

PROJECT MANUAL

FOR

DETROIT DIESEL SUBSTATION REPLACEMENT PACKAGE 1

PROJECT NUMBER: 2026-DD016-001



DETROIT™

DETROIT DIESEL

**13400 OUTER DR W
REDFORD, MICHIGAN 48239**

ISSUED FOR: BIDS; JULY 30, 2026

PREPARED BY:

HED

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SECTION 000110 - TABLE OF CONTENTS**PROCUREMENT AND CONTRACTING REQUIREMENTS****Division 00 -- Procurement and Contracting Requirements**

000101 - Project Title Page

000110 - Table of Contents

000115 - List of Drawing Sheets

SPECIFICATIONS**Division 01 -- General Requirements**

011000 - Summary

012200 - Unit Prices

012500 - Substitution Procedures

CSI 1.5C - Substitution Request Form (Sample) Pre-Bid

CSI 13.1A - Substitution Request Form (Sample) Post-Bid

013000 - Administrative Requirements

013000.01 - Administrative Requirements, Appendix 01

013000.02 - Administrative Requirements, Appendix 02

013000.03 - Administrative Requirements, Appendix 03

014000 - Quality Requirements

016000 - Product Requirements

016116 - Volatile Organic Compound (VOC) Content Restrictions

017000 - Execution and Closeout Requirements

017419 - Construction Waste Management and Disposal

017800 - Closeout Submittals

Division 02 -- Existing Conditions

024100 - Demolition

Division 03 -- Concrete**Division 04 -- Masonry****Division 05 -- Metals**

058010 - Post-Installed Anchors

Division 06 -- Wood, Plastics, and Composites

061000 - Rough Carpentry

066100 - Fiberglass Reinforced Panel (FRP)

Division 07 -- Thermal and Moisture Protection

076200 - Sheet Metal Flashing and Trim

078400 - Firestopping

079200 - Joint Sealants

Division 08 -- Openings

089100 - Louvers

Division 09 -- Finishes

Division 10 -- Specialties

Division 11 -- Equipment

Division 12 -- Furnishings

Division 13 -- Special Construction

Division 14 -- Conveying Equipment

Division 21 -- Fire Suppression

Division 22 -- Plumbing

Division 23 -- Heating, Ventilating, and Air-Conditioning (HVAC)

230513 - Common Motor Requirements for HVAC Equipment

230593 - Testing, Adjusting, and Balancing for HVAC

230913 - Instrumentation and Control Devices for HVAC

233300 - Air Duct Accessories

233423 - HVAC Power Ventilators

Division 25 -- Integrated Automation (NOT USED)

Division 26 -- Electrical (ON DRAWINGS)

Division 27 -- Communications

Division 28 -- Electronic Safety and Security

Division 31 -- Earthwork

Division 32 -- Exterior Improvements

Division 33 -- Utilities

Division 34 -- Transportation (NOT USED)

Division 40 -- Process Integration (NOT USED)

Division 46 -- Water and Wastewater Equipment (NOT USED)

END OF SECTION 000110

**SECTION 000115
LIST OF DRAWING SHEETS**

1.01 CONTRACT DRAWINGS

- A. The following Drawings, marked and dated as noted below, form a part of the Contract Documents:
1. Marked: Issued for: Bids
 2. Dated: JULY 30, 2026
 3. List: Refer to Drawing G-011 for complete list of drawings.

END OF SECTION 000115

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**SECTION 011000
SUMMARY****PART 1 GENERAL****1.01 PROJECT**

- A. Project Name: Detroit Diesel Substation Replacement Package 1
- B. Owner's Name: Detroit Diesel.
- C. Architect's Name: HED.

1.02 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is indicated on Drawings and specified in Section 024100.
- B. Scope of alterations new Work is indicated on Drawings.

1.03 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Owner intends to occupy the Project upon Substantial Completion.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

1.04 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied.
 - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
 - 3. Prevent accidental disruption of utility services to other facilities.

1.05 SPECIFICATION SECTIONS APPLICABLE TO EVERY CONTRACT

- A. Unless otherwise noted, provisions of the sections listed below apply to every contract. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Section 012200 - Unit Prices.
- C. Section 012500 - Substitution Procedures.
- D. Section 013000 - Administrative Requirements.
- E. Section 014000 - Quality Requirements.
- F. Section 016000 - Product Requirements.
- G. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- H. Section 017000 - Execution and Closeout Requirements.
- I. Section 017800 - Closeout Submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 011000

**SECTION 012200
UNIT PRICES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.
- C. Defect assessment and non-payment for rejected work.

1.02 COSTS INCLUDED

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.03 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.04 MEASUREMENT OF QUANTITIES

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. Assist by providing necessary equipment, workers, and survey personnel as required.
- E. Measurement by Area: Measured by square dimension using mean length and width or radius.
- F. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- G. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Architect prior to starting work.
- H. Contractor's Engineer Responsibilities: Sign surveyor's field notes or keep duplicate field notes, calculate and certify quantities for payment purposes.

1.05 PAYMENT

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.
- B. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from the transporting vehicle.
 - 4. Products placed beyond the lines and levels of the required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected Products.

1.06 DEFECT ASSESSMENT

- A. Replace Work, or portions of the Work, not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct one of the following remedies:
 - 1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Architect.
 - 2. The defective Work will be partially repaired to the instructions of the Architect, and the unit price will be adjusted to a new unit price at the discretion of Architect.
- C. The individual specification sections may modify these options or may identify a specific formula or percentage price reduction.
- D. The authority of Architect to assess the defect and identify payment adjustment is final.

1.07 SCHEDULE OF UNIT PRICES

- A. Unit Price: Concrete Slab Preparation for Finish Flooring:
 - 1. Description: Where concrete slab does not meet specified moisture testing requirements, provide remedial floor preparation. Preparation shall include finish flooring manufacturer recommended and approved surface applied sealer/moisture barrier and all related and required surface preparation. Such remediation shall be as required for finish flooring manufacturer to fully warrant any finish flooring adhesion failures for a period of one year after substantial completion of the Project. Any finish flooring adhesion failure during this time period shall be replaced or repaired without cost to the Owner.
 - 2. Unit of Measurement: Per square foot (s.f.) of floor slab area requiring remediation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 012200

SECTION 012500 SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Section 012200 - Unit Prices, for additional unit price requirements.
- B. Section 013000 - Administrative Requirements: Submittal procedures, coordination.
- C. Section 016000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.
- D. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Restrictions on emissions of indoor substitute products.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the Contractor will not be considered.

1.04 REFERENCE STANDARDS

- A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage); Current Edition.
- B. CSI/CSC Form 13.1A - Substitution Request (After the Bidding/Negotiating Phase); Current Edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

- B. A Substitution Request for specified installer constitutes a representation that the submitter:
 - 1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Show compliance with requirements for substitutions and the following, as applicable.
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 - 2. Note explicitly any non-compliant characteristics.
 - 3. Product Presentation: If requested by Architect, conduct a presentation at the Architect's office to prove appropriateness to the specified product.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.
- E. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal Time Restrictions:
 - 1. Owner will consider requests for substitutions only if submitted as "Voluntary Substitution" submitted with a bid.

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2. Substitutions submitted by Bidders at the time of "Bid Submission" to the Construction Manager as "Voluntary Substitutions" will be considered during the Bidding review and negotiation process. If a substitution is accepted, an Addendum/Bulletin will be issued incorporating such substitution.
 - B. Submittal Form (before award of contract) to support "Voluntary Substitution" included with bid:
 1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submittal Form (after award of contract):
 1. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request (After Bidding/Negotiating). See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience within 14 days of discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 3. Bear the costs engendered by proposed substitution of:
 - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
- D. Substitutions will not be considered under one or more of the following circumstances:
 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 2. Without a separate written request.
 3. When acceptance will require revisions to Contract Documents.

3.04 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
 1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.05 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.06 CLOSEOUT ACTIVITIES

- A. See Section 017800 - Closeout Submittals, for closeout submittals.
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- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION 012500

**SECTION 013000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Contractor's daily reports.
- F. Coordination drawings.
- G. Number of copies of submittals.
- H. Requests for Information (RFI) procedures.
- I. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 016000 - Product Requirements: General product requirements.
- B. Section 017000 - Execution and Closeout Requirements: Additional coordination requirements.
- C. Section 017800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 REFERENCE STANDARDS

- A. AIA G716 - Request for Information; 2004.

1.04 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 017000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Information (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Delegated Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Schedule meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.

2. Architect.
3. Contractor.
- C. Agenda:
 1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 5. Submission of initial Submittal schedule.
 6. Designation of personnel representing the parties to Contract, Owner and Architect.
 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, inspection requests, post approval documents and Contract closeout procedures.
 8. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

- A. Schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
 1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
- C. Agenda:
 1. Use of premises by Owner and Contractor.
 2. Owner's requirements.
 3. Construction facilities and controls provided by Owner.
 4. Temporary utilities provided by Owner.
 5. Survey and building layout.
 6. Security and housekeeping procedures.
 7. Schedules.
 8. Application for payment procedures.
 9. Procedures for testing and inspections and coordination with field personnel.
 10. Procedures for maintaining record documents.
 11. Requirements for start-up of equipment.
 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 1. Contractor.
 2. Owner.

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3. Architect.
 4. Special consultants.
 5. Contractor's superintendent.
 6. Major subcontractors.
- D. Agenda:
1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Maintenance of progress schedule.
 7. Corrective measures to regain projected schedules.
 8. Planned progress during succeeding work period.
 9. Maintenance of quality and work standards.
 10. Effect of proposed changes on progress schedule and coordination.
 11. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 DAILY CONSTRUCTION REPORTS

- A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.
- B. In addition to transmitting electronically a copy to Owner and Architect, submit two printed copies at weekly intervals.
 1. Submit in format acceptable to Owner.
- C. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
 1. Date.
 2. High and low temperatures, and general weather conditions.
 3. List of subcontractors at Project site.
 4. List of separate contractors at Project site.
 5. Safety, environmental, or industrial relations incidents.
 6. Meetings and significant decisions.
 7. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
 8. Directives and requests of authority having jurisdiction (AHJ).
 9. Change Orders received and implemented.
 10. Testing and/or inspections performed.
 11. Signature of Contractor's authorized representative.

3.05 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.

3.06 REQUESTS FOR INFORMATION (RFI)

- A. Definition: A request seeking one of the following:

1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
 - B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
 - C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Owner.
 - a. Use AIA G716 - Request for Information .
 3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
 - D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 016000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
 - E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
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6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 2. Note dates of when each request is made, and when a response is received.
 3. Highlight items requiring priority or expedited response.
 4. Highlight items for which a timely response has not been received to date.
 5. Identify and include improper or frivolous RFIs.
- H. Review Time: Architect will respond and return RFIs to Contractor within 5 working days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.07 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
1. Submit at the same time as the preliminary schedule.
 - a. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - b. Submit revised submittal schedule to reflect changes in current status and timing for submittals concurrently with the first complete submittal of Contractor's construction schedule.
 2. Coordinate with Contractor's construction schedule and schedule of values.
 3. Format schedule to allow tracking of status of submittals throughout duration of construction.

4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, role and name of subcontractor, and scheduled date of fabrication.
5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.08 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 017800 - Closeout Submittals.

3.09 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Design data.
 2. Sustainability design submittals and reports.
 3. Certificates.
 4. Test reports.
 5. Inspection reports.
 6. Manufacturer's instructions.
 7. Manufacturer's field reports.
 8. Qualification data.
 9. Maintenance data.
 10. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.10 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 017800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.11 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format via e-mail; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
 - 1. Contractor shall retain one copy of file as an electronic Project record document file at the Project Site. Use only final action submittals that are marked with approval notation from Architect's action stamp.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.12 SUBMITTAL PROCEDURES

- A. General Requirements:
 - 1. Use a separate transmittal for each item.
 - 2. Submission of separate specification sections in one submittal is not allowed unless materials specified in separate sections are integral to the submittal.
 - 3. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
 - 4. Transmit using approved form.
 - a. Refer to Section 013300.03, "Administrative Requirements, Appendix 03", for a sample transmittal form that contains all information required. The sample transmittal form is available in Microsoft Word format for Contractor's use. Contractor's form may be used if all required information is provided.
 - 5. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 - 6. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 - 7. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
 - 8. Deliver or transmit submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project. Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Transmittal must be electronically signed by the Contractor certifying submittal, to the best of the Contractor's knowledge, is in compliance with Contract Documents except as noted. Architect will return without review submittals received from sources other than Contractor.
 - a. Place a permanent label or title block on each submittal item for identification.
 - b. Refer to Appendix 013300.02, "Contractor's Submittal Label Information", for sample label. Sample is shown completely filled out for clarification. Size of label is optional but all information shown shall be included and shall be easily read.
 - c. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 - d. Deliver hard copy or sample submittals to Architect at business address; Attention: Contract Administration.

- e. Send submittals in electronic format via email to Architect.
 9. Schedule submittals to expedite the Project, and coordinate submission of related items. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - a. For each submittal and re-submittal for review, allow 10 working days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 working days.
 - 1) Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 calendar days.
 - d. Submittals received by 10:00 am will be marked as received on that day. Submittals received after 10:00 am will be marked as received on the next working day.
 10. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 11. Identify options requiring selection by Architect.
 12. Provide space on label or beside title block for Contractor review stamps. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Architect's project number and Owner's account/project number, if applicable.
 - c. Date.
 - d. Name and address of Architect.
 - e. Name and address of Contractor.
 - f. Name and address of subcontractor.
 - g. Name and address of supplier.
 - h. Name of manufacturer.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Name of drawing preparer not initials.
 - l. Name of person and company preparing submittals.
 - m. Other necessary identification.
 13. When revised for resubmission, identify all changes made since previous submission.
 - a. Reviewing of resubmitted Shop Drawings by the Architect shall be limited to required corrections only, and the Contractor or Subcontractor by resubmitting shall be held to represent that the resubmitted Shop Drawings contain no other alterations, additions or deletions. If additional changes have been made, same shall be specifically noted and described on the Shop Drawing and/or in the covering transmittal.
 - b. Architect's services beyond those stipulated in the Owner/Architect Agreement may be a cause for the Owner to impose reimbursement by the Contractor for these additional services performed by the Architect. As a guide to establish limits of these services and provide a base for the Contractor to use in preparing its Bid, the following limits shall apply:
 - 1) Up to two (2) reviews for each Shop Drawing, Product Data item, Sample and similar submittals.
 14. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 15. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
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16. Submittals not requested will be recognized, and will be returned "Submittal Not Requested (SNR)".
 17. Fabrication commenced prior to completion of review by Architect shall be at the sole risk of the Contractor.
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Submit concurrently with related shop drawing submittal unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 4. Do not submit (Material) Safety Data Sheets for materials or products.
 - a. Submit Material Data Safety Sheets to Owner if requested.
 5. Submit sustainable design reporting submittals under separate cover.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 2. Use of reproductions of Contract Documents in digital data form to create shop drawings is only permitted with Architect approval.
 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

3.13 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will acknowledge receipt and review. See below for actions to be taken.
- B. Submittals for Information: Architect will acknowledge receipt, but will take no other action.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
1. Refer to Section 013000.01, "Administrative Requirements Appendix 01", for sample action stamp.
 2. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Reviewed - No Exceptions Taken (R)", or language with same legal meaning.
 - 1) Proceed on Basis of Information Received.
 - b. "Reviewed - Information Noted (RIN)", or language with same legal meaning.
 - 1) Proceed on Basis of Revised Information Noted.
 - c. "Reviewed and Resubmit for Record (RRR)", or language with same legal meaning.
 - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
 - d. "Submittal Not Requested, Not Reviewed (SNR)", or language with same legal meaning.
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Rejected - Incomplete. Revise and Resubmit (IRR)".
 - 1) Work shall not proceed based on non-specified information submitted. Resubmit.
 - b. "Reviewed - Exceptions Noted. Revise and Resubmit (RR)".
 - 1) Work shall not proceed based on information submitted. Resubmit.
- E. Architect's and consultants' actions on items submitted for information:
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1. Items for which no action was taken:
 - a. "Received" - to notify the Contractor that the submittal has been received for record only.
2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.

END OF SECTION 013000

**SECTION 014000
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Inspection agencies and services.
- E. Control of installation.
- F. Tolerances.
- G. Manufacturers' field services.
- H. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Section 013000 - Administrative Requirements: Submittal procedures.
- B. Section 016000 - Product Requirements: Requirements for material and product quality.

1.03 DEFINITIONS

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.
- B. Contractor's Professional Delegated Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- C. Delegated Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Delegated Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.
 - 1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.
 - a. Full name.
 - b. Professional licensure information.
 - c. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.
- C. Delegated Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
 2. Include required product data and shop drawings.
 3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
 4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
 2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.05 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.06 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS - NOT USED**PART 3 EXECUTION****3.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Provide incidental labor and facilities:

- a. To provide access to Work to be tested/inspected.
- b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
- c. To facilitate tests/inspections.
- d. To provide storage and curing of test samples.
- 3. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
- 4. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 5. Arrange with Owner's agency and pay for tests and inspections required by Contractor beyond specified requirements.
- C. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- D. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.04 MANUFACTURERS' FIELD SERVICES

- A. Support SQD field service tech's with commissioning process.

3.05 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION 014000

**SECTION 016000
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Substitution limitations.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Section 012500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- B. Section 014000 - Quality Requirements: Product quality monitoring.
- C. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- D. Section 017419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.
- E. Section 230513 - Common Motor Requirements for HVAC Equipment: Motors for HVAC equipment.

1.03 REFERENCE STANDARDS

- A. EN 15804 - Sustainability of Construction Works - Environmental Product Declarations - Core Rules for the Product Category of Construction Products; 2022 (Corrigendum 2021).
- B. ISO 14025 - Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures; 2006.
- C. ISO 14040 - Environmental Management - Life Cycle Assessment - Principles and Framework; 2006, with Amendment (2020).
- D. ISO 14044 - Environmental Management - Life Cycle Assessment - Requirements and Guidelines; 2006, with Amendment (2020).
- E. ISO 21930 - Sustainability in Buildings and Civil Engineering Works — Core Rules for Environmental Product Declarations of Construction Products and Services; 2017.
- F. NEMA MG 00001 - Motors and Generators; 2024.

1.04 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.05 QUALITY ASSURANCE

- A. Composite Wood and Agrifiber: Products made of wood particles and/or plant material pressed and bonded with adhesive or resin such as particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates, and door cores.
- B. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.
 - 1. Good: Product-specific; compliant with ISO 14044.
 - 2. Better: Industry-wide, generic; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
 - 3. Best: Commercial-product-specific; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
 - 4. Where demonstration of impact reduction below industry average is required, submit both industry-wide and commercial-product-specific declarations; or submit at least 5 declarations for products of the same type by other manufacturers in the same industry.
- C. Health Product Declarations (HPD): Complete, published declaration with full disclosure of known hazards, prepared using one of the HPDC (HPD-OLT) online tools.
- D. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 100 miles (160.9 Km) from the Project site.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- C. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is not prohibited.
 - 1. If applicable, see drawings for list of items required to be salvaged for reuse and/or relocation.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. See Section 014000 - Quality Requirements, for additional source quality control requirements.
- C. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Containing lead, cadmium, or asbestos.
- D. Where other criteria are met, Contractor shall give preference to products that:

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1. If used on interior, have lower emissions, as defined in Section 016116.
 2. If wet-applied, have lower VOC content, as defined in Section 016116.
 3. Are extracted, harvested, and/or manufactured closer to the location of the project.
 4. Have longer documented life span under normal use.
 5. Result in less construction waste. See Section 017419
 6. Are made of recycled materials.
 7. Have a published Environmental Product Declaration (EPD).
 8. Have a published Health Product Declaration (HPD).
 9. Have a published Manufacturer's Inventory of Chemical Content.
- E. Motors: Refer to Section 230513 - Common Motor Requirements for HVAC Equipment, NEMA MG 00001 Type. Specific motor type is specified in individual specification sections.

2.03 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 012500 - Substitution Procedures.

3.02 OWNER-SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 2. Arrange and pay for product delivery to site.
 3. On delivery, inspect products jointly with Contractor.
 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 5. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
 1. Review Owner reviewed shop drawings, product data, and samples.
 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 3. Handle, store, install and finish products.
 4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 017419.
 - 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- F. For exterior storage of fabricated products, place on sloped supports above ground.
- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.
- I. Do not store products directly on the ground.
- J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- L. Prevent contact with material that may cause corrosion, discoloration, or staining.
- M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION 016000

SECTION 016116
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.

1.02 RELATED REQUIREMENTS

- A. Section 013000 - Administrative Requirements: Submittal procedures.
- B. Section 014000 - Quality Requirements: Procedures for testing and certifications.
- C. Section 016000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.
- D. Section 079200 - Joint Sealants: Emissions-compliant sealants.

1.03 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Flooring.
 - 4. Composite wood.
 - 5. Products making up wall and ceiling assemblies.
 - 6. Thermal and acoustical insulation.
 - 7. Free-standing furniture.
 - 8. Other products when specifically stated in the specifications.
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
 - 1. Concrete.
 - 2. Clay brick.
 - 3. Metals that are plated, anodized, or powder-coated.
 - 4. Glass.
 - 5. Ceramics.
 - 6. Solid wood flooring that is unfinished and untreated.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.

- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2025.
- C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2; 2017.
- D. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2020.
- E. CHPS (HPPD) - High Performance Products Database; Current Edition.
- F. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- G. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).
- H. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).
- I. SCS (CPD) - SCS Certified Products; Current Edition.
- J. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

1.06 QUALITY ASSURANCE

- A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
 - 1. Wet-Applied Products: State amount applied in mass per surface area.
 - 2. Paints and Coatings: Test tinted products, not just tinting bases.
 - 3. Evidence of Compliance: Acceptable types of evidence are the following;
 - a. Current UL (GGG) certification.
 - b. Current SCS (CPD) Floorscore certification.
 - c. Current SCS (CPD) Indoor Advantage Gold certification.
 - d. Current listing in CHPS (HPPD) as a low-emitting product.
 - e. Current CRI (GLP) certification.
 - f. Test report showing compliance and stating exposure scenario used.
 - 4. Product data submittal showing VOC content is NOT acceptable evidence.
 - 5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.
- B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
 - b. Published product data showing compliance with requirements.
 - c. Certification by manufacturer that product complies with requirements.
- C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS**2.01 MATERIALS**

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. Indoor-Emissions-Restricted Products: Comply with Indoor Emissions Standard and Test Method, except for:
 - 1. Inherently Non-Emitting Materials.
- C. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 - 2. Joint Sealants: SCAQMD 1168 Rule.
 - 3. Paints and Coatings: Each color; most stringent of the following:
 - a. 40 CFR 59, Subpart D.
 - b. SCAQMD 1113 Rule.
 - c. CARB (SCM).

PART 3 EXECUTION**3.01 FIELD QUALITY CONTROL**

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION 016116

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**SECTION 017000
EXECUTION AND CLOSEOUT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- I. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 013000 - Administrative Requirements: Submittals procedures.
- C. Section 014000 - Quality Requirements: Testing and inspection procedures.
- D. Section 017419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.
- E. Section 017800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- F. Section 017900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- G. Section 024100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.
- H. Section 078400 - Firestopping.

1.03 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.

1.05 QUALITY ASSURANCE

- A. Do not cut and patch structural work in a manner that could result in a reduction of load-carrying capacity or an increase in the structure's deflection. Obtain approvals from the Owner, Engineer of Record and Architect before cutting and patching any structural member or assembly.
 - 1. EXCEPTION: Modifications to structural work done in accordance with specific details included in the Contract Documents stamped by the Engineer of Record and approved by the Authorities Having Jurisdiction in the State in which the Project is located.
- B. Do not cut and patch operational elements or safety related components in a manner resulting in a reduction of capacities to perform in a manner intended or resulting in a decreased operational life, increased maintenance, or decreased safety.

1.06 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
- D. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.07 COORDINATION

- A. See Section 011000 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of work of separate sections.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

- A. Drawings showing existing construction are based on casual field observation and existing record documents only.
 - 1. Verify that construction arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
- C. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 - 2. Remove items indicated on drawings.
 - 3. Relocate items indicated on drawings.
 - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. Provide temporary connections as required to maintain existing systems in service.
 - 4. Verify that abandoned services serve only abandoned facilities.
 - 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- E. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
- F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
 - 1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

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- G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
 - H. Refinish existing surfaces as indicated:
 - 1. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 2. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - 3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 - I. Clean existing systems and equipment.
 - J. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
 - K. Do not begin new construction in alterations areas before demolition is complete.
 - L. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- D. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- E. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- F. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

- G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- H. Restore work with new products in accordance with requirements of Contract Documents.
- I. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- J. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 078400, to full thickness of the penetrated element.
- K. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- E. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.
- F. Waste Disposal: Do not wash waste materials down sewers or into waterways.

3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

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- C. Start all equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
 - D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
 - E. Verify that wiring and support components for equipment are complete and tested.
 - F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
 - G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
 - H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- B. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.11 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 230593 - Testing, Adjusting, and Balancing for HVAC.

3.12 FINAL CLEANING

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- G. Clean site; sweep paved areas.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Architect and Owner.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.14 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION 017000

**SECTION 017419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
 - 1. Aluminum and plastic beverage containers.
 - 2. Corrugated cardboard.
 - 3. Wood pallets.
 - 4. Clean dimensional wood.
 - 5. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
- E. Contractor Reporting Responsibilities: Submit periodic Waste Disposal Reports; report landfill disposal, incineration, recycling, salvage, and reuse regardless of to whom the cost or savings accrues; use the same units of measure on required reports.
- F. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

- A. Section 012500 - Substitution Procedures.
- B. Section 013000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- C. Section 016000 - Product Requirements: Waste prevention requirements related to product substitutions.
- D. Section 016000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- E. Section 017000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- M. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- N. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- O. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. Submit Report on a form acceptable to Owner.
 - 3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 4. Incinerator Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project delivered to incinerators.
 - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.

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5. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
 6. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards (cubic meters).
 - c. Include weight tickets as evidence of quantity.
 7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

- A. See Section 016000 and Section 012500.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 016000:
 1. Relative amount of waste produced, compared to specified product.
 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
 3. Proposed disposal method for waste product.
 4. Markets for recycled waste product.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

- A. See Section 013000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 016000 for waste prevention requirements related to delivery, storage, and handling.
- C. See Section 017000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- B. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION 017419

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**SECTION 017800
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties.

1.02 RELATED REQUIREMENTS

- A. Section 013000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 017000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Owner comments. Revise content of all document sets as required prior to final submission.
 - 3. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.

- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- B. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- C. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

3.06 WARRANTIES

- A. Obtain warranties, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties until time specified for submittal.

END OF SECTION 017800

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**SECTION 024100
DEMOLITION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Selective demolition of built site elements.
- B. Selective demolition of building elements for alteration purposes.
- C. Salvage of existing items to be reused or recycled.

1.02 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- C. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- D. Mechanical and Electrical Sections (Divisions 21 through 28) for demolition and cutting and patching requirements specified within them.

1.03 DEFINITIONS

- A. Demolish: Dismantle, raze, destroy, or wreck any building or structure or any part thereof.
- B. Remove: Detach or dismantle items from existing construction and dispose of them off site, unless items are indicated to be salvaged or reinstalled.
- C. Remove and Salvage: Detach or dismantle items from existing construction in a manner to prevent damage. Clean, package, label and deliver salvaged items to Owner in ready-for-reuse condition.
- D. Remove and Reinstall: Detach or dismantle items from existing construction in a manner to prevent damage. Clean and prepare for reuse and reinstall where indicated.
- E. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.04 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
- B. ASSE A10.6 - Safety and Health Program Requirements for Demolition Operations; 2006 (R2016).
- C. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Engineering Survey: Submit engineering survey of condition of building.
- C. Demolition Plan: Submit demolition plan as required by OSHA and local AHJs.
 - 1. Indicate extent of demolition, removal sequencing, bracing and location and construction of barricades and fences.
 - 2. Identify demolition firm and submit qualifications.

- D. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
- E. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.
- F. Inventory: Submit a list of items that have been removed and salvaged.
- G. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.06 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
- B. Professional Engineer Qualifications: Comply with Section 014000 - Quality Requirements.

1.07 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 DEMOLITION

- A. Remove portions of existing building as indicated on the Drawings.
- B. Remove other items indicated, for salvage, relocation, and recycling.

3.02 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- E. Survey of Existing Conditions: Record existing conditions by use of measured drawings, pre-construction photographs or videos.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.03 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with requirements in Section 017000.
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- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
 - 3. Comply with applicable requirements of ASSE A10.6 and NFPA 241.
 - 4. Use of explosives is not permitted.
 - 5. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 6. Provide, erect, and maintain temporary barriers and security devices.
 - 7. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 8. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 9. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
 - C. Do not begin removal until receipt of notification to proceed from Owner.
 - D. Do not begin removal until built elements to be salvaged or relocated have been removed.
 - E. Protect existing structures and other elements to remain in place and not removed.
 - 1. Provide bracing.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.
 - F. Protect walls, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - G. Cover and protect equipment that have not been removed.
 - H. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
 - 1. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure.
 - I. Hazardous Materials:
 - 1. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, and mercury.
 - J. Perform demolition in a manner that maximizes salvage and recycling of materials.
 - 1. Comply with requirements of Section 017419 - Construction Waste Management and Disposal.
 - 2. Dismantle existing construction and separate materials.
 - 3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
 - K. Existing Utilities:
 - 1. Refer to Divisions 21 through 28 Mechanical and Electrical Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.
 - 2. Protect existing utilities to remain from damage.
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3. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
 - a. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 4. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
 - a. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 5. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- L. Selective Demolition for Alterations:
1. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
 - a. Verify construction and utility arrangements are as indicated.
 - b. Report discrepancies to Owner before disturbing existing installation.
 - c. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
 2. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.
 3. Remove existing work as indicated and required to accomplish new work.
 - a. Remove items indicated on drawings.
 4. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
 - a. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
 - 1) Maintain fire-protection facilities in service during selective demolition operations.
 - b. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - c. Disconnect, demolish, and remove equipment, and components indicated on Drawings to be removed.
 - 1) Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - 2) Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - 3) Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - d. See Section 011000 - Summary for limitations on outages and required notifications.
 - e. Verify that abandoned services serve only abandoned facilities before removal.
 - f. Remove abandoned pipe, conduits, and equipment. Remove back to source of supply where possible, otherwise cap stub and tag with identification.
 5. Protect existing work to remain.
 - a. Prevent movement of structure. Provide shoring and bracing as required.
 - b. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
 - c. Repair adjacent construction and finishes damaged during removal work.
 - d. Patch to match new work.

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6. Comply with Owner's requirements for using and protecting stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.
 7. Removed and Salvaged Items:
 - a. Clean salvaged items.
 - b. Pack or crate items after cleaning. Identify contents of containers.
 - c. Store items in a secure area until delivery to Owner.
 - d. Transport items to Owner's storage area designated by Owner.
 - e. Protect items from damage during transport and storage.

3.04 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction by selective demolition operations.
- B. Patching: Comply with Section 017000 - Execution and Closeout Requirements.
- C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- D. Debris and Waste Removal:
 1. Remove debris, junk, and trash from site.
 2. Remove from site all materials not to be reused on site; do not burn or bury.
 3. Leave site in clean condition, ready for subsequent work.
 4. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 024100

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**SECTION 058010
POST-INSTALLED ANCHORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Section including requirements pertaining to post-installed anchors and attachments to cast-in-place concrete elements, concrete-slabs on steel-deck, precast concrete components, and masonry construction. This section pertains to all other sections of these specifications that require post-installed anchors, unless specified otherwise.
- B. Extent of Post-Installed Anchors – architectural, mechanical, electrical and structural work as required in specifications and drawings.

1.02 RELATED REQUIREMENTS

- A. Related Requirements:
 - 1. Drawing S-001.
 - 2. Special Inspection and Testing matrix shown on contract drawings.
 - 3. Division 01 sections for Quality Control and Testing
 - 4. Division 03 sections for Concrete.
 - 5. Division 04 sections for Masonry.
 - 6. Division 05 sections for Metals.
 - 7. Division 06 sections for Wood and Plastics.
 - 8. Division 07 sections for Thermal and Moisture Protection.
 - 9. Division 08 sections for Openings.
 - 10. Division 09 sections for Finishes.
 - 11. Division 10 sections for Specialties.
 - 12. Division 11 sections for Equipment.
 - 13. Division 13 sections for Special Construction.
 - 14. Division 14 sections for Conveying Systems
 - 15. Division 23 sections for Heating, Ventilation and Air Conditioning.
 - 16. Division 26 sections for Electrical.

1.03 ACTION SUBMITTALS

- A. Submit anchor capacities rated for cracked concrete only.
- B. Product data depicting specific type, physical properties and installation procedures of proposed anchor with the details of the structural element to which Post-Installed Anchors are attached.
 - 1. A general catalog of anchors without specific references is not acceptable.
 - 2. Submittal for all anchor types with the following:
 - 3. Proposed maximum loading
 - 4. Position of installation (underside of slab, topside of slab, side of beam, bottom of beam, etc.)
 - 5. Type and compressive strength of concrete or masonry in which anchor will be installed.
- C. Minimum member thickness at attachment location.
 - 1. Critical edge distances when applicable.
- D. Evaluation Service Reports (ESR) from the International Code Council (ICC) or International Association of Plumbing and Mechanical Officials (IAPMO):
 - 1. ESR's shall be compliant with the governing Building Code.
 - 2. Mechanical Anchors: AC-193 and ACI 355.2.

1.04 COORDINATION

- A. Coordinate installation of post-installed anchors to other construction.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle Post-Installed-Anchors in strict accordance with their manufacturer's written instructions.
 - 1. Protect anchors from corrosion and deterioration.

1.06 RESTRICTIONS FOR POST-INSTALLED ANCHORS

- A. Do not install post-installed anchor to concrete surfaces of concrete encased-steel-beams.
- B. The following types of anchors are not permitted for the support of tension loads from structural components:
 - 1. Adhesive anchors installed in overhead application.
 - 2. Powder actuated fasteners in facilities classified as Seismic Design Categories A and B, installed in tension applications where service load on any individual fastener exceeds 50 pounds.

PART 2 PRODUCTS

2.01 ANCHOR MANUFACTURERS

- A. Appropriate product types for cracked concrete conditions.
- B. Acceptable Manufacturers:
 - 1. Hilti (www.hilti.com).
 - 2. [DeWalt](http://anchors.dewalt.com/anchors) (anchors.dewalt.com/anchors).
 - 3. Simpson Strong-Tie Anchor System (www.simpsonanchors.com).

PART 3 EXECUTION

3.01 INSTALLATION

- A. Do not cut existing reinforcing.
 - 1. Relocate hole when interference with reinforcing is found.
- B. Installation of post-installed anchors shall be by certified installers in strict accordance with manufacturer's written instructions and ICC – ES Reports.

END OF SECTION 058010

**SECTION 061000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concealed wood blocking, nailers, and supports.
- B. Miscellaneous wood nailers, furring, and grounds.

1.02 REFERENCE STANDARDS

- A. PS 20 - American Softwood Lumber Standard; 2025.
- B. SPIB (GR) - Standard Grading Rules; 2021.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on fire retardant treated wood materials.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 ACCESSORIES

- A. Metal and Finish of Fasteners:
 - 1. Untreated Wood: Unfinished steel.
- B. Fasteners and Anchors:
 - 1. Power-Driven Fasteners: NES NER-272.
 - 2. Wood Screws: ASME B18.6.1.
 - 3. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).

4. Bolts: Steel bolts complying with ASTM A307, Grade A (ASTM F568, Property Class 4.6); with ASTM A563 (ASTM A563M) hex nuts and, where indicated, flat washers.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. NES NER-272 for power-driven fasteners.
 2. Table 2304.10.1--Fastening Schedule of the ICC's International Building Code.

3.02 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to authorities having jurisdiction may be used in lieu of solid wood blocking.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.03 TOLERANCES

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

END OF SECTION 061000

**SECTION 066100
FIBERGLASS REINFORCED PLASTICS (FRP) FABRICATIONS**

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall furnish, fabricate (where necessary), and install all fiberglass reinforced plastic (FRP) items, with all appurtenances, accessories and incidentals necessary to produce a complete, operable and serviceable installation as shown on the Contract Drawings and as specified herein, and in accordance with the requirements of the Contract Documents.

1.02 REFERENCES

- A. The publications listed below (latest revision applicable) form a part of this specification to the extent referenced herein. The publications are referred to within the text by the designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) TEST METHODS:

1. ASTM D635 Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position
2. ASTM E84 Surface Burning Characteristics of Building Materials

2.02 CONTRACTOR SUBMITTALS

- A. The CONTRACTOR shall furnish shop drawings of all fabricated gratings and accessories in accordance with the provisions of this Section.
- B. The CONTRACTOR shall furnish manufacturer's shop drawings clearly showing material sizes, types, styles, part or catalog numbers, complete details for the fabrication and erection of components including, but not limited to, location, lengths, type and sizes of fasteners, clip angles, member sizes, and connection details.
- C. The CONTRACTOR shall submit the manufacturer's published literature including structural design data, structural properties data, plate load/deflection tables, corrosion resistance tables, certificates of compliance, test reports as applicable, concrete anchor systems and their allowable load tables, and design calculations for systems not sized or designed in the contract documents.
- D. The CONTRACTOR may be requested to submit sample pieces of each item specified herein for acceptance by the ENGINEER as to quality and color. Sample pieces shall be manufactured by the method to be used in the WORK.

2.03 QUALITY ASSURANCE

- A. All items to be provided under this Section shall be furnished only by manufacturers having a minimum of ten (10) years experience in the design and manufacture of similar products and systems. Additionally, if requested, a record of at least five (5) previous, separate, similar successful installations in the last five (5) years shall be provided.
- B. Manufacturer shall offer a 3 year limited warranty on all FRP products against defects in materials and workmanship.
- C. Manufacturer shall be certified to the ISO 9001-2008 standard.
- D. Manufacturer shall provide proof of certification from at least two other quality assurance programs for its facilities or products (DNV, ABS, USCG, AARR).

2.04 PRODUCT DELIVERY AND STORAGE

- A. Delivery of Materials: Manufactured materials shall be delivered in original, unbroken pallets, packages, containers, or bundles bearing the label of the manufacturer. Adhesives, resins and their catalysts and hardeners shall be crated or boxed separately and noted as such to facilitate their movement to a dry indoor storage facility.
- B. Storage of Products: All materials shall be carefully handled to prevent them from abrasion, cracking, chipping, twisting, other deformations, and other types of damage. Adhesives, resins and their catalysts are to be stored in dry indoor storage facilities between 70 and 85 degrees Fahrenheit (21 to 29 degrees Celsius) until they are required.

PART 2 - PRODUCTS

3.01 MANUFACTURER

- A. Basis of Design: Fiberplate® as manufactured by:
 - 1. Fibergrate Composite Structures Inc. 5151 Belt Line Road, Suite 1212 Dallas, Texas 75254-7028 USA
 - 2. (800) 527-4043 Phone (972) 250-1530 Fax
 - 3. Website: www.fibergrate.com E-mail: info@fibergrate.com
- B. Or approved equal

3.02 GENERAL

3.03 REFERENCE STANDARDS

- A. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- C. ISO 9001 - Quality Management Systems — Requirements; 2015.
- D. All FRP items furnished under this Section shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements and dimensions as specified in the Contract Documents.
- E. Fiberglass reinforcement shall be bi-directional rovings in sufficient quantities as needed by the application and/or physical properties required.
- F. Resin shall be Isophthalic Polyester, with chemical formulations as necessary to provide the corrosion resistance, strength and other physical properties as required.
- G. All finished surfaces of FRP items and fabrications shall be smooth, resin-rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall be well covered with resin to protect against their exposure due to wear or weathering.
- H. All floor plate products shall have a tested flame spread rating of 25 or less per ASTM E84 Tunnel Test. Plate shall not burn past the 0.98 inch (25 mm) reference mark and will be classified HB per ASTM D635.
- I. All mechanical plate clips shall be manufactured of Type 316SS (stainless steel).

3.04 MOLDED FRP FLOOR PLATE

- A. Manufacture: Floor plate shall be of a one-piece molded construction manufactured by building up multiple layers of resin-impregnated fiberglass reinforcements which are continuous and equally oriented in the length and width directions. The plate shall have a nominal thickness of 3/8". Percentage of glass (by weight) shall not exceed 35% so as to achieve maximum corrosion resistance, and as required to maintain the structural requirements of the CONTRACT. After molding, no dry glass fibers shall be visible on any surface. All surfaces shall be smooth and uniform with no evidence of fiber orientation irregularities, interlaminar voids, porosity, resin rich or resin starved areas.
- B. Non-slip surfacing: Floor plate shall have a gritted surface, integrally molded into the plate during the manufacturing process. Plates which are secondarily gritted shall not be allowed.
- C. Fire rating: Floor plate shall be fire retardant with a tested flame spread rating of 25 or less when tested in accordance with ASTM E84. Certifications shall be dated within the past two years and test data performed only on the resin shall not be acceptable.
- D. Resin system: Manufacturer to submit corrosion data from tests performed on actual plate products in standard chemical environments. Corrosion resistance data of the base resin from the manufacturer is not a true indicator of plate product corrosion resistance and shall not be accepted.
- E. Color: To be selected by Owner.
- F. Depth: 3/8" with a tolerance of plus or minus 1/16".
- G. Load/Deflection: Plate load/deflection requirements at the required span (shown below) shall be less than manufacturers published maximum recommended loads. NOTE: 1/8" plate is designed for use as a covering only; not recommended for unsupported service.
Load/deflection not to exceed the following - choose one:
 - 1. Uniform distributed load over a 24" span: 100 pounds per square foot, with a maximum deflection of 0.30" for 3/8" thick plate
- H. Substitutions: Other products of equal strength, stiffness, corrosion resistance and overall quality may be submitted with the proper supporting data to the engineer for approval.

3.05 FLOOR PLATE FABRICATION

- A. Measurements: Floor Plate supplied shall meet the dimensional requirements and tolerances as shown or specified. The Contractor shall provide and/or verify measurements in field for work fabricated to fit field conditions as required by plate manufacturer to complete the work. When field dimensions are not required, contractor shall determine correct size and locations of required holes or cutouts from field dimensions before plate fabrication.
- B. Layout: Each plate section shall be readily removable, except where indicated on drawings. Manufacturer to provide openings and holes where located on the contract drawings. Plate openings which fit around protrusions (pipes, cables, machinery, etc.) shall be discontinuous at approximately the centerline of opening so each section of plate is readily removable. Additional supports at openings shall be provided by the Contractor.
- C. Sealing: All shop fabricated plate cuts shall sealed to provide maximum corrosion resistance. All field fabricated plate cuts shall be coated similarly by the contractor in accordance with the manufacturer's instructions.
- D. Hardware: Type 316 stainless steel hold-down clips shall be provided and spaced at a maximum of four feet apart with a minimum of four per piece of plate, or as recommended by the manufacturer. All floor plates are to be bolted in place.

PART 3 - EXECUTION

4.01 INSPECTION

- A. Shop inspection is authorized as required by the Owner and shall be at Owner's expense. The fabricator shall give ample notice to Contractor prior to the beginning of any fabrication work so that inspection may be provided. The plate shall be as free, as commercially possible, from visual defects such as foreign inclusions, delamination, blisters, resin burns, air bubbles and pits. The surface shall have a smooth finish (except for grit top surfaces).

4.02 INSTALLATION

- A. Contractor shall install plates in accordance with manufacturer's assembly drawings. Lock plate panels securely in place with hold-down fasteners as specified herein. Field cut and drill fiberglass reinforced plastic products with carbide or diamond tipped bits and blades. Seal cut or drilled surfaces in accordance with manufacturer's instructions. Follow manufacturer's instructions when cutting or drilling fiberglass products or using resin products; provide adequate ventilation.

END OF SECTION 066100

**SECTION 076200
SHEET METAL FLASHING AND TRIM**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, and other items indicated in Flashing Fabrications.

1.02 SUMMARY

- A. Work of this Section specifies sheet metal and flexible flashing work related to or used in conjunction with masonry work, roofing work, waterproofing, and the general waterproof integrity of the building structure.
- B. This Section includes, but is not limited to, shop and field fabricated flashings used at the perimeter or penetrations of roofing, siding, or waterproofing work where not integral with membrane roofing and waterproofing and metal roofing and siding systems, and in masonry construction at foundation walls, shelf angles, and lintels.
- C. Items specified in this Section may be installed by the roofer, masonry subcontractor, or other subcontractors, depending on the project requirements. Carefully coordinate with related Sections to avoid duplication or omission of required items.

1.03 RELATED REQUIREMENTS

- A. Section 031000 - Concrete Forming and Accessories: Placement of recessed reglets in formwork.
- B. Section 061000 - Rough Carpentry: Wood nailers for sheet metal work.
- C. Section 077100 - Roof Specialties: Manufacturers copings, flashings and expansion joint covers.
- D. Section 077123 - Manufactured Gutters and Downspouts.
- E. Section 077200 - Roof Accessories: Manufactured metal roof curbs.
- F. Section 079200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.04 REFERENCE STANDARDS

- A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- B. ASTM B32 - Standard Specification for Solder Metal; 2020.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).
- D. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2024).
- E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement; 2025.
- F. CDA A4050 - Copper in Architecture - Handbook; Current Edition.
- G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.06 SUBMITTALS

- A. Shop Drawings: None required.

1.07 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.08 PROJECT CONDITIONS

- A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation to ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Stainless Steel: ASTM A666/A666M, Type 304 alloy, soft temper, 26 gauge, 0.0187 inch (0.48 mm) thick; 2D mill finish.

2.02 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18-inch (450 mm) long legs; seam for rigidity, seal with sealant.

2.03 FLASHING FABRICATIONS

- A. General: Fabricate items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and material.
- B. One-Piece Flashing: Stainless Steel: 0.0187 inch (0.5 mm) thick.
- C. Two-Piece Flashing: Stainless Steel: 0.0187 inch (0.5 mm) thick.

2.04 FLASHING

- A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

2.05 ACCESSORIES

- A. Slip Sheet: 5-lb/square (0.244 kg/sq. m) red rosin, sized building paper conforming to FS UU-B-790, Type I, Style 1b.
- B. Primer Type: Zinc chromate.
- C. Protective Backing Paint: Asphaltic mastic, ASTM D4479 Type I.
- D. Concealed Sealants: Non-curing butyl sealant.

- E. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material as specified in Section 079200 - Joint Sealants.
- F. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.
- G. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.
 - 1. Size cleats and attachment devices as recommended by SMACNA (ASMM) or sheet metal manufacturer for application but never less than thickness of metal being secured.
- H. Plastic Cement: ASTM D4586/D4586M, Type I, asbestos free, asphalt based.
- I. Stainless-Steel Welding Rods: Type recommended by stainless-steel sheet manufacturer for type of metal sheets furnished.
- J. Solder: ASTM B32; Sn60 type, with an acid flux of type recommended by stainless-steel sheet manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch (0.38 mm).

3.03 INSTALLATION

- A. Unless otherwise indicated, install flashing and trim to comply with performance requirements, manufacturer's installation instructions, SMACNA (ASMM) and details shown. Anchor units of Work securely in place, providing for thermal expansion of metal units. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.
- B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems acceptable to the Owner's Representative. Install flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating flashing system.
- C. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
- D. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work.

- E. Welded Joints: Welded joints are to be used for stainless steel only. Clean surfaces to be welded, removing oils and foreign matter. Weld and grind joint smooth. Comply with applicable requirements of SMACNA (ASMM).
- F. Sealed Joints: Unless otherwise shown, use mastic sealant when sealant will be completely concealed within the joint and elastomeric sealant when sealant will be exposed or used in an expansive joint condition. Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA (ASMM) standards. Fill joint with elastomeric sealant and form metal to completely conceal sealant. Use joint adhesive for nonmoving joints specified not to be soldered.
- G. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.
 - 1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
 - 2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.
- H. Capflashings: Coordinate installation of capflashings with installation of assemblies to be protected by capflashing. Install capflashings in joints provided in masonry, concrete, or stone, as applicable. Waterproof joint by means of elastomeric sealant. Lap capflashing joints a minimum of 2 inches (50 mm) and bed with sealant.
- I. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.
- J. Insert flashings into reglets to form tight fit; secure in place with lead wedges; seal flashings into reglets with sealant.
- K. Apply plastic cement compound between metal flashings and felt flashings.
- L. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- M. Seal metal joints watertight.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.05 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 076200

**SECTION 078400
FIRESTOPPING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 017000 - Execution and Closeout Requirements: Cutting and patching.

1.03 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2024.
- C. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems; 2024.
- D. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers; 2024.
- E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- F. ITS (DIR) - Directory of Listed Products; Current Edition.
- G. FM 4991 - Approval Standard of Firestop Contractors; 2013.
- H. FM (AG) - FM Approval Guide; Current Edition.
- I. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).
- J. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.
- K. UL (DIR) - Online Certifications Directory; Current Edition.
- L. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
 - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
 - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:
 - 2. Verification of minimum three years documented experience installing work of this type.

3. Verification of at least five satisfactorily completed projects of comparable size and type.
4. Licensed by local authorities having jurisdiction (AHJ).

1.05 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Firestopping Manufacturers:
 1. 3M Fire Protection Products: www.3m.com/firestop/#sle.
 2. Hilti, Inc: www.us.hilti.com/#sle.
 3. RectorSeal, a CSW Industrials Company: www.rectorseal.com/firestop-solutions/#sle.
 4. Specified Technologies Inc: www.stifirestop.com/#sle.

2.02 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements, unless specific material or system is indicated on the Drawings.
- B. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.
- C. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.
- D. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- E. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated at penetrations in horizontal assemblies.
 2. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- B. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.

2.04 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements, unless specific material or system is indicated on the Drawings.
 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by Owner's Independent Testing Agency.
- C. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- D. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.
- E. Provide and install any additional labeling as required by code.

3.04 FIELD QUALITY CONTROL

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174 and ASTM E2393.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION 078400

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**SECTION 079200
JOINT SEALANTS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

1.03 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.
- D. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2022.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Backing material recommended by sealant manufacturer.
 - 4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 5. Substrates the product should not be used on.
 - 6. Substrates for which use of primer is required.
 - 7. Substrates for which laboratory adhesion and/or compatibility testing is required.
 - 8. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
 - 9. Sample product warranty.
 - 10. Certification by manufacturer indicating that product complies with specification requirements.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Sustainable Design Documentation: For sealants and primers, submit VOC content and emissions documentation; see Section 016116.
- F. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
- G. Manufacturer's qualification statement.

- H. Installer's qualification statement.
- I. Executed warranty.
- J. Manufacturer's Statement of Application for each sealant type and application specified in this Section. Format for this document is located in Section 079200 - Joint Sealants – Appendix A.

1.05 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.
- C. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: For Silicone Sealants 20 years from date of Substantial Completion.
 - 2. Warranty Period: For all other sealants 5 years from date of Substantial Completion.
- D. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Nonsag Sealants:
 - 1. Bostik Inc: www.bostik-us.com/#sle.
 - 2. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - 3. Master Builders Solutions: www.master-builders-solutions.com/en-us/#sle.
 - 4. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com/#sle.
 - 5. Pecora Corporation: www.pecora.com/#sle.
 - 6. Sika Corporation: www.usa-sika.com/#sle.
 - 7. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.

2.02 JOINT SEALANT APPLICATIONS

- A. Scope:
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
 - 1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
 - 2. Lap Joints between Manufactured Metal Panels: Butyl rubber, non-curing.
- C. Sound-Rated Assemblies: Walls and ceilings identified as STC-rated, sound-rated, or acoustical.

2.03 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 016116.
- B. Colors: As indicated on drawings or as otherwise selected by Architect from manufacturer's full range of available colors.

2.04 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.

2. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
3. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
4. Color: Match adjacent finished surfaces.
5. Products:
 - a. Dow; DOWSIL 756 SMS Building Sealant: www.dow.com/#sle.
 - b. Dow; DOWSIL 790 Silicone Building Sealant: www.dow.com/#sle.
 - c. Momentive Performance Materials, Inc/GE Silicones; SCS9000 SilPruf NB - Non-Staining Silicone Weatherproofing Sealant: www.siliconeforbuilding.com/#sle.
 - d. Pecora Corporation; Pecora 864 NST or 895 NST (Non-Staining Technology): www.pecora.com/#sle.
 - e. Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosealants.com/#sle.
 - f. Tremco Commercial Sealants & Waterproofing; Spectrem 2: www.tremcosealants.com/#sle.
 - g. Tremco Commercial Sealants & Waterproofing; Spectrem 3: www.tremcosealants.com/#sle.
- B. Non-Curing Butyl Sealant: Solvent-based, single component, non-sag, non-skinning, non-hardening, non-bleeding; non-vapor-permeable; intended for fully concealed applications.
 1. Products:
 - a. Pecora Corporation; Pecora BA-98 Non-Skinning Butyl Sealant: www.pecora.com/#sle.

2.05 ACCESSORIES

- A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
 2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
 3. Record each test on Preinstallation Adhesion Test Log as indicated.

4. If any sample fails, review products and installation procedures, consult manufacturer, or take other measures that are necessary to ensure adhesion; retest in a different location; if unable to obtain satisfactory adhesion, report to Architect.
 5. After completion of tests, remove remaining sample material and prepare joints for new sealant installation.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- C. Destructive Adhesion Testing: If there are any failures in first 1,000 linear feet (300 linear m), notify Architect immediately.
- D. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.
- E. Repair destructive test location damage immediately after evaluation and recording of results.

3.05 POST-OCCUPANCY

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

END OF SECTION 079200

**SECTION 089100
LOUVERS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 076200 - Sheet Metal Flashing and Trim.
- B. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.

1.03 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2023.
- C. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021, with Editorial Revision (2022).
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.
- D. Test Reports: Independent agency reports showing compliance with specified performance criteria.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
 - 1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Louvers:
 - 1. Greenheck
 - a. Website: www.Greenheck.com
 - 2. Or Approved Equal

2.02 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 - 1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf (of 1.2 kPa) without damage or permanent deformation.
 - 2. Intake Velocity: Airflow resistance at 1000 feet per minute free area intake velocity shall not be greater than 0.114 inch water gauge pressure drop. based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
 - 3. Exhaust Velocity: Airflow resistance at 1000 feet per minute free area exhaust velocity shall not be greater than 0.096 inch water gauge pressure drop. based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
 - 4. Beginning point of water penetration shall not be less than 1221 feet per minute free area intake velocity.
 - 5. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
- B. Combination Louvers: Combination horizontal fixed blade and operable damper unit, extruded aluminum construction.
 - 1. Free Area: 48%, minimum.
 - 2. Pressure Drop: .096 inches of water gauge maximum per square foot (square meter) of free area at exhaust velocity of 1000 fpm, when tested in accordance with AMCA 500-L, test unit size 72 inch by 72 inch.
 - 3. Pressure Drop: .114 inches of water gauge maximum per square foot (square meter) of free area at intake velocity of 1000 fpm, when tested in accordance with AMCA 500-L, test unit size 72 inch by 72 inch.
 - 4. Operation: Actuator provided in HVAC control system.
 - 5. Louver Frame: 6 inch deep channel style with 0.125 inch extruded aluminum wall thickness.
 - 6. Stationary front blades shall be drainable style located on approximately 5 inch centers and 45 degree angles with 0.081 inch extruded aluminum wall thickness.
 - 7. Operable rear blades shall be airfoil design center pivot style with 0.063 inch extruded aluminum wall thickness.
 - 8. Jamb seals: Compressible style stainless steel.
 - 9. Blade seals: TPE (Thermal Plastic Elastomer).
 - 10. Blade linkage: To be out of airstream and concealed within frame.
 - 11. Blade axles: 0.5 inch diagonal zinc plated steel. Axle bearings shall be synthetic sleeve type.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063T5 or 6063T6 alloy, T52 or T6 temper.

2.04 FINISHES

- A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
 - 1. Manufacturers:
 - a. PPG; Duranar: www.ppgmetalcoatings.com/#sle.
 - b. Sherwin-Williams Company; Fluoropon: www.coil.sherwin.com/#sle.
- B. Primer: Zinc chromate, alkyd type.
- C. Color: As selected from manufacturer's standard colors.

2.05 ACCESSORIES

- A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
- B. Bird Screen: Interwoven wire mesh of aluminum, 14 gauge, 0.0641 inch (1.63 mm) diameter wire, 1/2 inch (13 mm) open weave, diagonal design.
- C. Insect Screen: 18 x 16 size aluminum mesh.
- D. Fasteners and Anchors: Stainless steel.
- E. Flashings and Subsills: Of same material as louver frame, formed to required shape, single length in one piece per location.
 - 1. Provide sill sump pan extending 1 (one) inch beyond interior face of louver assembly.
 - 2. Sill sump pan to extend up 4 inches at full length of interior leg and have 4 inch high side panels at jambs.
 - 3. Louver frame to have 1/4-inch clearance to sill sump pan below.
 - 4. Sill to slope and drain to exterior with drip edge at exterior.
 - 5. Form sill sump pan of 0.050 inch (1.27 mm) thick aluminum minimum.
- F. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.
- B. Verify that field measurements are as indicated on shop drawings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Set sill members and sill flashing in continuous bead of sealant.
- D. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- E. Secure louver frames in openings with concealed fasteners.
- F. Coordinate with installation of louver actuators.

3.03 ADJUSTING

- A. Adjust operable louvers for freedom of movement of control mechanism. Lubricate operating joints.

3.04 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.
- C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

END OF SECTION 089100

**SECTION 230500
BASIC MECHANICAL REQUIREMENTS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division -1 Specification Sections, apply to this Section.
- B. This is a Basic Mechanical Requirement Section and forms a part of the following Sections:
 - 1. All Division 23 Sections.

1.02 PROPOSED SUBSTITUTIONS

- A. Refer to Division 1 "Substitutions".

1.03 COORDINATED WORK TO FACILITATE TESTING, ADJUSTING AND BALANCING

- A. Provide all labor, material and equipment necessary to complete all work to properly balance all systems, including but not limited to, replacement of equipment drives, belts and sheaves at no additional cost to accomplish the work specified in Section "Testing, Adjusting and Balancing".

1.04 CODES, RULES, REGULATIONS, ORDINANCES AND STANDARDS

- A. In addition to the requirements shown or specified, comply with all applicable State, County, City, Township and local Codes, Rules, Regulations, Ordinances and Standards.
- B. Comply with the requirements shown or specified when those requirements are in excess of that required by Codes, Rules, Regulations, Standards and Ordinances.
- C. Advise the Architect of changes required to conform to State, County, and Local regulations, ordinances and codes prior to the time that contract is awarded.
- D. International Building Code, most recent edition adopted by the Authority Having Jurisdiction, including all applicable state and local admendments authored by the state in which the Project is located. NFPA 13, 14, 20 most recent edition adopted by the Authority Having Jurisdiction. NEC, most recent edition adopted by the Authority Having Jurisdiction.
- E. International Mechanical Code, most recent edition adopted by the Authority Having Jurisdiction, including all applicable state and local admendments authored by the state in which the Project is located.
- F. NFPA 90A most recent edition adopted by the Authority Having Jurisdiction.
- G. NEC, most recent edition adopted by the Authority Having Jurisdiction.

1.05 PERMITS, INSPECTIONS, TESTS, AND APPROVALS

- A. Secure and pay for all required permits, inspections, tests and approvals.
- B. Perform all tests required under applicable codes, rules, regulations, and ordinances.
- C. All parts of each system and associated equipment shall be tested and adjusted to work properly and be left in good operating condition.
- D. Provide all testing instruments, gauges, pumps and other equipment required or necessary for tests.
- E. Notify the Owner's Representative in advance of all tests and conduct all tests to his entire satisfaction.
- F. Correct all defects disclosed in the work by tests or otherwise without additional cost to the Owner.
- G. Repeat tests after any defects disclosed thereby have been corrected.

1.06 ACCEPTABLE MANUFACTURERS

- A. Acceptable manufacturers shall be considered for material in accordance with the requirements of the Specification Section, subject to the approval of the Engineer. Such approval concerns the manufacturer only and does not in any way act to permit any deviation from strict compliance with the requirements of these Specifications.

1.07 CONTRACT DRAWINGS

- A. Contract Drawings for Mechanical Work are diagrammatic, intended to convey the scope of the work and indicate general arrangement of equipment, ducts, piping and approximate sizes and locations of equipment and outlets. Do not scale drawings for measurements.
- B. Consult Mechanical, Architectural, Structural and Electrical Contract Drawings and Specifications to become familiar with all conditions affecting the Work, coordinate interconnecting work with other Trades affected, and verify all spaces in which the work will be installed.
- C. Where job conditions require reasonable changes in order to coordinate installation with other trades, these changes shall be made without extra cost to the Owner.
- D. The Contract Drawings and Specifications are to be cooperative, and whatever is called for by either shall be binding as if called for by both.

1.08 USE OF EQUIPMENT

- A. The use of any equipment, or any part thereof, for any purpose including testing even with the Owner's consent, shall not be construed to:
 - 1. Be an acceptance of the work on the part of the Owner.
 - 2. Obligate the Owner in any way to accept improper work or defective materials.
 - 3. Be the basis for determining the beginning of the Contractor's guarantee or manufacturer's warranty period.

1.09 LAYOUT AND COORDINATION DRAWINGS

- A. Prepare layout drawings in accordance with Division 1 Section "Administrative Requirements", and as specified below.
- B. Prepare layout drawings drawn to scale showing the intended method of installation and construction. Coordinate work with all other trades. Use the Contract Drawings and Specifications as a guide in preparing coordination drawings. Comply with the full intent of the Contract Drawings. Deviate from the Contract Drawings only as required to resolve installation requirements. Layout drawings shall show the detailed routing of all piping and ductwork and shall incorporate all requirements for; electrical conduit, buss duct, lighting and cable tray systems; building structural systems; building architectural systems (sprinklers, access panels, etc.); and other items as may be required.
- C. Layout drawings shall show all equipment, valves, dampers, and specialties including the required access spaces.
- D. The layout drawings shall not be a repetition of the Contract Drawings. Prepare coordination drawings on a reproducible medium with dimensioned equipment and piping locations, elevations and mounting details. If available, electronic drawing files can be purchased from the Architect. Drawing size shall match contract drawing size. Post changes and modifications as they occur.
- E. A set of layout drawings shall be kept on site and be available upon demand to the Architect, Owner's Project Representative, and others.
- F. Layout drawings are not required to be submitted to the Architect unless specifically requested by the Architect.

- G. Update the layout drawings, when changes are made, so that these drawings represent the currently constructed (or about to be constructed) conditions.
- H. Use the final layout drawings in preparing "Record Documents" as specified below and as specified in "Project Closeout Procedures" section.

1.10 RECORD DOCUMENTS

- A. Prepare record documents in accordance with Division 1 Section "Project Closeout Procedures". In addition to the requirements specified in Division 1, indicate the following installed conditions:
 - 1. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
 - 2. Approved substitutions, Contract Modifications, and actual equipment and materials installed.
 - 3. Contract Modifications, actual equipment and materials installed.

1.11 MAINTENANCE AND OPERATING MANUALS

- A. Prepare maintenance and operating manuals in accordance with Division 1 Section "Project Closeout Procedures". In addition to the requirements specified in Division 1, include the following information for equipment items:
 - 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 - 2. Manufacturer's printed operating and maintenance data, parts list and procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 - 3. Maintenance procedures and schedule for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 - 4. Servicing instructions and lubrication charts and schedules.
 - 5. Drive belt replacement schedule. Including manufacturer, model number, and size.
 - 6. Air filter replacement schedule including manufacturer, model number and size.
 - 7. List of all contractors and sub-contractors with address, telephone number, fax number and e-mail address, with their respective responsibility on the Project.

1.12 SUBMITTALS

- A. General:
 - 1. Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections. All submittals shall be fully bookmarked and products shall reference the specific specification section(s) and/or drawings they are complying with.
- B. Comply with the requirements of Section "Submittal Procedures" and as specified herein. All required submittals for an item shall be submitted in a complete single package.
- C. Required submittals are listed in applicable Specification Sections. Submittals not required by these Specifications will not be reviewed and will not be returned.
- D. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals in accordance with the requirements of Section "Submittal Procedures".

- E. If a submittal is returned "Rejected", the resubmittal shall include a cover letter by the supplier/vendor addressing each of the engineer's comments provided in the "Rejected" submittal. The supplier/vendor shall provide indication in the resubmittal where changes have been made to the resubmittal to address the engineer's comments or for changes for any other reason.
- F. The Contractor is required to identify any areas where submittal does not meet the project requirements. The Contractor is to include the reason for not meeting the project requirements (i.e., outdated product referenced, outdated standards referenced, etc.). This does not relieve the contractor from meeting the project requirements or from complying with the "Proposed Substitution" specification requirements.
- G. The following submittals are required prior to bid submission:
 - 1. Proposed substitutions.
 - 2. The following submittals are required prior to construction start:
 - a. Required product data.
 - b. Required shop drawings.
 - 3. The following submittals are required prior to construction punch list:
 - a. All required shop drawings and product data.
 - b. Operating and maintenance manuals.
 - c. Record documents.
 - d. Guarantees and warranties.
 - e. Certifications, inspection and test reports.
- H. Shop Drawings:
 - 1. Submit manufacturer's technical product data, including rated capacities of selected model with clearly indicated, weights (shipping, installed, and operation), dimensions, required clearances, and methods of assembly of components, furnished specialties and accessories; and installation and start-up instructions.
 - 2. Submit ladder-type wiring diagrams for power and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.
 - 3. Submit maintenance data and parts list for all mechanical equipment; including "trouble shooting" maintenance guide; plus servicing, and preventative maintenance procedures and schedule. Include this data and product data in maintenance manual; in accordance with requirements of Division 1.

1.13 CONSTRUCTION PUNCH LIST

- A. Inspect the work and operate all systems prior to requesting the construction punch list to insure that the work is complete and operating in accordance with the requirements of the Contract Documents.
- B. Prior to requesting construction punch list:
 - 1. Operate the HVAC system in the various modes of operation.
 - 2. Verify the test work is complete, reviewed and accepted by the Owner's Representative.
 - 3. Verify maintenance and operating manual work is complete, reviewed and accepted by the Owner's Representative.
 - 4. Verify system final adjustments and cleaning work is complete.
- C. The final construction punch list time shall be coordinated with the Owner's Representative, providing; minimum one (1) week notice.

1.14 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

- B. Receive, properly house, handle, hoist, deliver to proper location, equipment and other material required.
- C. After delivery, before and after installation, protect equipment and materials against theft, injury or damage from all causes.
- D. Store equipment and materials in clean, dry space; store off the ground; protect from weather and physical damage.

1.15 QUALITY ASSURANCE

- A. Applicable Codes and Standards.
- B. Installer's qualifications: Minimum 5 years of installation experience on successful projects for the installing firm of the individual doing the installation, unless a higher minimum is otherwise specifically noted in other Division 23 Specification Sections.
- C. Welder's Qualifications:
 - 1. Welders shall be qualified in accordance with ASME Boiler and Pressure Vessel Code, Section IX, and Brazing Qualifications.
 - 2. Welding procedures and testing shall comply with ANSI Standard B31.1.0 - Standard Code for Pressure Piping, Power Piping, and The American Welding Society, Welding Handbook.
 - 3. Soldering and Brazing procedures shall conform to ANSI B9.1 Standard Safety Code for Mechanical Refrigeration.
 - 4. Certifications: Submit welder certificates, signed by Contractor, certifying that welders comply with requirements specified under "Quality Assurance" heading of this Section.
- D. Provide the following stamps and labels:
 - 1. "AGA" label on all gas fired equipment.
 - 2. "UL" or "ETL" label on all equipment with electrical connections.
 - 3. ASME Code stamp/label on all boilers, water heaters, tanks and receivers.
- E. Air Conditioning Equipment:
 - 1. Capacity ratings for air conditioning equipment shall be in accordance with applicable ARI Standards with ASHRAE 90A minimum "COP" and "EER" efficiency levels.

1.16 TEMPORARY PROTECTION AND UTILITIES

- A. Provide temporary protection, construction water, heat and ventilation as specified in Division 1 Section "Temporary Facilities and Controls".
- B. Permanent HVAC equipment shall not be used for temporary heating, ventilating or air conditioning unless written Owner approval is obtained. Refer to Division 1 Section "Temporary Facilities and Controls".

1.17 WARRANTY

- A. All systems, components, parts, assemblies and labor furnished under this contract shall be warranted against defects in materials and workmanship in accordance with the General Conditions. Any manufacturing or component defects arising during this warranty period shall be corrected without cost to the Owner.
- B. All applicable software as detailed in this specification shall be updated by the supplier free of charge during and at the end of the warranty period. This will ensure that all system software will be the most up-to-date software available.
- C. Additional warranty requirements, included in the individual specification sections, shall be considered requirements in addition to those of the General Conditions. In all instances, the most stringent requirements shall apply.

1.18 HOUSEKEEPING

- A. Maintain the premises neat and orderly and thoroughly clean upon completion of the work.

PART 2 PRODUCTS

2.01 ENERGY CODE COMPLIANCE

- A. All heating, ventilating, and air conditioning equipment and all motors shall comply with the requirements included in the individual Division 23 Section governing the said equipment or with the current state energy code. Whichever is more stringent.

PART 3 EXECUTION

3.01 ROUGH-INS

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to equipment specifications in Divisions 2 through 28 Specification Sections and the Drawings for rough-in requirements.

3.02 INSTALLATION, COORDINATION AND SPECIAL PROVISIONS

- A. Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment.
- B. Coordinate connection of electrical services to mechanical equipment.
- C. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
- D. Coordinate mechanical systems, equipment, and materials installation with other building components.
- E. Verify all dimensions by field measurements.
- F. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
- G. Coordinate installation of identifying devices after completing covering and painting where identifying devices are applied to surfaces.
- H. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
- I. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form.
- J. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components.
- K. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
- L. Provide minimum 36" clear access to any component or device with an electrical or pneumatic control connection.
- M. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.03 CUTTING AND PATCHING

- A. Perform cutting and patching in accordance with Division 1 Section "Cutting and Patching".
- B. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
 - 1. Uncover Work to provide for installation of ill-timed Work.
 - 2. Remove and replace defective Work.
 - 3. Remove and replace Work not conforming to requirements of the Contract Documents.
 - 4. Remove samples of installed Work as specified for testing.
 - 5. Install equipment and materials in existing structures.
 - 6. Upon written instructions from the Owner's Representative, uncover and restore Work to provide for observation of concealed Work.
- C. Cut, remove and legally dispose of selected mechanical equipment, components and materials as indicated, including, but not limited to, removal of mechanical units, and other mechanical items made obsolete by the new work.
- D. Protect the structure, finishes, and adjacent materials not indicated or scheduled to be removed.
- E. Patch existing finished surfaces and building components using new materials matching existing materials and experienced Installers. For installers' qualifications refer to the materials and methods required for the surface and building components being patched.
- F. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers. For installers' qualifications refer to the materials and methods required for the surface and building components being patched.
- G. Refer to Division 1 Section "Reference Standards and Definitions" for definition of "Experienced Installer".

3.04 SYSTEM ACTIVATION

- A. Activation of the permanent heating, ventilating system for testing will be allowed only after the building is substantially complete, or by written request to and written permission of the Owner's Project Representative.
- B. Temporary filters shall be provided at each air inlet, including but not limited to air grilles. To prevent the accumulation of construction dust/debris in the duct system. The filters shall be maintained until the completion of all painting and/or dust generating construction activities.
- C. Temporary filters shall be installed to prevent the accumulation of dust and dirt in all the duct systems before the ventilating and air conditioning duct systems are activated. New filters shall be provided and installed upon completion of the work and prior to acceptance of the work by the Owner. If temporary filters get dirty during system activation, the filters must then be replaced before starting system again.
- D. Prior to air testing thoroughly clean all ductwork. The entire system shall be re-checked for compliance with the drawings and specifications so that all components are free from defects resulting from the early activation of the permanent ventilating and air conditioning systems.
- E. Properly operate, and maintain the permanent heating, ventilating systems to the time of final acceptance by the Owner. The minimum temperatures called for under Temporary Heating shall be maintained during this period. Any adjustments and repairs required to comply with the Specifications, tests, and balancing of the permanent heating systems shall be made to the satisfaction of the Owner's Representative before final acceptance. Make all repairs and adjustments required to put the heating and air conditioning systems and equipment into first class condition before final acceptance by the Owner's Representative.

3.05 SYSTEM AND EQUIPMENT ADJUSTMENT

- A. After the testing has been completed, energize all systems and equipment.
- B. Adjust all equipment and auxiliary devices for smooth and quiet operation.
- C. Check motor and coupling alignment to verify compliance with manufacturer's tolerances; make adjustments as necessary.
- D. Lubricate all bearings.
- E. Adjust fan motor bases to the center adjustment position, wherever possible, to facilitate future belt tightening.
- F. Check all motors and bearings for overheating and make necessary adjustments - if required.
- G. Submit a "System and Equipment Adjustment" report to the Architect. This report shall address all of the items listed above.

3.06 MAINTENANCE OF EXISTING UTILITY SERVICES

- A. Uninterrupted normal use of the existing facilities must be maintained during the time required to perform the complete installation of the work indicated in the Contract Documents. It is mandatory that the existing buildings be maintained in service.
- B. Investigate existing conditions and the location of all existing equipment and the location of all existing services before starting.
- C. If a service is disturbed, immediately without regard for working hours, place the service back into operation.
- D. Sufficient advance notice shall be given to the Owner and its permission obtained prior to interruption of present services. It should be assumed that disruption of utilities and services will be done at other than normal working hours. No additional or extra payment will be authorized to comply with these requirements.
- E. Repair, replace and maintain in service any utilities, facilities, or services (underground, overground, interior or exterior) damaged, broken or otherwise rendered inoperative during the course of construction in the existing building.
- F. All openings must be securely covered, or otherwise protected, to prevent injury due to carelessly or maliciously dropped tools or materials, grit, dirt, or any foreign matter. Damaged work shall be repaired or replaced until work is fully and finally accepted.
- G. Protect motors, pumps, electrical equipment, heating equipment and all similar items of equipment from dirt, grime, plaster, paint and water during all phases of construction. This protection shall be provided by covering with transparent plastic sheeting.

3.07 DEMOLITION

- A. General:
 - 1. Demolish, remove, demount, and disconnect abandoned mechanical materials and equipment indicated to be removed and not indicated to be salvaged or saved.
 - 2. Protect adjacent materials indicated to remain. Install and maintain dust and noise barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Remove protection and barriers after demolition operations are complete.
 - 3. Locate, identify, and protect mechanical services passing through demolition area and serving other areas outside the demolition limits. Maintain services to areas outside demolition limits. When services must be interrupted, install temporary services for affected areas.

-
4. Materials and Equipment to be Salvaged: Remove, demount, and disconnect existing mechanical materials and equipment indicated to be removed and salvaged, and deliver materials and equipment to the location designated for storage.
 5. Disposal and Cleanup: Remove from the site and legally dispose of demolished materials and equipment not indicated to be salvaged.
 6. Clean area after demolition of work to satisfaction of Owner's Designated Representative.
 7. Repair or replace equipment or materials damaged during demolition to satisfaction of Owner's designated representative.
 8. Remove, reconnect, cap, plug and replace existing piping and ductwork only where indicated in the Contract Documents.
 9. Remove and/or replace existing equipment, controls, etc., only where indicated in the Contract Documents.
- B. Scheduling:
1. Submit schedules indicating proposed methods and sequence of operations for demolition prior to commencement of Work. Include coordination for shut-off of utility services and details for dust and noise control.
 2. Coordinate sequencing with construction phasing and Owner occupancy specified in Division 1 Section "Summary of the Work".

3.08 TESTING, START-UP, AND TRAINING PROCEDURES

- A. Develop and implement a plan and schedule for the testing, start-up, and training for all new mechanical equipment. This plan will be specific to the project.
- B. Provide any testing equipment and re-testing necessary.
- C. In addition to all required submittal data for approval of the equipment, O & M Manuals, and warrantee information, provide documentation on all testing, start-up, and training activities. This documentation will include but is not limited to:
1. Installation, Start-up, and Check-out materials shipped with the equipment
 2. Factory or Field Check-out forms used by factory or field technicians
 3. Pre-functional and Functional Test Procedures and Check Lists
 4. Start-up and System Operational Procedures and Check Lists
 5. Sequences of Operation, Control Drawings, or other equipment documentation
 6. Training Manuals
 7. Re-testing of all deficiencies or non-conformance issues
- D. Develop project-specific forms and check-lists for the equipment on this project.
- E. Functional performance testing and verification may be achieved by manual testing or monitoring the performance and analyzing the results using the control system's trend log capabilities. Simulating conditions may be allowed, though timing the testing to experience actual conditions is encouraged wherever practical. Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The contractor executing the test shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test the contractor shall return all affected building equipment and systems to their pre-test condition.
- F. Submit at project close-out with the as-built drawings, a document certifying that:
1. Systems were tested and function per design intent
 2. Systems were installed per manufacturers recommendations and to industry accepted minimum standards
 3. Systems received adequate operational check-out by installing contractors
 4. Proper performance of equipment and systems was documented and given to the Owner.
-

5. O & M Manuals and as-built drawings are complete and accurate.
 6. Owner's operating personnel are adequately trained.
- G. Equipment and systems covered by this specification include but are not limited to:
1. Heating, Ventilating Systems
 2. Control Systems

END OF SECTION 230500

**SECTION 230513
COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General construction and requirements.
- B. Three phase electric motors.

1.02 RELATED REQUIREMENTS

- A. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.
- B. Section 262913 - Enclosed Controllers.

1.03 REFERENCE STANDARDS

- A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; 2015, with Errata (2026).
- B. IEEE 112 - IEEE Standard Test Procedure for Polyphase Induction Motors and Generators; 2017.
- C. NEMA MG 00001 - Motors and Generators; 2024.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide wiring diagrams with electrical characteristics and connection requirements.
- C. Test Reports: Indicate test results verifying nominal efficiency and power factor for three phase motors larger than 1/2 horsepower.
- D. Manufacturer's Installation Instructions: Indicate setting, mechanical connections, lubrication, and wiring instructions.
- E. Operation Data: Include instructions for safe operating procedures.
- F. Maintenance Data: Include assembly drawings, bearing data including replacement sizes, and lubrication instructions.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of electric motors for Fan use, and their accessories, with minimum three years documented product development, testing, and manufacturing experience.
- B. Comply with NFPA 70.
- C. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of high efficiency motors.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer warranty for motors larger than 20 horsepower.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Baldor Electric Company/ABB Group; _____: www.baldor.com/#sle.
- B. Leeson Electric Corporation; _____: www.leeson.com/#sle.
- C. Regal-Beloit Corporation (Century); _____: www.centuryelectricmotor.com/#sle.
- D. _____.
- E. Substitutions: See Section 016000 - Product Requirements.

2.02 GENERAL CONSTRUCTION AND REQUIREMENTS

- A. Electrical Service: Refer to Section 260583 for required electrical characteristics.
- B. Nominal Efficiency:
 - 1. Enclosed Motor with Four Poles: 82.5.
- C. Construction: TEFC
 - 1. Design for continuous operation in 104 degrees F (40 degrees C) environment.
 - 2. Design for temperature rise in accordance with NEMA MG 00001 limits for insulation class, service factor, and motor enclosure type.
 - 3. Motors with frame sizes 254T and larger: Energy efficient type.
- D. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.
- E. Wiring Terminations:
 - 1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
 - 2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.03 THREE PHASE POWER - SQUIRREL CAGE MOTORS

- A. Starting Torque: Between 1 and 1-1/2 times full load torque.
- B. Starting Current: Six times full load current.
- C. Power Output, Locked Rotor Torque, Breakdown or Pull Out Torque: NEMA Design B characteristics.
- D. Design, Construction, Testing, and Performance: Comply with NEMA MG 00001 for Design B motors.
- E. Insulation System: NEMA Class B or better.
- F. Testing Procedure: In accordance with IEEE 112. Load test motors to determine free from electrical or mechanical defects in compliance with performance data.
- G. Motor Frames: NEMA Standard T-Frames of steel, or cast iron with end brackets of cast iron.
- H. Thermistor System (Motor Frame Sizes 254T and Larger): Three PTC thermistors embedded in motor windings and epoxy encapsulated solid state control relay for wiring into motor starter; refer to Section 262913.
- I. Bearings: Grease lubricated anti-friction ball bearings with housings equipped with plugged provision for relubrication, rated for minimum ABMA STD 9, L-10 life of 20,000 hours. Calculate bearing load with NEMA minimum V-belt pulley with belt center line at end of NEMA standard shaft extension. Stamp bearing sizes on nameplate.
- J. Sound Power Levels: To NEMA MG 00001.

- K. Nominal Efficiency: As indicated at full load and rated voltage when tested in accordance with IEEE 112.
- L. Nominal Power Factor: As indicated at full load and rated voltage when tested in accordance with IEEE 112.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
- C. Check line voltage and phase and ensure agreement with nameplate.

3.02 SCHEDULE

- A. Three Phase - Energy Efficient, Totally Enclosed, Fan Cooled Performance:
 - 1. 1800 rpm.
 - a. 5 hp:
 - 1) NEMA Frame: 184T.
 - 2) Minimum Percent Power Factor: 83.
 - 3) Minimum Percent Efficiency: 88.

END OF SECTION 230513

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SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Measurement of final operating condition of HVAC systems.
- C. Vibration measurement of equipment operating conditions.
- D. Commissioning activities.

1.02 RELATED REQUIREMENTS

- A. Section 019113 - General Commissioning Requirements: Commissioning requirements that apply to all types of work.
- B. Section 230800 - Commissioning of HVAC.

1.03 REFERENCE STANDARDS

- A. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2024, with Errata (2025).

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Include at least the following in the plan:
 - a. Preface: An explanation of the intended use of the control system.
 - b. List of all air flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - c. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - d. Identification and types of measurement instruments to be used and their most recent calibration date.
 - e. Final test report forms to be used.
 - f. Detailed step-by-step procedures for TAB work for each system and issue, including:
 - 1) Total flow calculations.
 - 2) Rechecking.
 - 3) Diversity issues.
 - g. Expected problems and solutions, etc.
 - h. Details of how TOTAL flow will be determined; for example:
 - i. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.
- C. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.
- D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 - 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 2. Include actual instrument list, with manufacturer name, serial number, and date of calibration.

3. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
4. Units of Measure: Report data in I-P (inch-pound) units only.
5. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Architect.
 - g. Project Contractor.
 - h. Project altitude.
 - i. Report date.
- E. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

3.02 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 1. Systems are started and operating in a safe and normal condition.
 2. Temperature control systems are installed complete and operable.
 3. Proper thermal overload protection is in place for electrical equipment.
 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 5. Fans are rotating correctly.
 6. Fire and volume dampers are in place and open.
 7. Access doors are closed and duct end caps are in place.
 8. Air outlets are installed and connected.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

- A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.
- B. Provide additional balancing devices as required.

3.04 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

3.05 RECORDING AND ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.

- B. Permanently mark settings of dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.
- F. Check and adjust systems approximately six months after final acceptance and submit report.

3.06 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Vary branch air quantities by damper regulation.
- E. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- F. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- G. Adjust outside air automatic dampers, outside air, and exhaust dampers for design conditions.
- H. Measure temperature conditions across outside air, and exhaust dampers to check leakage.
- I. Where modulating dampers are provided, take measurements and balance at extreme conditions.
- J. Measure building static pressure and adjust supply, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near the building entries.

3.07 COMMISSIONING

- A. See Sections 019113 - General Commissioning Requirements and 230800 for additional requirements.
- B. Perform prerequisites prior to starting commissioning activities.
- C. Fill out Prefunctional Checklists for:
 - 1. Air side systems.
- D. Furnish to the Commissioning Authority, upon request, any data gathered but not shown in the final TAB report.
- E. Re-check a random sample equivalent to ____ 25 percent of the final TAB report data as directed by Commissioning Authority.
 - 1. Original TAB agency shall execute the re-checks, witnessed by the Commissioning Authority.
 - 2. Use the same test instruments as used in the original TAB work.
 - 3. Failure of more than 10 percent of the re-checked items of a given system shall result in the rejection of the system TAB report; rebalance the system, provide a new system TAB report, and repeat random re-checks.
 - 4. For purposes of re-check, failure is defined as follows:

- a. Minimum Outside Air Flow: Deviation of more than 20 percent of instrument reading; for inlet vane using linear proportional control, deviation of more than 30 percent at intermediate supply flow.
 - b. Temperatures: Deviation of more than one degree F (0.5 degree C).
 - c. Sound Pressures: Deviation of more than 3 decibels, with consideration for variations in background noise.
5. For purposes of re-check, a whole system is defined as one in which inaccuracies will have little or no impact on connected systems; for example, the air distribution system served by one air handler or the hydronic chilled water supply system served by a chiller or the condenser water system.

3.08 SCOPE

- A. Test, adjust, and balance the following:
1. Fans.
 2. Air Filters.

3.09 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
1. Manufacturer.
 2. Model/Frame.
 3. HP/BHP.
 4. Phase, voltage, amperage; nameplate, actual, no load.
 5. RPM.
 6. Service factor.
 7. Starter size, rating, heater elements.
 8. Sheave Make/Size/Bore.
- B. Exhaust Fans:
1. Location.
 2. Manufacturer.
 3. Model number.
 4. Serial number.
 5. Air flow, specified and actual.
 6. Total static pressure (total external), specified and actual.
 7. Inlet pressure.
 8. Discharge pressure.
 9. Sheave Make/Size/Bore.
 10. Number of Belts/Make/Size.
 11. Fan RPM.
- C. Vibration Tests:
1. Location of points:
 - a. Fan bearing, drive end.
 - b. Fan bearing, opposite end.
 - c. Motor bearing, center (if applicable).
 - d. Motor bearing, drive end.
 - e. Motor bearing, opposite end.
 - f. Casing (bottom or top).
 - g. Casing (side).
 - h. Duct after flexible connection (discharge).
 - i. Duct after flexible connection (suction).

2. Test readings:
 - a. Horizontal, velocity and displacement.
3. Normally acceptable readings, velocity and acceleration.
4. Vibration source (if non-complying).

END OF SECTION 230593

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**SECTION 230913
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Damper Operators:
 - 1. Electric operators.
- B. Thermostats:
 - 1. Electric thermostats.

1.02 RELATED REQUIREMENTS

- A. Section 233300 - Air Duct Accessories.
- B. Section 253513 - Integrated Automation Actuators and Operators.
- C. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.
- D. Section 262726 - Wiring Devices: Elevation of exposed components.

1.03 REFERENCE STANDARDS

- A. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2021.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Substantial Completion.
- C. Provide five year manufacturer's warranty for control air compressors.

PART 2 PRODUCTS

2.01 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.02 DAMPERS

- A. See Section 233300 for dampers and this section for actuators and operators.

2.03 DAMPER OPERATORS

- A. General:
 - 1. Provide actuators with torque capacity sized for minimum of 20 percent greater than maximum design stream velocity and hold tight seal against maximum system pressures.
-

2. Provide spring return for two position control and for fail safe operation.
 3. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
 4. Provide one operator for maximum 36 sq ft (3.34 sq m) damper section.
 5. See Section 253513 for field-mount damper actuators and operators.
- B. Electric Operators:
1. Manufacturers:
 - a. Schneider Electric: www.schneider-electric.us/#sle.
 - b. Belimo.
 - c. Substitutions: See Section 016000 - Product Requirements.
 2. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch.

2.04 THERMOSTATS

- A. Electric Thermostats:
1. Manufacturers:
 - a. Substitutions: See Section 016000 - Product Requirements.
 2. Type: NEMA BS 31032, line voltage 120 volts, with setback/setup temperature control.
 3. Service: Cooling only.
 4. Covers: Locking with set point adjustment, with thermometer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that systems are ready to receive work.
- B. Beginning of installation means installer accepts existing conditions.
- C. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
- D. Ensure installation of components is complementary to installation of similar components.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches (1500 mm) above floor. Align with lighting switches and humidistats; see Section 262726.
- C. Provide isolation (two-position) dampers of parallel blade construction.
- D. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.
- E. Provide conduit and electrical wiring in accordance with Section 260583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

END OF SECTION 230913

**SECTION 233300
AIR DUCT ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Backdraft dampers - metal.
- B. Volume control dampers.
- C. Miscellaneous Products:
 - 1. Damper operators.
 - 2. Damper position switch.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 233100 - Ductwork and Accessories.
- C. Section 253513 - Integrated Automation Actuators and Operators: Damper operators.
- D. Section 253516 - Integrated Automation Sensors and Transmitters: Damper position switch.

1.03 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2018.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2021.
- D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2021.
- E. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide for shop-fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 BACKDRAFT DAMPERS - METAL

- A. Manufacturers:
 - 1. Louvers & Dampers, Inc, a brand of Mestek, Inc: www.louvers-dampers.com/#sle.
 - 2. Nailor Industries, Inc: www.nailor.com/#sle.
 - 3. Ruskin Company: www.ruskin.com/#sle.
 - 4. Pottorff.
 - 5. Greenheck

- B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch (150 mm) width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.02 VOLUME CONTROL DAMPERS

- A. Manufacturers:
 - 1. Louvers & Dampers, Inc, a brand of Mestek, Inc: www.louvers-dampers.com/#sle.
 - 2. Nailor Industries, Inc: www.nailor.com/#sle.
 - 3. Ruskin Company: www.ruskin.com/#sle.
 - 4. Pottorff.
 - 5. Greenheck
 - 6. Substitutions: See Section 016000 - Product Requirements.
- B. Fabricate in accordance with SMACNA (DCS) and as indicated.

2.03 MISCELLANEOUS PRODUCTS

- A. Damper Operators: Provide electric operators.
- B. Damper position switch

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 233100 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- D. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.

END OF SECTION 233300

**SECTION 233423
HVAC POWER VENTILATORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall exhausters.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
- B. AMCA 99 - Standards Handbook; 2025.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2020.
- D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2025.
- E. AMCA 300 - Reverberation Room Methods of Sound Testing of Fans; 2024.
- F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.05 QUALITY ASSURANCE

1.06 FIELD CONDITIONS

- A. Request Owner permission to use permanent ventilator(s) for ventilation during construction.

PART 2 PRODUCTS

2.01 POWER VENTILATORS - GENERAL

- A. Manufacturers:
 - 1. Greenheck Fan Corporation: www.greenheck.com/#sle.
 - 2. PennBarry, Division of Air System Components: www.pennbarry.com/#sle.
 - 3. Twin City.
 - 4. Cook
- B. Static and Dynamically Balanced: Comply with AMCA 204.
- C. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
- D. Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.
- E. Fabrication: Comply with AMCA 99.
- F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.02 WALL EXHAUSTERS

- A. Manufacturers:
-

1. Greenheck Fan Corporation: www.greenheck.com/#sle.
 2. PennBarry, Division of Air System Components: www.pennbarry.com/#sle.
 3. Twin City Fan & Blower; WPB: www.tcf.com/#sle.
 4. Substitutions: See Section 016000 - Product Requirements.
- B. Fan Unit: V-belt or direct driven with spun aluminum housing; resiliently mounted motor; 1/2 inch (13 mm) mesh, 0.062 inch (1.6 mm) thick aluminum wire bird screen.
- C. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.
- D. Sheaves: For V-belt drives, provide cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm can be reached with sheaves set at mid-position; fan shaft with self-aligning prelubricated ball bearings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide sheaves required for final air balance.
- C. Install backdraft dampers on inlet to roof and wall exhausters.
- D. Provide backdraft dampers on outlet from cabinet and ceiling exhausters fans and as indicated.

END OF SECTION 233423