-35 units	
Gloss Level 5	A tradition semi-gloss	35-70 units	
Gloss Level 6	A traditional gloss	70-85 units	
Gloss Level 7	A high gloss	More than 85 units	

**1.04 SUBMITTALS**

- A. **General Requirements:** Provide (3) copies of a schedule detailing each substrate in the same order as the schedules used in this Section. Include the following:
  - 1. Specific Products Used For Each Coat.
  - 2. Documentation That Manufacturer Reviewed and Approved Each Painting System.
  - 3. Data Pages For All Products Listed; highlight (1) set with the following:
    - a. Type of Resin
    - b. Dry Film Thickness
    - c. Volume Solids
    - d. Units of Sheen
    - e. Other Performance or Descriptive Data Required by this Section If this information is not on Data Page, provide information in a letter of certification from manufacturer; attach letter to appropriate Data Page.
- B. **Color Samples:**
  - 1. Architect will select colors and sheens.
  - 2. Submit samples of paint colors selected by Architect in sheen selected.

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- C. **Draw-Downs:** Submit (3) draw-downs of each product and color combination. Draw-downs shall be applied using 4 mil WFT draw-down bar on Leneta, Byko, or Sample-Ease plain white coated cards; size 3 7/8 inches by 6 inches.
1. Label each card with the following:
    - a. Job Name
    - b. Date
    - c. Product Name
    - d. Product Number
    - e. Color Number as stated in Color Schedule
    - f. Name, Address, and Phone Number of Supplying Facility

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. **Packing and Shipping:** Deliver materials to site in unopened containers with labels legible and intact.
- B. **Storage and Protection:** Store materials in a suitable manner and location which will avoid damage to building, avoid conflict in the execution of work, and meet requirements of governing health and fire regulations.
1. Keep storage areas neat and clean.
  2. Damage to materials or surrounding area shall be made good.
  3. Take every precaution to avoid danger of fire.
  4. Protect against contamination by foreign matter.

**1.06 SITE CONDITIONS**

- A. **Environmental Requirements:**
1. General: Follow manufacturer's printed directions as to environmental conditions under which coatings and coating systems can be applied.
  2. Dust Control: Before painting is started in an area, broom clean and remove excessive dust. After painting operations begin in a given area, broom cleaning shall not be allowed. Cleaning shall be done only with commercial vacuum cleaning equipment. Apply products only in dust-free areas.
  3. Temperature Requirements: Minimum ambient air and surface temperature shall be 40 degrees F for 24 hours before, during, and 24 hours after application, unless otherwise required by manufacturer of products being applied.
  4. Ventilation Requirements: Provide adequate ventilation for escape of moisture from building in order to prevent mildew, damage to other work, and improper drying of paint.
  5. Moisture Requirements: Do not work when inclement weather may damage surface.
  6. Illumination Requirements: Perform no work under less than 30 foot-candles measured 3 feet above floor.

**1.07 SEQUENCING AND SCHEDULING**

**A. Coordination With Other Trades:**

1. Familiarity With Work By Others Which Affects Painting: Painting Contractor shall examine Specifications for various other trades and shall be thoroughly familiar with their provisions regarding painting.
2. Scheduling: Schedule and coordinate painting with other trades. Do not proceed until other work and Project conditions are as required to achieve satisfactory results.

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

**A. General Requirements For Coating Products:**

1. Single Source Supplier of System Materials: For coating systems provide materials for the total system (block filler, primer, finish, etc.) from a single source manufacturer or compatible materials approved by finish coat material manufacturer.
2. Colors and Sheens: Architect will select.

**2.02 PRIMERS**

**A. Vinyl Acrylic Interior Wall Primer:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Benjamin Moore & Company/Coronado, Super Kote 5000 Latex Primer Sealer 40-11 (VOC 48 g/L) (1.1 to 1.5 mils DFT) (Solids 31.9 Percent)
  - b. Diamond Vogel, Interior PVA Primer/Sealer DU-1507 (VOC 83 g/L) (2.0 to 3.0 mils DFT) (Solids 43 Percent)
  - c. Glidden Professional, Prep & Prime Primer Sealer 1000-1200 (VOC 100 g/L) (1.2 to 1.3 mils DFT) (Solids 29 Percent)
  - d. Hirshfield's, Contractor Select Drywall Primer 1258 (VOC Less Than 50 g/L) (1.1 mils DFT) (Solids 29 Percent)
  - e. PPG, Speedhide Interior Latex Sealer 6-2 (VOC 98 g/L) (1.0 to 1.3 mils DFT) (Solids 28 Percent)
  - f. Sherwin-Williams Company, ProMar 200 Primer B28W8200 (VOC 91 g/L) (1.1 mils DFT) (Solids 28 Percent)
  - g. Rust-Oleum, Zinsser Latex Dry Wall Primer (VOC Less Than 100 g/L) (1.5 mils DFT) (Solids 31 Percent)
2. General Requirements:
  - a. Minimum Volume Solids: 28 Percent
  - b. VOC Content Limits: 150 g/L

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**B. Rust-Inhibitive Waterborne Acrylic Cross-Linking Primer/Industrial Maintenance Coatings:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Benjamin Moore & Company, Super Spec HP DTM Acrylic Semi-Gloss P29 (VOC 206 g/L) (1.5 to 2.5 mils DFT Per Coat) ( Solids 40 Percent)
  - b. Glidden Professional/Devoe Coatings, Devflex 4020PF DTM Primer (VOC 91 g/L) (2.2 to 3.5 mils DFT) (Solids 44 Percent)
  - c. Diamond Vogel, Pinnacle Protective Coatings Finium DTM-AT Acrylic (VOC 100 g/L) (2.0 to 3.0 mils DFT) (Solids 40 Percent)
  - d. Hirshfield's, Acrylic DTM Primer, 9250 Series
  - e. PPG, Pitt-Tech Int/Ext DTM Primer 90-912 (VOC 90 g/L) (2.0 to 4.0 mils DFT) (Solids 39 Percent)
  - f. Sherwin-Williams Company, ProCryl Universal Primer, B66-310 Series (VOC 99 g/L) (2.0 to 4.0 mils DFT) (Solids 39 Percent)
  - g. Rust-Oleum, Sierra Performance, MetalMax DTM Acrylic Enamel Primer (VOC 0 g/L) (1.5 to 2.5 mils DFT) (Solids 35 Percent)
2. General Requirements:
  - a. Minimum Volume Solids: 39 Percent
  - b. VOC Content Limits: 340 g/L

**2.03 BLOCK FILLERS**

**A. 100 Percent Acrylic Block Surfacer:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Benjamin Moore & Company, Super Spec Masonry Hi Build Block Filler 206 (VOC 45 g/L) (8.5 to 11.4 mils DFT) (Solids 53.4 Percent)
  - b. Glidden Professional/Devoe Coatings, Bloxfil 4000 Heavy Duty Acrylic Blockfiller (VOC 67 g/L) (7.0 to 14.5 mils DFT) (Solids 45 Percent)
  - c. Diamond Vogel, Dia-Pro Acrylic Block Filler BF-1515 (VOC 62 g/L) (5.0 to 15.0 mils DFT) (Solids 50 Percent)
  - d. Hirshfield's, Prowall 4000 Acrylic Latex Block Filler 1450 (VOC Less Than 100 g/L) (8.0 mils DFT) (Solids 51 Percent)
  - e. PPG, Speedhide Int/Ext Hi-Fill Block Filler 6-16 (VOC 47 g/L) (7.4 to 14.7 mils DFT) (Solids 46 Percent)
  - f. Sherwin-Williams Company, Loxon Block Surfacer A24W200 (VOC 81 g/L) (8 mils DFT) (Solids 55 Percent) (pH 8.0 to 13.0 DFT)
2. General Requirements:
  - a. Minimum Volume Solids: 46 Percent
  - b. VOC Content Limits: 200 g/L
  - c. Alkali Resistance: Tolerance of pH Levels Up To 10

**2.04 EXTERIOR FINISH PAINTS**

**A. 2-Component Acrylic Polyurethane:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Benjamin Moore & Company, Corotech Aliphatic Acrylic Urethane V500-90 (VOC 240 g/L) (2.3 to 3.3 mils DFT) (Solids 72 Percent) (OTC, LEED On Metal Rust Inhibitive)
  - b. International/Devoe Coatings, Devthane 379H Gloss (VOC 44 g/L) (2.0 to 3.0 mils DFT Per Coat) (Solids 69 Percent)
  - c. Diamond Vogel, Pinnacle Multi-Thane 330 High Solids Acrylic Polyurethane, IG-Series (VOC 315 to 340 g/L) (2.0 to 3.0 mils DFT Per Coat) (Solids 62 Percent)
  - d. PPG, Pitthane II, 94-2800 (VOC 314 g/L) (1.5 to 3.0 mils DFT) (Solids 63 Percent)
  - e. Sherwin-Williams Company, Acrolon 218 HS, B65 Series (VOC 340 g/L) (3.0 to 6.0 mils DFT) (Solids 65 Percent)
  - f. Rust-Oleum, Aliphatic Polyurethane, 9700 Series (VOC 250 g/L) (2.0 to 3.0 mils DFT) (Solids 62 Percent)
2. General Requirements:
  - a. Minimum Volume Solids: 62 Percent
  - b. VOC Content Limits: 350 g/L
  - c. Sheen: 75 to 100 Units at 60 Degrees

**2.05 INTERIOR FINISH PAINTS**

**A. Vinyl Acrylic Interior Eggshell Finish:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Benjamin Moore & Company, Ultra Spec 500 Interior Latex Eggshell Finish N538 (VOC 0 g/L) (1.8 mils DFT) (Solids 42 Percent)
  - b. Diamond Vogel, Vantage Plus Interior Latex Eggshell Enamel, DE-Series (VOC 96 to 99 g/L) (2.0 to 3.0 mils DFT) (Solids 35 Percent)
  - c. Glidden Professional, Ultra-Hide 150 Eggshell 1412V (VOC 50 g/L) (1.3 to 1.5 mils DFT Per Coat) (Solids 32 Percent)
  - d. Hirshfield's, Contractor Select Interior Eggshell 2390 (VOC Less Than 100 g/L) (1.4 mils DFT Per Coat) (Solids 32 Percent)
  - e. PPG, Speedhide Interior Eggshell Enamel 6-411 (VOC 67 g/L) (1.5 to 1.7 mils DFT) (Solids 38 Percent)
  - f. Sherwin-Williams Company, ProMar 200 Eg Shel B20W2200 (VOC 96 g/L) (1.6 mils DFT) (Solids 42 Percent)
  - g. Rust-Oleum, Zinsser Perma White Interior Satin Finish (VOC 50 g/L) (1.5 mils DFT) (Solids 38 Percent)
2. General Requirements:
  - a. Minimum Volume Solids: 32 Percent
  - b. VOC Content Limits: 150 g/L
  - c. Sheen: 10 to 20 Units at 85 Degrees

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**B. Vinyl Acrylic Interior Flat Finish:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Benjamin Moore & Company, Ultra Spec 500 Interior Latex Flat Finish N536 (VOC 12 g/L) (1.8 mils DFT) (Solids 41 Percent)
  - b. Diamond Vogel, Vantage Plus Interior Latex Flat Enamel, DF-Series (VOC 43 to 47 g/L) (2.0 to 3.0 mils DFT) (Solids 35 Percent)
  - c. Glidden Professional, Ultra-Hide 150 Flat 1210V (VOC 50 g/L) (1.3 to 1.5 mils DFT Per Coat) (Solids 33 Percent)
  - d. Hirshfield's, Contractor Select Interior Flat 1590 (VOC Less Than 50 g/L) (1.2 mils DFT Per Coat) (Solids 31 Percent)
  - e. PPG, Speedhide Interior Flat Latex 6-70 (VOC 50 g/L) (1.3 mils DFT) (Solids 32 Percent)
  - f. Sherwin-Williams Company, ProMar 200 Zero VOC Interior Flat, B30W-2600 Series (VOC 0 g/L) (1.6 mils DFT) (Solids 39 Percent)
  - g. Rust-Oleum, Zinsser Perma White Interior Eggshell Matte Finish (VOC 50 g/L) (1.5 mils DFT) (Solids 41 Percent)
2. General Requirements:
  - a. Minimum Volume Solids: 31 Percent
  - b. VOC Content Limits: 50 g/L
  - c. Sheen: 0 to 5 Units at 85 Degrees

**C. Non-Blocking, Acrylic, Semi-Gloss/Industrial Maintenance Coatings:**

1. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - a. Benjamin Moore & Company, Super Spec HP DTM Acrylic Semi-Gloss P29 (VOC 206 g/L) (1.5 to 2.5 mils DFT Per Coat) ( Solids 40 Percent)
  - b. Glidden Professional/Devco Coatings, Devflex Waterborne Acrylic Semi-Gloss 4216(HP) (VOC Less Than 100 g/L) (1.5 to 4.0 mils DFT Per Coat) (Solids 36 Percent)
  - c. Diamond Vogel, Pinnacle Protective Coatings Finium DTM-AT Acrylic (VOC 100 g/L) (2.0 to 3.0 mils DFT) (Solids 40 Percent)
  - d. Hirshfield's, Heavy Duty 100 Percent Acrylic Semi-Gloss 9090 (VOC Less Than 180 g/L) (1.5 mils DFT Per Coat) (Solids 39 Percent)
  - e. PPG, Pitt-Tech Plus Acrylic Waterborne Semi-Gloss 90-1210 Series (VOC 90 g/L) (2.0 to 4.0 mils DFT) (Solids 40 Percent)
  - f. Sherwin-Williams Company, Pro Industrial High Performance Acrylic, B66-650 Series (VOC 50 g/L) (2.5 to 4.0 mils DFT) (Solids 35 Percent)
  - g. Rust-Oleum, S37 System Metalmax® DTM Acrylic Enamel (VOC Less Than 100 g/L) (1.0 to 3.0 mils DFT) (Solids 35 Percent)
2. General Requirements:
  - a. Minimum Volume Solids: 30 Percent
  - b. VOC Content Limits: LEED, 250 On Metal, 340 g/L
  - c. Sheen: 30 to 60 Units at 60 Degrees

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. **Verification of Conditions:** Examine surfaces to receive coatings to ensure that they are dry, clean, of uniform texture, free of bond inhibiting foreign substances or other conditions that would adversely affect adhesion, protective properties or coating appearance. Give particular attention to prime coatings provided by other contractors.
1. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
  2. Proceed with coating application only after unsatisfactory conditions have been corrected.
    - a. Application of coating indicates acceptance of surfaces and conditions.
- B. **Testing For Moisture Content:** Examine surfaces for moisture content and make surface moisture tests by use of a commercial moisture meter.
1. Do not apply oil or solvent type products when moisture reading is greater than 12 percent.
  2. Do not apply latex emulsion paints when condensation or free moisture is present on surface.

#### **3.02 PREPARATION**

- A. **Protection:**
1. **Protect Work By Others:** Cover or otherwise protect finished work of other trades and surfaces not being painted concurrently or not to be painted.
  2. **Protection of Miscellaneous Items:** Remove or otherwise protect finish hardware, electrical plates, fixtures, prefabricated accessories, and similar items mounted to surfaces to be painted. Store removed items in a secure location and reinstall after finish work is completed.
  3. **Protection of Identifying Markings:** Do not paint over, and protect from overspray and defacement, identifying markings, such as labels, nameplates, and identifying stickers giving fire ratings, directions, or other pertinent information, which are installed on products to be painted. Restore identifying markings which are defaced during painting to their original condition, or remove and install new, as approved by Architect.
  4. **Signs and Barricades:** Install signs and barricades, if necessary, to protect painting work from damage.
  5. **Fire Prevention:** Take extraordinary care to prevent fire. Open cans of flammable painting materials only when needed. Keep rubbing cloths and oily rags submerged in water.
- B. **General Surface Preparation Requirements:**
1. Comply with manufacturer's written instructions and recommendations applicable to substrates indicated.

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2. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - a. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
3. Clean surfaces free of dust, dirt, and any other surface contaminants which adversely affect adhesion or appearance.
4. Provide barrier coats over incompatible primers or remove primers and reprime substrate.
5. Primer:
  - a. When recommended by finish coat manufacturer for surface being finished, provide primer or undercoat whether specified or not.
  - b. Primer may be deleted when applying a new finish over an existing finish unless otherwise recommended by manufacturer of product being applied.

**C. Preparation of New Concrete Masonry Units (CMU):**

1. Clean surfaces so they are free of dirt, loose mortar particles, efflorescence, laitance, and other contaminating materials. Patch holes, cracks, and spalled areas with patching compound.
2. Repair Cracks and Imperfections in Substrate:
  - a. Small to Medium Cracks and Imperfections (No Greater Than 1/8 Inch): All loose material must be removed, crack must be dry and clean. Fill crack with masonry patch, using a broad knife. Allow to dry then top dress to obtain desired finish using masonry patch.
  - b. Medium to Large Cracks (1/8 to 1/4 Inch): Prepare surface and fill using the procedure above for small to medium cracks using smooth masonry patch and filler as a tape bedding compound, apply single layer of polyester reinforcing tape. Top dress exposed tape with final coat of masonry patch.
  - c. Cracks and Imperfections Greater Than 1/4 Inch Require Special Preparation and Handling:
    - 1) Remove all loose material with scraper or power tool.
    - 2) Remove all dirt, dust or powder by water or air blast.
    - 3) Repair area using non-shrinking grout.
    - 4) Allow to cure thoroughly. Apply one coat masonry conditioner reduced properly so as not to build a glaze.
    - 5) Top dress with masonry patch if necessary.
3. Thoroughly spray and back-roll, brush, or rub specified block filler over concrete masonry units to fill all pock marks, air holes and other surface imperfections. Rub excess filler off surfaces and allow filler to dry for not less than 24 hours before applying finish materials.



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**D. Preparation of Existing Painted Concrete Masonry Units (CMU):**

1. Water blast existing surfaces to remove not less than 90 percent of existing paint/coating without damaging substrate.
2. Repair Cracks and Imperfections in Substrate:
  - a. Small to Medium Cracks and Imperfections (No Greater Than 1/8 Inch): All loose material must be removed, crack must be dry and clean. Fill crack with masonry patch, using a broad knife. Allow to dry then top dress to obtain desired finish using masonry patch.
  - b. Medium to Large Cracks (1/8 to 1/4 Inch): Prepare surface and fill using the procedure above for small to medium cracks using smooth masonry patch and filler as a tape bedding compound, apply single layer of polyester reinforcing tape. Top dress exposed tape with final coat of masonry patch.
  - c. Cracks and Imperfections Greater Than 1/4 Inch Require Special Preparation and Handling:
    - 1) Remove all loose material with scraper or power tool.
    - 2) Remove all dirt, dust or powder by water or air blast.
    - 3) Repair area using non-shrinking grout.
    - 4) Allow to cure thoroughly. Apply one coat masonry conditioner reduced properly so as not to build a glaze.
    - 5) Top dress with masonry patch if necessary.
3. Thoroughly spray and back-roll, brush, or rub specified block filler over concrete masonry units to fill all pock marks, air holes and other surface imperfections. Rub excess filler off surfaces and allow filler to dry for not less than 24 hours before applying finish materials.

**E. Preparation of Steel and Iron:**

1. Remove surface contamination and prepare surfaces in accordance with paint product manufacturer's recommendations.
2. When Project site application of a primer or touch up of a factory applied primer is required, use a product compatible with finish coat product to be applied.
3. Site preparation of Exposed Steel Joists in Finished Rooms:
  - a. Sand off drips, bubbles, runs, and other imperfections in factory applied primer coat so they will not be visible after finish coat of paint is applied.
  - b. Touch-up prepared primer coat before application of finish coat.

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- F. **Preparation of Shop-Primed Steel Substrates:** Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming in accordance with SSPC-PA 1 for touching up shop-primed surfaces.
- G. **Preparation of Galvanized Steel:** Remove surface contamination and prepare surfaces in accordance with paint product manufacturer's recommendations.
  - 1. Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. **Preparation of Gypsum Board:** Remove minor contamination such as dust and dirt.
- I. **Preparation of Mechanical and Electrical Work Metal Surfaces:** Prepare metal surfaces as specified for "Steel and Iron" and for "Non-Ferrous Metals" as applicable to type of metal material scheduled to be painted.
- J. **Preparation of Previously Painted Surfaces:** Surfaces shall be dry; clean; free of dust, dirt, powder, grease, oil, wax or other contaminating materials; and free of flaking, crumbling, and chalking before paint application is started. Treat or remove contaminating materials. Dull old paint by light sanding so that no gloss or sheen remains. Remove loose, chipped, peeling, and blistered old paint by scraping or sanding.
  - 1. Previously painted surfaces which are to receive a new painted finish, or are required to receive a new painted finish as a result of damage caused by Project Work, may include but are not limited to the following:
    - a. **Metal Surfaces:** Completely remove previously applied paint if more than 25 percent of previous coating has failed or if previous coating can be easily scraped off surface. Make hard or glossy paint surfaces dull by sanding, sandblasting or using other abrasive methods to remove all gloss sheen.
    - b. **Gypsum Board Surfaces:** Patch holes and cracks in surfaces with latex patching compound. Spot prime patched areas.
    - c. **Pipe Covering:** Clean and prepare surfaces as recommended by new finish coating material manufacturer.

**3.03 APPLICATION**

- A. **General Application Requirements:**
  - 1. **Workmanship:**
    - a. Employ only competent and experienced workers.
    - b. Painted surfaces shall be free of streaks and brush marks and shall have a smooth, even texture.
  - 2. **Ceiling Drops:** Paint ceiling drops as specified for wall and ceiling surfaces of like material, unless otherwise noted.

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3. Wiremold: Paint exposed wire mold to match adjacent surface unless otherwise directed.

**B. Film Thickness:**

1. Apply each paint product in accordance with manufacturer's recommendations, including spreading rate (mil thickness).
2. Measure paint product film thickness upon painting completion using a precision instrument designed for measuring and evaluating wet and dry film thickness of paints and coatings.
  - a. Measurements resulting in film thicknesses less than those recommended by product manufacturer will require application of additional material.
3. Application of poor hiding colors of a particular product may require the application of additional coat(s) in order to provide proper hiding of substrate surface materials.
  - a. Provide additional coats as necessary to cover existing colors and painted graphics, where occurs.

**3.04 CLEANING**

**A. General Cleaning Requirements:**

1. Remove spills, splatters, and stains from surfaces, including those in paint storage and mixing rooms.
2. Unless otherwise approved, refinish entire wall or surface where portion of finish has been damaged or is otherwise unacceptable, by work of this Section.
3. Remove debris from site upon work completion, or sooner if directed.
4. Including work of other trades, clean, repair, and touch-up products which have been soiled, discolored or damaged by work of this Section or be responsible for removal and installation of new when directed.

**3.05 EXTERIOR PAINT SCHEDULE**

**A. Ferrous Metal - 2-Component Aliphatic Acrylic Modified Polyurethane (Ferrous, Galvanized, and Mill Finish Aluminum):**

1. First Coat: Waterborne Epoxy Primer:
  - a. DFT: 2.0 to 4.0 mils.
2. Second Coat: 2-Component Aliphatic Acrylic Modified Polyurethane.
3. Third Coat: 2-Component Aliphatic Acrylic Modified Polyurethane:
  - a. DFT: 2.5 to 5.0 mils.

**3.06 INTERIOR PAINT SCHEDULE**

**A. Concrete Masonry Units - Vinyl Acrylic Eggshell Finish:**  
(Not Scheduled For Epoxy)

1. First Coat: 100 Percent Acrylic Block Surfacers:
  - a. Minimum DFT: 8.0 mils (75 to 125 Square Feet Per Gallon).
2. Second Coat: Vinyl Acrylic Eggshell Finish.
3. Third Coat: Vinyl Acrylic Eggshell Finish:
  - a. Minimum DFT: 1.6 Per Coat.

**B. Gypsum Drywall - Walls - Vinyl Acrylic Eggshell Finish:**

1. First Coat: Vinyl Acrylic Interior Wall Primer:
  - a. Minimum DFT: 1.5 mils.
2. Second Coat: Vinyl Acrylic Eggshell Finish.
3. Third Coat: Vinyl Acrylic Eggshell Finish"
  - a. Minimum DFT: 1.6 Per Coat.

**C. Gypsum Drywall - Ceilings - Vinyl Acrylic Flat Finish:**

1. First Coat: Vinyl Acrylic Interior Wall Primer:
  - a. Minimum DFT: 1.5 mils
2. Second Coat: Vinyl Acrylic Flat Finish
3. Third Coat: Vinyl Acrylic Flat Finish:
  - a. Minimum DFT: 1.2 Per Coat

**D. Metal - Semi-Gloss/Industrial Maintenance Coatings:**  
(Ferrous, Galvanized, and Mill Finish Aluminum)

1. Prime: Rust-Inhibitive Waterborne Acrylic Cross-Linking Primer:
  - a. DFT: 2.0 to 4.0 mils.
2. Second Coat: Non-Blocking, Acrylic, Semi-Gloss/Industrial Maintenance Coatings.
3. Third Coat: Non-Blocking, Acrylic, Semi-Gloss/Industrial Maintenance Coatings:
  - a. Minimum DFT: 1.3 mils Per Coat.

**END OF SECTION**

**SECTION 10 14 20**

**DIE-CUT VINYL LETTER SIGNAGE**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. **Section Includes:** Provide die-cut vinyl letters where noted to be applied on interior wall surface.

**1.02 SUBMITTALS**

- A. **General Requirements:** Provide submittals in accordance with Section 01 33 00.
- B. **Shop Drawings:** Provide a message list for vinyl letter signage required and manufacturer's specifications.
- C. **Samples:** Provide manufacturer's color chart for vinyl letters which identifies full range of colors.

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

- A. **Die-Cut Vinyl Letters:**
1. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
    - a. A.R.K. Ramos Manufacturing Company, Inc., Oklahoma City, OK
    - b. Nelson-Harkins Industries, Chicago, IL
    - c. FDC Graphic Films, Inc., South Bend, IN
    - d. 3M Commercial Graphics Division, St. Paul, MN
  2. **Description:**
    - a. **Material:** Letters die-cut from 3.5 mils thickness vinyl film.
    - b. **Color:** Architect will select from manufacturer's full range of standard colors.
    - c. **Letter Style:** Architect will select from manufacturer's full range of letter styles.

**2.02 FABRICATION**

- A. **Fabrication of Vinyl Letters:** Die-cut to provide a crisp, sharp letter; surface cut for installation to face of wall.

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

**A. Installation of Vinyl Letters Direct to Wall Surfaces:**

1. Verify location and layout with Architect.
2. Apply vinyl letters direct to wall surfaces after proper application and curing time for paint.
3. Lay out letters with care maintaining alignment and appropriate letter spacing for letter style.
4. Apply in accordance with manufacturer's recommendations.

**END OF SECTION**

**FLAT-CUT METAL LETTER SIGNAGE**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. **Section Includes:** Provide individual flat-cut aluminum numerals mounted on standoffs where noted.

**1.02 SUBMITTALS**

- A. **General Requirements:** Provide submittals in accordance with Section 01 33 00.
- B. **Shop Drawings:** Indicate locations, shapes, sizes, spacing, description of materials and finishes, and installation method.
- C. **Product Data:** Manufacturer's signage specifications and installation recommendations.
- D. **Samples:** Submit sample of a typical numeral intended to be provided, for Architect's approval before starting fabrication.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. **Packing and Shipping:** Deliver products to site in manufacturer's original unopened packaging which have legible product identification.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. **Acceptable Manufacturers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
  - 1. Gemini Incorporated, Cannon Falls, MN
  - 2. Comparable product of the following manufacturers as approved by Architect:
    - a. A.R.K. Ramos
    - b. Livers Bronze Company, Inc.
    - c. Matthews International Corporation
    - d. Metal Arts, Division of L & H Manufacturing Company
    - e. Mills Manufacturing Company
    - f. Nelco Metalcraft, Inc.
    - g. Nelson Harkins Industries

**2.02 MATERIALS**

- A. **Aluminum:** Alloy and temper of aluminum plate as recommended by aluminum producer and finisher for use and finish indicated.

**2.03 FABRICATION**

**A. Precision Cut Aluminum Numerals/Letters:**

1. Style: As selected by Architect.
2. Size: As indicated on Drawings.
3. Fabrication: Precision cut from 1/4-inch thick aluminum plate, with satin texture, using waterjet or high speed routers to provide a crisp, sharp numeral.
4. Aluminum Finish: Clear anodized.

**PART 3 - EXECUTION**

**3.01 PREPARATION**

**A. General Requirements:**

1. Verify location and layout of letters with Architect.
2. Clean substrate surface prior to installation.

**3.02 INSTALLATION**

- A. General Requirements:** Install numerals on substrate surface using studs and spacers recommended by letter manufacturer.

**3.03 CLEANING**

- A. General Requirements:** At completion of installation, clean numeral surfaces in accordance with manufacturer's instructions, and clean substrate surface.

**3.04 PROTECTION**

- A. General Requirements:** Protect installed numerals from damage until acceptance by Owner.

**END OF SECTION**



**SECTION 23 05 30**

**HYDRONIC SYSTEM SPECIALTIES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

A. **Section Includes:** Include labor, materials, equipment, and accessories necessary to furnish and install hydronic specialties in relation to hydronic supplied equipment specified in Section 23 21 13.23 - Aboveground Hydronic Piping.

B. **Related Sections:**

1. Section 23 00 00: Heating, Ventilating, and Air-Conditioning (HVAC) - General Requirements
2. Section 23 01 00: Operation and Maintenance of HVAC Systems
3. Section 23 05 13: Common Motor Requirements for HVAC Equipment
4. Section 23 05 53: Identification for HVAC Piping and Equipment
5. Section 23 21 13.23: Aboveground Hydronic Piping
6. Section 23 25 00: HVAC Water Treatment

**1.02 REFERENCES**

A. **American Society of Mechanical Engineers (ASME)**

**1.03 SUBMITTALS**

A. **Shop Drawings:** Submit a portfolio showing hydronic system specialties to be used and a schedule of equipment to be served with related specialty types and sizes for approval by Architect/Engineer.

**1.04 QUALITY ASSURANCE**

A. **Regulatory Requirements:**

1. State Building Code
2. Local Codes and Ordinances
3. Local Authority having jurisdiction

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

A. **Acceptable Manufacturers for Strainers:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Crane No. 988-1/2 or Crane No. 989-1/2
2. Metraflex
3. Mueller

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- B. **Acceptable Manufacturers for Flow Indicators:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
1. Ken Gerrish Company
  2. Tour Anderson
  3. FDI, Flow Design Inc.
  4. Pro hydronic Specialties
- C. **Acceptable Manufacturers for Balance Valves:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
1. Ken Gerrish Company
  2. Tour Anderson
  3. FDI, Flow Design Inc.
  4. Pro Hydronic Specialties
- D. **Acceptable Manufacturers for Coil Valve Kits:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:
1. Ken Gerrish Company
  2. Tour Anderson
  3. Flow Design Inc.

**2.02 PIPING SPECIALTIES**

- A. **Unions - Hydronic Piping:** Flanged union connections shall be made with 150 psi weld neck flanges, with not less than 1/16 inch sheet gasket. Screwed unions shall be Crane No. 250-H or approved equal, bronze to steel seat, 2,000 psi.
- B. **Strainers:** Strainers shall be Crane No. 988-1/2, Crane No. 989-1/2, or Engineer approved equal, with stainless steel or monel mesh screen with reinforced ends and 2 inch pipe nipple with blow-off valve and cap on discharge openings.
1. Provide 20 mesh size for 1-1/2 inch and less and 40 mesh size for 2 inch and larger.
- C. **Air Vents:**
1. Manual: Crane No. 702 petcock or approved equal or Dole No. 9 coin valve or approved equal.
  2. Automatic: Heavy duty unit with built in air chamber, overflow connector for 1/4 inch O.D. copper tubing. Acceptable manufacturers: B&G No. 7, Sarco 13W or approved equal.

**2.03 BALANCE VALVES**

- A. Balance valves larger than 4 inches shall be globe or ball style with memory stops and integral flow indicator.
- B. Balance valves 4 inches and smaller shall be globe or ball style balance valves with memory stops and integral flow indicators.

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- C. Contractor may use (balance valve coil kits) as described, with integral strainers, vents, drain valves and unions at reheat coils, VAV box coils, fan-coil units, unit ventilators, displacement/chilled beams, dedicated energy recovery (vertical unit ventilators) units, and unit heaters.
- D. Where flow limiting devices are used, device shall be selected with a design flow rate of 1.0 GPM as a minimum flow through the limiting device. Flow reduction below that point shall be by balancing and valve adjustment.
- E. Provide minimum of four (4) balancing valve needles matching the manufacturers valve fitting taps to be delivered to the Owners balancing contractor. Submit CV capacity charts with needles to balancer for setting GPMs
- F. Provide schedule of valve sizes in shop drawings for each location used.

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

- A. **Location:** Install compression tanks and air separators where shown on Drawings.
- B. **Unions - Hydronic:** Install unions or flanges in pipe connections to equipment and where shown on Drawings and details. Install air separators with unions on inlet and outlet.
- C. **Strainers:** Install strainers where indicated on Drawings of same size as pipe in which it is installed.
- D. **Balancing Valves:** Install balancing valves where indicated on the Drawings, with the flow rates as indicated.
  - 1. Use globe style balance valves at large pipe location, and air handling equipment. Ball style or globe style balancing valves may be used at terminal equipment.
- E. **Air Vents:** Provide and install vents where indicated on Drawings and where required in piping installation.
  - 1. **Manual Air Vent:** Install air vent valves at the high point wherever drops occur in the direction of water flow, at the top of all supply risers and at the high points of return risers on all hydronic supply and return mains. Install air vent valves on the end of 1/8 inch copper tubing extended to an accessible location from a reducer provided at the high point. If not in a accessible location copper lines shall run to a 6 inch by 6 inch electrical box with stainless steel cover and shall terminate with a manual air vent.
    - a. The high side of heating elements on upfed hot water radiation, hydronic coils, cabinet unit heaters, etc., to be piped complete with a 3/4 inch by 4 inch high air chamber with a reducer at the top from which a 1/8 inch copper tube to be extended to an accessible manual (not automatic) key operated air vent valve.
  - 2. **Automatic Air Vent:** Install automatic air vents at the top of supply risers and at the high point of return risers of hydronic supply and return mains where indicated. Air vent valve to be preceded by an isolation shut off valve. Extend drain line to an accessible location.

**END OF SECTION**

**SECTION 23 82 33**

**RADIANT HEAT EQUIPMENT**

**PART 1 - GENERAL**

**1.01 SUMMARY**

A. **Section Includes:** Include labor, materials, equipment, and accessories necessary to furnish and install radiant heat equipment as scheduled on Drawings.

B. **Related Sections:**

1. Section 23 00 00: Heating, Ventilating, and Air-Conditioning (HVAC) - General Requirements
2. Section 23 09 23: Direct-Digital Control System for HVAC
3. Section 23 09 93: Sequence of Operations for HVAC Controls
4. Section 23 21 13.23: Aboveground Hydronic Piping

**1.02 SUBMITTALS**

A. **Shop Drawings:** Submit a portfolio showing schedules of radiant heating equipment showing mechanical requirements for approval by Architect/Engineer.

B. **Schedules:** Submit schedules of radiation heating elements and enclosures indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and a comparison of specified heat required to actual heat output provided.

**1.03 QUALITY ASSURANCE**

A. **Terminal Heat Transfer Units:** Products shall be by a manufacturer regularly engaged in production of such units and issuing complete catalog data on such product.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

A. **Acceptable Manufacturers for Finned-Tube Radiation:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Vulcan
2. Airtherm
3. Rittling
4. Sterling
5. Trane
6. Sigma

**SECTION 23 82 33**

B. **Acceptable Manufacturers for Convectors:** Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Vulcan
2. Airtherm
3. Rittling
4. Sterling
5. Trane
6. Sigma

**2.02 FINNED TUBE RADIATION**

A. **Elements:** Tube and fin size and type shall be as scheduled on Drawings or specified.

1. Steel heating elements shall be manufactured with pressure tubing permanently bonded to steel fins by a mechanical process.
2. Copper aluminum heating elements shall be manufactured of seamless copper tube permanently bonded to aluminum fins by a mechanical process.
3. Capacity of element is based on 140 degree F. EWT, 20 degree F. TD and 30% glycol.

B. **Backplate:** Full backplate shall be die-formed for rigidity. Backplate shall be off-the-wall type allowing for ease of enclosure removal. Provide a rubber gasket for a complete air seal at the wall.

1. Contractor shall note on Drawings special applications of radiation where full size, flat finished backplate is required and where radiation covers are omitted in cabinet construction.

C. **Heating Element Hangers:** Hangers for heating elements shall be of the ball-bearing, cradle type or rod type die-formed, providing for lengthwise movement of element during expansion and contraction, as well as aligning element to prevent contact with bracket, wall or enclosure. Vertical adjustment shall also be provided.

1. Hangers shall be adjusted to provide pitch for steam radiation piping.

D. **Supply and Return Pipe Hangers:** Provide hanger for supply and return pipe lines of the roller bearing type, assuring noiseless operation of these pipe lines during expansion and contraction.

E. **Brackets:** Brackets shall be die-formed for rigidity and shall support the full backplate at the top, as well as the front skirt of the enclosure. Brackets shall incorporate a security lock for fastening the enclosure, eliminating removal of enclosure without tools.

F. **Enclosures:** Enclosures shall be of style scheduled on Drawings and shall be manufactured of 16 gauge steel. Reinforce enclosures with welded gussets across louvered area and further reinforce by joining with slip joints. Secure enclosure to brackets with a security type lock to prevent removal without tools.

1. When heating pipe is run in cover with element, cover height shall be increased as required to accommodate pipe.

G. **Finish:** Enclosures shall be chemically phosphatized before priming with zinc chromate baked primer or baked enamel. Final coat shall be baked enamel of color selected by Architect/Engineer.

**SECTION 23 82 33**

H. **Accessories:** Accessories shall be die-formed with beaded or flanged edges.

1. Locate 2 foot long access section at every control valve and where shown on Drawings with screwdriver slot operator.

**2.03 CONVECTORS**

A. **Elements:** Seamless copper tubing shall be mechanically expanded into evenly spaced aluminum fins and cast brass headers. Element headers may be 2-, 3- or 4-tubes deep as scheduled on Drawings. Elements shall be held in place with steel side plates and supports. Provide dielectric couplings as required. Supports shall allow means of adjusting pitch of elements. Elements shall be factory air tested at 100 psi under water.

1. Capacity of element is based on 140 degree F. EWT, 20 degree F. TD and 30% glycol.

B. **Cabinet:** Cabinets may be style as specified in convector schedule. Enclosure shall be 16 gauge steel with 18 gauge steel back and ends. Exposed corners shall be rounded. Easily secured front panels shall be braced and reinforced for stiffness. Recessed and semi-recessed units shall have 4-side overlap enclosures mounted such that bottom of enclosure is at top of base.

C. **Finish:** Enclosures shall be chemically phosphatized before priming with zinc chromate baked primer or baked enamel. Final coat shall be baked enamel of color selected by Architect/Engineer.

**PART 3 - EXECUTION**

**3.01 RADIATION, AND CONVECTOR INSTALLATION**

A. **Valves, Pipe, and Fittings:** Install units with valves, pipe, and fittings as detailed on Drawings for steam and hot water systems.

B. **Control:** Controls for unit heaters shall be installed and connected to units as described in Section 23 09 23: Direct-Digital Control System for HVAC

**3.02 EQUIPMENT SCHEDULES**

A. Refer to Drawings for Schedules.

**END OF SECTION**