



**Newport News Redevelopment & Housing Authority**  
**Division of Purchasing**  
**227 – 27<sup>th</sup> Street • P.O. Box 797**  
**Newport News, VA 23607**  
**Phone: (757) 928-2623 Fax: (757) 247-6535**  
**[www.nnrha.com](http://www.nnrha.com)**

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**INVITATION FOR BIDS**

**IFB #ATP-04-26**

**ALTERATIONS TO PINECROFT**

**Issue date: March 23, 2026**  
**Optional Site Visit: April 8, 2026 @ 2:00 PM**  
**Closing Date: April 21, 2026 @ 2:00 PM**

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Monique Warren  
Procurement Manager

Newport News Redevelopment and Housing Authority  
Division of Purchasing  
227 27<sup>th</sup> Street P.O. Box 797  
Newport News, VA 23607  
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Invitation for Bids  
IFB# ATP-04-26  
April 21, 2026

Alterations to Pinecroft

**Optional Site Visit: April 2, 2026 @ 2:00PM**  
**Bid Due Date and Time: April 21, 2026 @ 2:00 PM**

Sealed bids, subject to the conditions and instructions contained herein, will be received at the above office until the date and hour shown (local prevailing time) and then publicly opened, for furnishing the described equipment, materials, and/or services, for delivery and/or performance F.O.B. Newport News, VA. **Bids received in the issuing office after the date and time may not be considered.** NNRHA is not responsible for delays in the delivery of mail by the U.S. Postal Service, private couriers, or the intra-authority mail system. **It is the sole responsibility of the bidder to ensure that its bid reaches the issuing office by the designated date and hour.** The official time used in the receipt of bids is that time on the automatic time stamp machine or other documentary evidence of receipt in the issuing office.

All requests for interpretation of specifications shall be by written request, sent via facsimile to (757) 245-2144 or emailed to [mwarren@nnrha.org](mailto:mwarren@nnrha.org). Any changes to this document will be issued as addenda and will be on file in the Division of Purchasing until bids are opened. All such addenda will become part of the contract and all offerors will be bound by such addenda, whether or not received by the bidder. This form must be signed, as well as subsequent addenda, and all pages returned in a sealed envelope. All signatures must be original and not photocopies. **Written questions must be submitted ten (10) days prior to the closing date of the bid; last day for written questions is April 13, 2026 @ 4:00 p.m.**

**PLEASE NOTE: The Wilbern Building is closed daily between the hours of 12:00 noon to 1:00 p.m.**

In compliance with this Invitation for Bids, and subject to all the conditions thereof, the undersigned offers, if this bid is accepted within ninety (90) calendar days from the date of the opening, to furnish any or all of the items and/or services upon which prices are quoted, at the price set opposite each item, to be delivered at the time and place specified herein. The undersigned certifies they have read, understands, and agrees to all terms, conditions, and requirements of the bid, and is authorized to contract on behalf of firm named below.

Company Name: \_\_\_\_\_ Federal Tax ID: \_\_\_\_\_  
Address: \_\_\_\_\_ City/State/Zip: \_\_\_\_\_  
Telephone: \_\_\_\_\_ Fax Number: \_\_\_\_\_ Email: \_\_\_\_\_  
Print Name: \_\_\_\_\_ Title: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**A. PURPOSE**

Newport News Redevelopment and Housing Authority (NNRHA) is seeking proposals from Virginia Licensed "Class A" General Contractors with at least five (5) years of similar experience in major mechanical, electrical work, and painting.

**Bid Documents Include:**

- Attachment "A" - Work Write-Up (Specifications)
- Attachment "B" - Pricing Sheet (s) \*
- Attachment "C" - Terms and Conditions \* (**Initial each page**)
- Attachment "D" - Statement of Bidders Qualifications\*
- Attachment "E" - Minority Business Participation Commitment \*
- Attachment "F" - Certificate of Non-Segregated Facilities\*
- Attachment "G" - Non-Collusive Affidavit\*
- Attachment "H" - Bid Bond Form\*
- Attachment "I" - Payment and Performance Bond\*
- Attachment "J" - Contractor's Certificate of Completion and Release\*
- Attachment "K" - Davis Bacon Wage Rate\*
- Attachment "L" - Section 3 Forms\*
- Attachment "M" - HUD Forms/Information\*

**NOTE:**

ALL FORMS IDENTIFIED WITH a **RED \*** MUST BE COMPLETED AND SUBMITTED WITH BID PACKAGE.

**B. ACCESS AND WORK HOURS:**

Contractors shall have access to the site between the hours of 8:00 AM- 5:00 PM, Monday- Friday unless granted permission otherwise. NNRHA currently observes the following holidays:

- |                        |                               |
|------------------------|-------------------------------|
| New Year's Day         | Labor Day                     |
| Martin Luther King Day | Veterans Day                  |
| President's Day        | Thanksgiving Day              |
| Memorial Day           | Friday after Thanksgiving Day |
| Juneteenth Day         | Christmas Eve                 |
| Independence Day       | Christmas Day                 |

**C. OPTIONAL PRE-BID CONFERENCE AND SITE VISIT:**

An optional pre bid conference will be held at Pinecroft Apartments, 75 Wellesley Dr, Newport News, VA 23602 on April 2, 2026, at 2:00PM with an optional site visit to follow immediately after pre bid conference. The purpose of this conference is to allow potential bidders an opportunity to present questions and obtain clarification relative to any facet of this invitation for bid.

While attendance at the pre bid conference is not a prerequisite for submitting a bid, bidders who intend to submit a bid are encouraged to attend. Please bring a copy of your solicitation with you. Any changes resulting from the pre bid conference will be issued as an addendum.

**D. LIQUIDATED DAMAGES:**

In accordance with the Invitation for Bids, it is hereby understood and agreed by the Contractor that time is of the essence in delivery of supplies, completion of the project, services, materials or equipment of the character and quality specified in the bid document. In the event these specified supplies, services, material or equipment are not delivered by the dates specified, there will be deducted, not as penalty but as liquidated damages, the sum of \$250.00 per day for each and every calendar day of delay beyond the time

specified; except that if such delays are the results of an act of negligence, or default on the part of NNRHA, public suppliers, or by riot, sabotage or labor trouble that results from cause or causes entirely beyond the control or fault of the Contractor or his suppliers. NNRHA may grant a reasonable extension of time if deemed appropriate. Upon receipt of a written request and justification for an extension from the Contractor, the Contractor Officer may extend the time for performance of the contract or delivery of goods herein specified at the Contracting Officer's sole discretion for good cause shown.

#### **E. DAVIS BACON WAGE DETERMINATION**

Due to funding and anticipated dollar amount of this contract, Davis Bacon Wage Rates shall apply. If the successful bidder has not attended a pre-bid meeting within the last six (6) months, they shall be required to contact Monique Warren, Procurement Manager at (757)928-2623 to attend a pre-bid meeting prior to start of work for this project. Otherwise, the contractor must obtain the required forms/signage for submittal and posting. Reference Decision # VA20260140 01/02/2026

#### **F. MINIMUM QUALIFICATIONS:**

Each Bidder shall:

1. Demonstrate that the bidder is currently operating as a company providing mechanical and electrical services similar to those sought by this invitation and done so continuously during the three (3) calendar years immediately preceding submission of its bid.
2. Demonstrate that the bidder has billed and received payment of work for the same as, or similar to, that sought by this invitation in the aggregate amount of \$250,000+ in each year of the three (3) years immediately preceding submission of its bid.
3. Provide the name, address, contact person, telephone number for three (3) recent references for which the bidder has provided mechanical and electrical services, the dates and location where the bidder provided the services and the annual amount of the billing to each customer. The Department reserves the right to contact any or all of those customers to verify the information the bidder provides and ask for positive and negative feedback.

#### **G. LOCATION AND SCHEDULE OF WORK:**

Upon acceptance and review of the bid, the Authority shall execute a contract and notice to proceed to the Contractor for the property listed in this bid package. Prior to award, Contractor must provide proof of adequate fulltime staff and equipment to complete the project. Provide a dedicated point of contact for field/production side, as well as a separate office clerical/billing position.

#### **H. REQUIREMENTS OF CONTRACTOR**

- i. The Contractor shall provide a safe and efficient site, with controlled access. As part of this obligation, the Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Site Work. All materials shall be protected from damage during delivery, storage and installation. The Contractor is responsible for keeping a clean and safe construction area.
- ii. Contractor shall submit all required licenses with their bid. All licensing

(including City of Newport News Business License) must remain current throughout the contract. Any lapse in coverage shall be a breach of contract.

- iii. Contractor shall remedy any defect due to faulty material or workmanship and pay for all damage to other work resulting therefrom, which appear within one (1) year from final payment. Further, contractor shall furnish owner with all manufacturers and suppliers written warranties covering items furnished under the contract prior to release of the final payment.
- iv. For the final clean up, Contractor shall remove from the site construction materials, tools and debris. Sweep and clean all interior/exterior work areas. Vacuum all dust, wipe down hardware, doors, walls and ceilings. Clean all windows referenced in the specifications.
- v. Contractor shall comply with all applicable federal requirements under EPA's Lead Renovation, Repair, and Painting (LRRP) Rule, including the regulatory standards and work practices outlined in 40 CFR Part 745, Subpart E.
- vi. Contractor shall maintain current certification from the U.S. Environmental Protection Agency (EPA), demonstrating compliance with all applicable federal training, safety, and regulatory requirements.
- vii. Contractors will be required to follow the rules and regulations of the Build America Buy America Act (BABA), Pub. L No. 117-58 §§ 70901-52.

#### **I. CHANGE ORDERS**

Pricing will be applied according to submitted bid. Change orders will be provided in writing. Work done contrary to the written instructions of the Authority's representative; done outside the written scope of work; or any additional work done without the Authority's approval will be considered unauthorized and will not be paid. Any additional items or services not listed in this proposal may be requested by the Authority's representative in the form of a change order.

#### **J. INVOICES:**

Invoices shall be issued by Contractor and will be identified per property address. The Authority follows a net 30 payment cycle. All invoices from the Contractor shall contain the following information:

1. Name and address of Contractor, including telephone number where Contractor can be reached in case of emergency.
2. Work performed by property.
3. Breakout of cost of materials where applicable by property.
4. Total price by property address

ATTACHMENT "A"

# SPECIFICATIONS

NEWPORT NEWS REDEVELOPMENT  
AND HOUSING AUTHORITY

## ALTERATIONS TO PINECROFT APARTMENTS

75 WELLESLEY DRIVE  
NEWPORT NEWS, VA 23606

PRE-FINAL DESIGN SUBMISSION  
FEBRUARY 27, 2026

MATTHEW G BURTON ARCHITECT LLC  
109 NAT TURNER BOULEVARD  
NEWPORT NEWS, VA 23601 - (757) 644-4462  
[www.matthewgburton.com](http://www.matthewgburton.com)

MBA PROJECT NO. 346

# ALTERATIONS TO PINECROFT APARTMENTS

75 WELLESLEY DRIVE  
NEWPORT NEWS, VA 23606

PRE-FINAL DESIGN SUBMISSION  
FEBRUARY 27, 2026

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Division Not Used

**APPENDIX A – SUPPLEMENTAL REQUIREMENTS**

- 1. Virginia Housing Minimum Cabinet Requirements Version 2025.1

END OF TABLE OF CONTENTS

**DOCUMENT 00 72 00 - GENERAL CONDITIONS**

1.1 DOCUMENT

- A. General Conditions for Construction Contracts – Public Housing Programs (form HUD-5370, 1/2014) published by the U.S. Department of Housing and Urban Development, forms a part of this Contract and by reference is incorporated herein as fully as if repeated at length.

END OF DOCUMENT  
(01/2024)

**SECTION 01 11 00 - SUMMARY OF WORK****PART 1 GENERAL****1.1 PROJECT DESCRIPTION**

- A. Pinecroft Apartments is an existing six-story, 140-unit mid-rise elderly housing apartment building located at 75 Wellesley Drive Newport News, Virginia 23606. Work of this Project includes multiple distinct work items as follows:
1. Prep and paint all common area walls and gypsum board ceilings. Wall surfaces are a combination of CMU and gypsum board. All surfaces are previously painted.
  2. Replace angle stop valves at kitchen sink, bathroom lavatory, and water closet in each apartment.
  3. Repair existing hydronic piping where leaks have occurred. Reinsulate repaired pipes as required and repair ceiling surfaces.
  4. Replace cabinets and countertops in each apartment kitchen. Disconnect range hood from central exhaust duct and cap duct. Provide new wall grille connected to existing central exhaust. Provide new recirculating range hood and electric range. Demolish existing transfer fan between kitchen and living room. Patch wall and ceiling surfaces and repaint.
  5. Provide new refrigerators for each apartment.
  6. Mechanical and electrical work to replace existing hydronic fan-coil units, controls, and electrical connections in each apartment.
  7. Mechanical and electrical work to replace existing hydronic air handling units, controls, and electrical connections for common areas on each floor.
  8. Installation of isolation valves on the main hydronic loops in the first floor above-ceiling space, reinsulation of piping where the valves are installed, and repairs to ceilings as required.
  9. Repair of exterior, rooftop mounted service platforms consisting of demolishing existing steel plate decking and replacement with galvanized floor grating. Work includes rust removal and repainting structures.
  10. Additional work as described in the contract documents.
- B. The Project will be constructed under a single prime contract.

**1.2 WORK BY OTHERS**

- A. Separate Contracts: The Owner may execute contracts for additional work at the site, that is excluded from the work of this Contract. Cooperate with the Owner and separate contractors to accommodate this requirement.

**1.3 WORK SEQUENCE**

- A. Construct Work in stages to accommodate Owner's use of premises during construction period.
- B. Coordinate construction schedule and operations with the Owner.
- C. Schedule the Work to accommodate this requirement.

**1.4 OWNER OCCUPANCY**

- A. The Owner will occupy the site and premises during the entire period of construction for conduct of normal operations.

- B. Cooperate with the Owner to minimize conflict, and to facilitate Owner's operations.
- C. Schedule the Work to accommodate this requirement.

#### 1.5 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Limit use of site and premises to allow for:
  - 1. Work by separate contractors.
  - 2. Work by Owner.
  - 3. Owner occupancy.
- B. Move any stored products under Contractor's control that interfere with the operations of the Owner or separate contractors.
- C. Assume full responsibility for protection and safekeeping of products under this Contract stored on site.
- D. Obtain and pay for use of any additional storage or work areas needed for operations.
- E. Coordinate use of site and premises with the Owner:
  - 1. Employee parking: In designated areas.
  - 2. Storage and staging areas: In designated areas.
- F. Confine operations to construction area unless otherwise approved by Owner.
- G. If access to adjacent common or occupied spaces is required:
  - 1. Schedule operations with Owner in advance.
  - 2. Perform work after normal business hours or on weekends when directed by Owner.
- H. Do not interrupt building fire or life safety systems.
- I. Do not close or obstruct exits except where noted on plans.
- J. Do not use or store hazardous or flammable materials on premises without Owner's approval; follow requirements of governing authorities having jurisdiction over the work.
- K. Prohibit smoking within interior spaces.

#### 1.6 OWNER-FURNISHED, CONTRACTOR-INSTALLED PRODUCTS

- A. Products that will be furnished and paid for by Owner and installed by the Contractor are indicated on the drawings as "OFPI".
- B. Owner's Responsibilities:
  - 1. Arrange for and deliver necessary Shop Drawings, Product Data and Samples to Contractor.
  - 2. Arrange and pay for product delivery to site, in accordance with Progress Schedule.
  - 3. Deliver supplier's bill of materials to Contractor.
  - 4. Inspect deliveries jointly with Contractor.
  - 5. Submit claims for transportation damage.
  - 6. Arrange for replacement of damaged, defective, and missing items.
  - 7. Arrange for manufacturers' warranties, service, and inspections, as required.

- C. Contractor's Responsibilities:
  - 1. Designate delivery date for each product in Progress Schedule.
  - 2. Review Shop Drawings, Product Data and Samples. Submit to Architect with notification of any discrepancies or problems anticipated in use of product.
  - 3. Receive and unload products at site.
  - 4. Promptly inspect products jointly with Owner; record shortages, damage, and defective items.
  - 5. Handle products at site, including uncrating and storage.
  - 6. Protect products from exposure to elements and from damage.
  - 7. Assemble, install, connect, adjust, and finish products, as stipulated in respective specification section.
  - 8. Repair or replace any items damaged by Contractor.

1.7 OWNER-FURNISHED, OWNER-INSTALLED PRODUCTS

- A. Products that will be furnished and installed by the Owner are indicated on the drawings as "OFOI".
- B. Owner's Responsibilities:
  - 1. Arrange for and deliver necessary Shop Drawings, Product Data and Samples to Contractor for coordination and informational purposes.
- C. Contractor's Responsibilities:
  - 1. Review Shop Drawings, Product Data and Samples. Coordinate required utility connections with contract documents and report any discrepancies to Architect.
  - 2. Ensure utility connections for equipment are installed to suit owner's equipment.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION  
(04/2022)

## SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Architect's Supplemental Instructions.
  2. Change Order Proposals.
  3. Change Orders.

#### 1.2 CHANGE PROCEDURES

- A. Architect's Supplemental Instructions: Architect will advise of minor changes in Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract.
- B. Change Order Proposals (PCO):
1. Owner-Initiated Proposal Requests: the Architect may issue a Proposal Request that includes a detailed description of a proposed change with supplemental or revised drawings and specifications. Prepare and submit a Change Order Proposal (PCO) for any change to Contract Sum or Contract Time within 7 days after receipt. Do not stop work or initiate changes in response to a Proposal Request until the PCO is approved.
  2. Contractor-Initiated Proposals: The Contractor may propose a change by submitting a Change Order Proposal (PCO) to Architect. Describe proposed change, reason for change, its full effect on Work, and any change to Contract Sum or Contract Time.
  3. Change order proposals shall be prepared and submitted to the Architect on Virginia Department of General Services forms GC-1 (DGS-30-200), SC-1 (DGS-30-204), and SS-1 (DGS-30-208). DGS forms are available online at <https://dgs.virginia.gov/forms/>.
  4. Include:
    - a. Quantities and unit costs, with total cost or credit to Owner. If requested, furnish documentation of quantities.
    - b. Taxes, delivery charges, equipment rentals, and trade discounts as applicable.
    - c. If change in Contract Time is involved, provide updated Progress Schedule.
  5. Submit electronically in Adobe PDF format.
  6. Provide separate PCOs for each distinct issue- do not group multiple requests on one PCO.
  7. Change Order Proposals approved by the Architect and the Owner are authorization for the Contractor to proceed with the work as described in the PCO.
  8. Approved PCOs will be advanced for subsequent inclusion in a Contract Change Order.
- C. Contract Change Orders:
1. Format: Owner's Standard Format.
  2. Execution: Architect will issue Change Orders for signature of parties as provided in the General Conditions of the Contract.
  3. Contract Change Orders will consist of one or more approved PCOs and will be issued periodically as the Architect deems appropriate.

### PART 2 PRODUCTS

Not used

**PART 3 EXECUTION**

Not used

END OF SECTION  
(04/2022)

## SECTION 01 29 00 - PAYMENT PROCEDURES

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Schedule of Values.
  2. Applications for Payment.

#### 1.2 SCHEDULE OF VALUES

- A. General:
1. Submit a Schedule of Values to Architect at the earliest possible date, but not less than 7 days prior to submitting first Application for Payment.
  2. Upon request of Architect, furnish additional data to support values given that will substantiate their correctness.
  3. Approved Schedule of Values will be used as basis for reviewing Contractor's Applications for Payment.
- B. Form and Content:
1. Format: form HUD-51000 (07/97) – Schedule of Amounts for Contract Payments as published by the U.S. Department of Housing and Urban Development.
  2. Schedule of Values shall be arranged according to the CSI MasterFormat system.
  3. List installed value of component parts of Work in sufficient detail to serve as basis for computing values for progress payments.
  4. Include separate line items for:
    - a. At minimum, each technical section in the Specifications (Divisions 02-49)
    - b. Site mobilization.
    - c. Bonds and insurance.
    - d. Contractor's overhead and profit.
    - e. Additional breakdown as required.
  5. For items on which payment will be requested for stored materials, break down value into:
    - a. Total cost of materials, delivered and unloaded.
    - b. Total installed value.
  6. Total of costs listed in Schedule of Values shall equal Contract Sum.
- C. Submit review copy electronically in Adobe PDF format.
- D. Review and Resubmittal:
1. After initial review by Architect, revise and resubmit if required.
  2. Revise and resubmit along with next Application for Payment when a Change Order is issued. List each Change Order as a new line item.

#### 1.3 APPLICATIONS FOR PAYMENT

- A. Preparation:
1. Format: form HUD-51001 (1/2014) – Periodic Estimate for Partial Payment.
  2. Use data from reviewed Schedule of Values. Provide dollar value in each column for each line item representing portion of work performed.

3. List each authorized Change Order as a separate line item, listing Change Order number and dollar value.
  4. Prepare Application for Final Payment as specified in Section 01 77 00.
- B. Payment for Materials Stored Off Site:
1. Format: form HUD-51004 (01/204)– Summary of Materials Stored.
  2. Stored materials shall be under direct control of the Contractor.
  3. Store materials in a secure and protected environment as required to keep the materials in like-new condition.
  4. Obtain a risk of loss insurance policy which covers the materials during storage and in transit until delivered and unloaded at the project site. The policy shall name the owner as additional insured.
  5. Deduct cost of transportation from the storage facility to the project site from the cost of materials as previously specified in this Section.
  6. Provide the Architect access to the storage facility to inspect materials in storage as well as other substantiating data required to demonstrate compliance with this section.
- C. Waivers of Lien:
1. Along with the each Application for Payment, submit waivers of lien from Contractor and each Subcontractor or Sub-subcontractor included on the current month's Application for Payment.
  2. Submit partial waivers on each item for amount requested, prior to deduction of retainage.
  3. For completed items, submit full or final waiver.
- D. Substantiating Data:
1. When Architect requires substantiating information, submit data justifying dollar amounts in question.
  2. Provide one copy of data with cover letter showing Application number and date, and line item number and description.
- E. Submittal:
1. Submit each Application for Payment electronically in Adobe PDF format for Architect's certification.
  2. When requested, provide three original copies of each Application for Payment.
  3. Payment period: at Contractor's discretion, but not more often than monthly intervals.

## **PART 2 PRODUCTS**

Not used

## **PART 3 EXECUTION**

Not used

END OF SECTION  
(04/2022)

## SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Project coordination.
  - 2. Project meetings.

#### 1.2 PROJECT COORDINATION

- A. Submit required project submittals electronically in Adobe PDF format.
- B. Coordinate scheduling, submittals, and work of various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.
- C. Coordinate space requirements and installation of mechanical and electrical items that are indicated diagrammatically on Drawings.
  - 1. Follow routing shown as closely as practical; place runs parallel with building lines.
  - 2. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of work of separate Sections in preparation for Substantial Completion.
- F. After Owner occupancy, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents to minimize disruption of Owner's activities.

#### 1.3 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI to the Architect.
  - 1. Architect will not act on RFIs submitted to Architect by other entities controlled by Contractor.
  - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. Name of Architect.
  - 6. RFI number, numbered sequentially.
  - 7. RFI subject.
  - 8. Specification Section number and title and related paragraphs, as appropriate.
  - 9. Drawing number and detail references, as appropriate.

10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit a Change Order Proposal according to Division 01 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, submit a Change Order Proposal (PCO) in accordance with Section 01 26 00 within 10 days of receipt of the RFI response.

#### 1.4 PROJECT MEETINGS

- A. Schedule and administer progress meetings and pre-installation conferences.
- B. Make physical arrangements for meetings; notify involved parties at least 7 days in advance.
- C. Record significant proceedings and decisions at each meeting; reproduce and distribute copies to parties in attendance and others affected by proceedings and decisions made.

#### 1.5 PRECONSTRUCTION CONFERENCE

- A. Schedule within 15 days after date of Notice to Proceed at Contractor's Project field office.
- B. Attendance:
  1. Contractor.
  2. Owner.
  3. Architect.
  4. Major subcontractors and suppliers as Contractor deems appropriate.
- C. Review and Discuss:
  1. Relation and coordination of various parties, and responsible personnel for each party.

2. Use of premises, including office and storage areas, temporary controls, and security procedures.
3. Construction schedule and critical work sequencing.
4. Processing of:
  - a. Contract modifications.
  - b. Shop Drawings, Product Data, and Samples.
  - c. Applications for Payment.
  - d. Other required submittals.
5. Procedures for maintaining contract closeout submittals.
6. Installation and removal of temporary facilities.
7. Notification procedures and extent of testing and inspection services.

#### 1.6 PROGRESS MEETINGS

- A. Schedule progress meetings at intervals as agreed upon by Owner, Architect, and Contractor.
- B. Location: Contractor's Project field office.
- C. Attendance:
  1. Contractor.
  2. Owner.
  3. Architect.
  4. Subcontractors and suppliers as appropriate to agenda.
  5. Others as appropriate to agenda.
- D. Agenda:
  1. Status of:
    - a. Outstanding RFIs.
    - b. Outstanding Submittals.
    - c. Outstanding PCOs.
  2. Project Schedule: including Work progress since previous meeting, overall progress, and completion date.
  3. Field observations, deficiencies, conflicts, and problems:
    - a. Provide updates on outstanding project issues (Old Business).
    - b. Introduce new project issues that have developed since the last meeting (New Business).
  4. Identify parties responsible for resolving issues and document in meeting minutes.
- E. Minutes: Keep progress meeting minutes to record significant discussions and agreements achieved. Meeting minutes shall be distributed to attendees within three days following the meeting.

#### 1.7 PRE-INSTALLATION CONFERENCES

- A. Where required in individual specification Sections, convene a pre-installation conference at the project site or other designated location.
- B. Require attendance of parties directly affecting or affected by work of the specific Section.
- C. Review conditions of installation, preparation and installation procedures, and coordination with related work.

**PART 2 PRODUCTS**

Not used

**PART 3 EXECUTION**

Not used

END OF SECTION  
(04/2022)

## SECTION 01 33 00 - SUBMITTAL PROCEDURES

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Submittal procedures.
  - 2. Submittal schedule.
  - 3. Shop Drawings.
  - 4. Product Data.
  - 5. Samples.
  - 6. Quality control submittals.
  - 7. Project Closeout Submittals.

#### 1.2 SUBMITTAL PROCEDURES

- A. Number each submittal with Project Manual section number and a sequential number within each section. Number resubmittals with original number and an alphabetic suffix.
- B. Identify Project, Contractor, Subcontractor or supplier, pertinent Drawing sheet and detail numbers, and specification Section number, as appropriate.
- C. Submit all submittals listed under "Submittals for Review" simultaneously for each Product or Specification Section.
- D. Where multiple Products function as an assembly, group submittals for all related Products into single submittal.
- E. Architect will not review incomplete submittals.
- F. Apply Contractor's stamp, signed or initialed certifying that:
  - 1. Submittal was reviewed.
  - 2. Products, field dimensions, and adjacent construction have been verified.
  - 3. Information has been coordinated with requirements of Work and Contract Documents.
- G. Schedule submittals to expedite the Project, and deliver to Architect. Coordinate submittal of related items.
- H. Processing Time: 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.
  - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
  - 4. Resubmittal Review: Allow 15 days for review of each resubmittal.

- I. Submittals that do not have Contractor's approval stamp, are not required by the contract documents, or are otherwise incomplete will be returned not reviewed.
- J. Revise and resubmit submittals when required; identify all changes made since previous submittal.
- K. Distribute copies of reviewed submittals to concerned parties and to Project Record Documents file. Instruct parties to promptly report any inability to comply with provisions.
- L. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

### 1.3 SUBMITTAL SCHEDULE

- A. Within 15 days after date of Notice to Proceed, submit a submittal schedule showing all submittals proposed for project, including submittals listed as:
  - 1. Submittals for Review.
  - 2. Quality Control Submittals.
  - 3. Closeout Submittals.
- B. Include for each submittal:
  - 1. Specification section number.
  - 2. Description of submittal.
  - 3. Type of submittal.
  - 4. Anticipated submittal date.
  - 5. For submittals requiring Architect's review, date reviewed submittal will be required from Architect.
- C. Except for physical samples, submit electronically in Adobe PDF format.

### 1.4 SHOP DRAWINGS

- A. Present information in clear and thorough manner.
- B. Identify details by reference to sheet and detail numbers or room number shown on Drawings.
- C. Reproductions of details contained in Contract Documents are not acceptable.
- D. Architect will return one annotated copy to Contractor electronically for printing and/or distribution.

### 1.5 PRODUCT DATA

- A. Mark each copy to identify applicable products, models, options, and other data.
- B. Supplement manufacturers' standard data to provide information unique to this Project.
- C. Architect will return one annotated copy to Contractor for printing and/or distribution.

### 1.6 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

- B. Where so indicated, submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect's selection.
- C. Include identification on each sample, with full Project information.
- D. Unless otherwise specified in individual specifications, submit two of each sample.
- E. Architect will retain one of each sample and return remainder to Contractor indicating approval or rejection of samples, or of selection of color, texture, or pattern if full range is submitted.

1.7 QUALITY CONTROL SUBMITTALS

- A. Quality control submittals specified in Section 01 40 00 are for information and do not require Architect's responsive action except to require resubmission of incomplete or incorrect information.

1.8 PROJECT CLOSEOUT SUBMITTALS

- A. Submit in accordance with Section 01 77 00.

**PART 2 PRODUCTS**

Not used

**PART 3 EXECUTION**

Not used

END OF SECTION  
(04/2022)

## SECTION 01 35 16 - ALTERATION PROJECT PROCEDURES

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Patching and extending existing work.
  - 2. Transitions and adjustments.
  - 3. Repair of damaged surfaces.

#### 1.2 PROJECT CONDITIONS

- A. Hazardous Materials:
  - 1. The original building was constructed after January 1, 1985, and as such no asbestos containing materials or lead based paint are expected to exist.
  - 2. If asbestos, lead-bearing paint, or other suspected hazardous materials are encountered during work of this Contract:
    - a. Notify Owner and Architect and immediately cease work in affected area.
    - b. Restrict access to the affected area while work proceeds in unaffected areas.
  - 3. Await clearance from Owner to resume work in affected area.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. New Materials:
  - 1. Provide new materials to match existing adjacent materials for closing of openings, repairs, and reconstructions where suitable salvaged materials do not exist, are insufficient in quantity, or where reuse is not permitted.
  - 2. Match existing materials in material, type, size, quality, color, finish, and other attributes.
- B. Reused Materials (where specifically indicated for reuse):
  - 1. Clean and prepare salvaged materials for reuse.
  - 2. Do not use materials with objectionable chips, cracks, splits, dents, scratches, or other defects.
  - 3. Repair operable items to function properly.

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Test materials to be used in repairs for compatibility with existing materials; do not use incompatible materials.
- B. Cut, move, or remove items as necessary for access to alterations and renovation work. Replace and restore upon completion.
- C. Remove, cut, and patch work in manner to minimize damage and to provide means for restoring products and finishes to their original or specified new condition.
- D. Remove unsuitable materials not marked for salvage.

- E. Remove debris and abandoned items from areas of work and from concealed spaces.

### 3.2 ALTERATIONS

- A. Coordinate alterations and renovations to expedite completion.
- B. Install products and finish surfaces as specified in individual sections, or where no specification section exists to match existing.
- C. Refinish visible surfaces to specified condition, with neat transition to adjacent surfaces.
- D. Finish patches to provide uniform color and texture over entire surface, with repairs not discernible from normal viewing distance. If finish cannot be matched, refinish entire surface to nearest intersections.
- E. Where new work abuts or aligns with existing, provide smooth and even transition. Where a change in plane of 1/4 inch or more occurs, submit recommendation to Architect for transition.
- F. Where alterations expose mechanical and electrical components that were previously concealed, renovate to be concealed in completed work.
- G. In addition to specified replacement of equipment and fixtures, restore mechanical and electrical systems to full operational condition.
- H. Patch holes in exposed surfaces left by removal of mechanical and electrical components.
- I. Existing Fire-Rated Assemblies:
  - 1. Patch or replace fire protection materials to maintain integrity of fire ratings.
  - 2. Seal penetrations through and perimeter of fire-rated assemblies under provisions of Section 07 84 00.
  - 3. Seal perimeter of fire-rated assemblies with an approved fire-resistive joint system where required.

END OF SECTION  
(04/2022)

## SECTION 01 40 00 - QUALITY REQUIREMENTS

### PART 1 GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. References.
2. Quality assurance and control of installation.
3. Mockups.
4. Manufacturer's field services and reports.
5. Design data and calculations.
6. Test reports and certifications.
7. Manufacturer's installation instructions.

#### 1.2 REFERENCES

- A. For products or workmanship specified by reference to association, trade, or industry standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Conform to edition of reference standard in effect as of date of Project Specifications.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

#### 1.3 QUALITY ASSURANCE AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully 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 a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

#### 1.4 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces

and installation, quality of workmanship, or startup of equipment, as applicable, and to initiate instructions when necessary.

- B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report to Architect within 10 days of observation.

#### 1.5 DESIGN DATA AND CALCULATIONS

- A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide design data and calculations.
- B. Accuracy of design data and calculations is the responsibility of the Contractor.
- C. When so specified, prepare design data and calculations under the direction of a professional engineer licensed in the state in which the Project is located. Affix engineer's seal to submittals.
- D. Submit electronically in Adobe PDF format.

#### 1.6 TEST REPORTS AND CERTIFICATIONS

- A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide test reports and manufacturers' certifications.
- B. Indicate that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Submittals may be recent or previous test results on material or Product, but must be acceptable to Architect.
- D. Submit electronically in Adobe PDF format.

#### 1.7 MANUFACTURER'S INSTALLATION INSTRUCTIONS

- A. When Contract Documents require that Products be installed in accordance with manufacturer's instructions:
  - 1. Submit manufacturer's most recent printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, as applicable.
    - a. Submit in quantities specified for Product Data.
    - b. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
    - c. Identify conflicts between manufacturers' instructions and requirements of Contract Documents.
  - 2. Perform installation of Products to comply with requirements of manufacturer's instructions.
  - 3. If installation cannot be performed in accordance with manufacturer's instructions, notify Architect and await instructions.
  - 4. Submit electronically in Adobe PDF format.

**PART 2 PRODUCTS**

Not used

**PART 3 EXECUTION**

Not used

END OF SECTION  
(04/2022)

## **SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS**

### **PART 1 GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Temporary utilities.
  - 2. Field offices and sheds.
  - 3. Temporary controls.
  - 4. Protection of installed Work.
  - 5. Security.
  - 6. Progress cleaning.
  - 7. Water, erosion, sediment, dust, and mold and mildew control.
  - 8. Access roads and parking areas.
  - 9. Removal.

### **PART 2 PRODUCTS**

Not used

### **PART 3 EXECUTION**

#### **3.1 TEMPORARY ELECTRICITY**

- A. Connect to existing electrical system for electricity required during construction.
  - 1. Cost of electricity used will be paid for by Owner. Exercise measures to conserve electricity.
  - 2. Regulate system to prevent interference with Owner's normal usage.

#### **3.2 TEMPORARY LIGHTING**

- A. Provide portable lights when required to provide minimum lighting levels necessary for specific work.

#### **3.3 TEMPORARY HEAT**

- A. Existing heating systems may be used during construction. Costs of fuel used from existing facilities will be paid for by Owner. Exercise measures to conserve fuel.

#### **3.4 TEMPORARY VENTILATION**

- A. Ventilate enclosed areas to facilitate curing of materials, disperse humidity, and prevent accumulations of dust, fumes, vapors, or gases.
- B. Provide temporary fan units as required to maintain clean air for construction.

#### **3.5 TEMPORARY TELEPHONE AND COMPUTER SERVICES**

- A. Contractor shall be accessible during normal business hours via mobile telephone with voice mail or an answering service.

3.6 TEMPORARY WATER

- A. Connect to existing water source for water required for construction.
  - 1. Regulate system to prevent interference with Owner's usage.
  - 2. Costs of water used will be paid for by Owner. Exercise measures to conserve water.

3.7 TEMPORARY SANITARY FACILITIES

- A. Provide chemical toilets for use during construction.
- B. Permanent toilets may not be used during construction.
- C. Maintain facilities in clean and sanitary condition.

3.8 FIELD OFFICES AND SHEDS

- A. Provide temporary field offices and storage sheds required for construction.
- B. Areas on site designated by Owner may be used for field office and storage of materials subject to damage by weather.
- C. Do not unreasonably encumber site or premises with excess materials or equipment.

3.9 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to allow Owner's use of site and premises, and to protect existing facilities from construction operations.

3.10 PROTECTION OF INSTALLED WORK

- A. Protect installed work from construction operations; provide special protection when required in individual specification sections.

3.11 PROGRESS CLEANING

- A. Maintain areas free from waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Provide containers for collection of waste materials, debris, and rubbish; remove and dispose of off site as required by construction activities.
- C. Clean interior areas daily to provide suitable conditions for finish work.

3.12 TEMPORARY CONTROLS

- A. Dust Control:
  - 1. Provide dust control materials and methods to minimize dust from construction operations.
  - 2. Prevent dust from dispersing into atmosphere.

3.13 ACCESS ROADS AND PARKING AREAS

- A. Do not allow heavy vehicles or construction equipment in parking areas.
- B. Provide for access by emergency vehicles.
- C. Keep fire hydrants and water control valves free from obstruction and accessible for use.
- D. Maintain existing construction, and restore to original or specified condition at completion of Work.

3.14 REMOVAL

- A. Remove temporary utilities, equipment, facilities, and services when construction needs can be met by use of permanent construction or upon completion of Project.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing and permanent facilities used during construction to original or to specified condition.

END OF SECTION  
(04/2022)

## SECTION 01 60 00 - PRODUCT REQUIREMENTS

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Products.
  - 2. Transportation and handling.
  - 3. Storage and protection.
  - 4. Reuse of existing materials.
  - 5. Product options.

#### 1.2 PRODUCTS

- A. Provide interchangeable components by the same manufacturer for identical items.
- B. Do not use products containing asbestos or other known hazardous materials.
- C. Do not reuse materials and equipment removed from existing construction in completed Work, except as specifically permitted by the Contract Documents.

#### 1.3 TRANSPORTATION AND HANDLING

- A. Coordinate delivery of Products to prevent conflict with Work and adverse conditions at site.
- B. Transport and handle Products in accordance with manufacturer's instructions.
- C. Promptly inspect shipments to ensure that Products comply with requirements of Contract Documents, are undamaged, and quantities are correct.
- D. Provide equipment and personnel to handle products by methods to prevent damage.

#### 1.4 STORAGE AND PROTECTION

- A. Store and protect Products in accordance with manufacturer's instructions with manufacturer's seals and labels intact and legible.
- B. Store Products on site unless prior written approval to store off site has been obtained from Owner.
- C. Store Products subject to damage by elements in weathertight enclosures. Maintain temperature and humidity within ranges required by manufacturer's instructions.
- D. Exterior Storage:
  - 1. Store fabricated Products above ground; prevent soiling and staining.
  - 2. Cover products subject to deterioration with impervious sheet coverings; provide ventilation to prevent condensation.
  - 3. Store loose granular materials in well drained area on solid surfaces; prevent mixing with foreign matter.

- E. Arrange storage areas to permit access for inspection. Periodically inspect stored products to verify that products are undamaged and in acceptable condition.

1.5 REUSE OF EXISTING MATERIALS

- A. Carefully remove, handle, protect, and store Products.
- B. Clean and refinish Products to original or specified condition.
- C. Restore operable components to working condition.
- D. Arrange and pay for transportation, storage, and handling of Products requiring off site storage, restoration, or renovation.

1.6 PRODUCT OPTIONS

- A. Products specified by naming one Product: Substitutions will not be allowed.
- B. Products specified by naming three or more acceptable Products: Select any named Product.
- C. Products specified by naming one or more Products followed by "or equal", or by indicating named product as "basis of design" or similar statements:
  - 1. Select the specified Product or any Product having equivalent or superior characteristics to the specified Product and meeting the requirements of the Contract Documents.
  - 2. Submit Product Data to substantiate compliance of proposed Product with specified requirements.
  - 3. The specified Product establishes the required standard of quality.
- D. Products specified by reference standard only:
  - 1. Select any Product meeting the specified standard.
  - 2. Submit Product Data to substantiate compliance of proposed Product with specified requirements.
- E. Products specified by required performance or attributes, without naming a manufacturer or Product:
  - 1. Select any Product meeting specified requirements.
  - 2. Submit Product Data to substantiate compliance of proposed Product with specified requirements.

**PART 2 PRODUCTS**

Not used

**PART 3 EXECUTION**

Not used

END OF SECTION

(04/2022)

## SECTION 01 73 29 - CUTTING AND PATCHING

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes requirements and limitations for cutting and patching of work. See additional requirements in Section 02 41 20 – Selective Structure Demolition.

#### 1.2 SUBMITTALS

- A. Submit written request in advance of executing cutting or alteration that affects:
  - 1. Work of Owner or separate contractor.
  - 2. Structural integrity of project.
  - 3. Integrity or effectiveness of weather exposed or moisture resistant elements or systems.
  - 4. Efficiency, operational life, maintenance, or safety of operational elements.
  - 5. Visual qualities of sight exposed elements.
- B. Include in Request:
  - 1. Identification of project.
  - 2. Description of work affected.
  - 3. Necessity for cutting or patching.
  - 4. Effect of cutting or patching on work of Owner or separate contractor, or on structural, weatherproof, or visual integrity of project.
  - 5. Description of proposed work:
    - a. Scope of cutting and patching.
    - b. Subcontractor and trades to execute work.
    - c. Products proposed to be used.
    - d. Extent of refinishing.
  - 6. Alternate to cutting and patching.
  - 7. Cost proposal, if applicable.
  - 8. Written permission of any separate contractor whose work will be affected.
- C. If conditions of work or schedule necessitate a change of material from that originally installed, submit substitution request in accordance with Section 01 25 00.

### PART 2 PRODUCTS

Not used

### PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Examine existing conditions of work, including elements subject to movement or damage during cutting and patching.
- B. After uncovering work, examine conditions affecting installation of new products or performance of work.
- C. Provide protection for other portions of project.

- D. Provide protection from elements.

### 3.2 CUTTING AND PATCHING

- A. Execute cutting to include excavating, fitting, and patching of Work required to:
  - 1. Make several parts fit properly.
  - 2. Uncover work to provide for installation of ill timed work.
  - 3. Remove and replace defective work.
  - 4. Remove and replace work not conforming to requirements of Contract Documents.
  - 5. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.
- B. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, and finishes.
- C. Execute cutting and demolition by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs and new work.
- D. Execute excavating and backfilling by methods that will prevent damage to other Work, and will prevent settlement.
- E. Employ original installer or fabricator to perform cutting and patching for:
  - 1. Weather exposed or moisture resistant elements.
  - 2. Sight exposed finished surfaces.
- F. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.
- G. Refinish entire surfaces as necessary to provide an even finish:
  - 1. Continuous surfaces: To nearest intersections.
  - 2. Assembly: Refinish entirely.

END OF SECTION  
(04/2022)

## SECTION 01 77 00 - CLOSEOUT PROCEDURES

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Closeout procedures.
  - 2. Final cleaning.
  - 3. Adjusting.
  - 4. Project record documents.
  - 5. Operation and maintenance data.
  - 6. Warranties.
  - 7. Spare parts and maintenance materials.
  - 8. Starting of systems.
  - 9. Demonstration and instructions.

#### 1.2 CLOSEOUT PROCEDURES

- A. Final Inspection:
  - 1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with the Contract Documents and ready for Architect's inspection.
  - 2. If Architect performs reinspection due to failure of Work to comply with claims of status of completion made by Contractor, the Owner will compensate Architect for such additional services and will deduct the amount of such compensation from final payment to Contractor.
- B. Submit final Application for Payment showing original Contract Sum, adjustments, previous payments, retainage withheld from previous payments, and sum remaining due.
- C. Closeout Submittals:
  - 1. Evidence of compliance with requirements of governing authorities.
  - 2. Project Record Documents.
  - 3. Operation and Maintenance Data.
  - 4. Warranties.
  - 5. Spare parts and maintenance materials.
  - 6. Evidence of payment of Subcontractors and suppliers.
  - 7. Final lien waiver.
  - 8. Certificate of insurance for products and completed operations.
  - 9. Consent of Surety to final payment.
- D. Owner will occupy the building as specified in Section 01 11 00.

#### 1.3 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean surfaces exposed to view:
  - 1. Remove temporary labels, stains and foreign substances.
  - 2. Polish transparent and glossy surfaces.

3. Damp mop hard surface flooring.

C. Clean equipment and fixtures to a sanitary condition.

D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

#### 1.4 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

#### 1.5 PROJECT RECORD DOCUMENTS

A. Maintain following record documents on site; 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. Material Safety Data Sheets.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Make entries neatly and accurately.

E. Label each set or volume with title "PROJECT RECORD DOCUMENTS", project title, and description of contents.

1. Organize contents according to Project Manual table of contents.
2. Provide table of contents for each volume.

F. Drawings: Mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Drawings.

G. Specifications: Mark each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and Modifications.

H. Shop Drawings: Mark each item to record actual construction including:

1. Field changes of dimension and detail.
2. Details not on original Shop Drawings.

I. Submit electronically in Adobe PDF format.

## 1.6 OPERATION AND MAINTENANCE DATA

- A. Identify as "OPERATION AND MAINTENANCE INSTRUCTIONS" and title of project.
- B. Contents:
  - 1. Directory: List names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
  - 2. Operation and maintenance instructions: Arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
    - a. Significant design criteria.
    - b. List of equipment.
    - c. Parts list for each component.
    - d. Operating instructions.
    - e. Maintenance instructions for equipment and systems.
    - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
  - 3. Project documents and certificates including:
    - a. Shop drawings and product data.
    - b. Air and water balance reports.
    - c. Certificates.
    - d. Copies of warranties and bonds.
  - 4. Provide one set of printed original owner's manuals for kitchen appliances for each residential unit plus three additional printed copies for the Owner.
- C. Submittal:
  - 1. Submit electronically in Adobe PDF format at least 15 days prior to final inspection.
  - 2. Architect will notify Contractor of any required revisions after final inspection.
  - 3. Revise content of documents as required prior to final submittal.
  - 4. Submit revised documents electronically in Adobe PDF format within 10 days after final inspection.

## 1.7 WARRANTIES

- A. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.
- B. Include Table of Contents.
- C. Submit electronically in Adobe PDF format along with final Application for Payment.
- D. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

## 1.8 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. Deliver to Project site in location as directed; obtain receipt prior to final payment.

1.9 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Utilize Operation and Maintenance Manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed upon times, at equipment location.
- D. Prepare and insert additional data in Operation and Maintenance Manuals when need for additional data becomes apparent during instruction.

**PART 2 PRODUCTS**

Not used

**PART 3 EXECUTION**

Not used

END OF SECTION  
(04/2022)

## SECTION 02 41 20 - SELECTIVE STRUCTURE DEMOLITION

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Demolition of designated building construction, equipment, and fixtures for salvage or disposal.
  - 2. Identification of utilities.

#### 1.2 DEFINITIONS

- A. Demolish: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

#### 1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner. Carefully salvage in a manner to prevent damage and promptly return to Owner.

#### 1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition work, safety of structure, and dust control.
- B. Obtain required permits from authorities.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Conform to applicable codes when hazardous or contaminated materials are discovered.
- E. Do not close or obstruct exits.

#### 1.5 PROJECT CONDITIONS

- A. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- B. Minimize interference with streets, walks, public right-of-ways, and adjacent facilities.

- C. Hazardous Materials: no hazardous materials are expected to exist within the project area. Any hazardous materials discovered shall be handled in accordance with Section 01 35 16.
- D. Maintain fire-protection facilities in service during selective demolition operations.

## **PART 2 PRODUCTS**

Not used

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Erect temporary barricades, warning devices, and controls.
- B. Provide protective coverings, shoring, bracing, and supports for construction designated to remain.
- C. Temporarily or permanently disconnect utilities as required.
- D. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

### **3.2 DEMOLITION**

- A. Remove existing construction to extent indicated and as necessary to join new work to existing. Do not remove more than is necessary to allow for new construction.
- B. Conduct selective demolition and debris-removal operations to ensure minimum interference with other adjacent occupied and used facilities.
- C. Do not damage work designated to remain.
- D. Minimize noise and spread of dirt and dust.
- E. Assign work to trades skilled in procedures involved.
- F. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Temporarily cover openings to remain.
- G. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly notify Architect in writing.
- H. Protect and support active utilities designated to remain. Post warning signs showing location and type of utility and type of hazard.
- I. Remove and dispose of waste materials off site.

### 3.3 SALVAGE

#### A. Removed and Salvaged Items:

1. Clean salvaged items.
2. Store items in a secure area designated by Owner and/or transport items to Owner's storage area.
3. Protect items from damage during transport and storage.

#### B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Protect items from damage during storage.
3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

### 3.4 CLEANING

- #### A.
- Clean adjacent areas of dust, dirt, and debris caused by selective demolition operations. Return adjacent construction to condition existing before selective demolition operations began.

END OF SECTION  
(04/2022)

## SECTION 07 84 00 - FIRESTOPPING

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Firestopping perimeter of, and penetrations through, fire rated assemblies.

#### 1.2 REFERENCES

- A. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)):
  1. E814 - Standard Test Method for Fire Tests of Through-Penetration Firestops.
  2. E1966 - Standard Test Method for Fire-Resistive Joint Systems.
  3. E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-Story Test Apparatus.
- B. Underwriters Laboratories, Inc. (UL):
  1. 1479 - Fire Tests of Through-Penetration Firestops.
  2. 2079 - Fire Resistance of Building Joint Systems.

#### 1.3 SUBMITTALS

- A. Submittals for Review:
  1. Product Data:
    - a. Firestopping schedule; prepare in tabular format and identify:
      - 1) Type of assembly receiving firestop and required fire rating.
      - 2) Type of penetrating item.
      - 3) Proposed firestop system.
    - b. Include UL details or engineering judgments for each firestop system.
  2. Test Reports: Indicate conformance with ASTM E814, ASTM E1966, ASTM E2307, UL 1479, or UL 2079.

#### 1.4 QUALITY ASSURANCE

- A. Firestopping: Fire resistance rating equivalent to adjacent construction; tested to ASTM E814, ASTM E1966, ASTM E2307, UL 1479, or UL 2079.

#### 1.5 PROJECT CONDITIONS

- A. Do not apply sealants, mortars, or putties when temperature of substrate material and surrounding air is below 40 degrees F or is anticipated to drop below that temperature within 24 hours after installation.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Firestopping: One or more of the following:
  1. Silicone elastomer compound: Single or multiple component, low modulus, moisture curing silicone sealant.

2. Ceramic sealant: Single component, moisture curing ceramic sealant.
3. Intumescent sealant: Single component, water based intumescent sealant.
4. Acrylic sealant: Single component acrylic sealant, suitable for painting.
5. Putty: Single component ceramic fiber base putty or intumescent elastomer putty that expands on exposure to surface heat gain.
6. Mortar: Hydraulic cementitious mortar.
7. Pillows or blocks: Formed intumescent or mineral fiber pillows or blocks.
8. Intumescent strips: Solvent free intumescent wrap strips.
9. Mechanical devices: Incombustible fillers or silicone elastomer covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.

## 2.2 ACCESSORIES

- A. Forming and Damming Materials: As recommended by firestopping manufacturer for intended use.
  1. Permanent: Mineral fiber board, mineral fiber matting, or mineral fiber putty.
  2. Temporary: Plywood, particle board, or other.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Prepare openings to receive firestopping as directed by manufacturer:
  1. Remove incidental and loose materials from penetration opening.
  2. Remove free liquids and oil from involved surfaces and penetration components.
  3. Install damming materials to accommodate and ensure proper thickness and fire rating requirements and provide containment during installation.
  4. Remove combustible materials and materials not intended for final penetration seal system.

### 3.2 INSTALLATION

- A. Install firestopping at perimeter of and penetrations through fire rated assemblies.
- B. Apply materials in accordance with manufacturer's instructions.
- C. Apply firestopping material in sufficient thickness to achieve required ratings.
- D. Compress fibered material to achieve a density of 40 percent of its uncompressed density.
- E. Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.
- F. Place intumescent coating in sufficient coats to achieve rating required.
- G. Remove dam material after firestopping material has cured.
- H. Finish exposed surfaces to smooth, flush appearance.

END OF SECTION  
(10/2022)

## **SECTION 07 92 00 - JOINT SEALERS**

### **PART 1 GENERAL**

#### 1.1 SUMMARY

- A. Section Includes: Joint sealers.

#### 1.2 REFERENCES

- A. ASTM International (ASTM):
  1. C834 - Standard Specification for Latex Sealing Compounds.
  2. C1193 - Standard Guide for Use of Joint Sealants.

#### 1.3 SUBMITTALS

- A. Submittals for Review:
  1. Product Data: Indicate sealers, primers, and accessories proposed for use.

#### 1.4 PROJECT CONDITIONS

- A. Do not apply sealers at temperatures below 40 degrees F unless approved by sealer manufacturer.

#### 1.5 WARRANTIES

- A. Furnish manufacturer's 10 year warranty providing coverage for sealers and accessories that fail to provide air and water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

### **PART 2 PRODUCTS**

#### 2.1 MATERIALS

- A. Joint Sealer Type 1:
  1. ASTM C834, single component acrylic latex, non sag.
  2. Movement capability: Plus or minus 7-1/2 percent.
  3. Color: White, paintable.
- B. Joint Sealer Type 2:
  1. ASTM C920, Grade NS, single component silicone, non sag, mildew resistant.
  2. Movement capability: Plus or minus 25 percent.
  3. Color: white at porcelain or enameled plumbing fixtures, clear at other locations.

#### 2.2 ACCESSORIES

- A. Primers, Bondbreakers, and Solvents: As recommended by sealer manufacturer.

### **PART 3 EXECUTION**

#### 3.1 PREPARATION

- A. Remove loose and foreign matter that could impair adhesion. If surface has been subject to chemical contamination, contact sealer manufacturer for recommendation.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Protect adjacent surfaces with masking tape or protective coverings.
- D. Sealer Dimensions: Open joints up to 1/2 inch wide; Depth equal to width.

3.2 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Install sealers and accessories in accordance with ASTM C1193.
- C. Fill joints full without air pockets, embedded materials, ridges, and sags.
- D. Tool sealer to smooth profile.
- E. Apply sealer within manufacturer's recommended temperature range.

3.3 CLEANING

- A. Remove masking tape and protective coverings after sealer has cured.
- B. Clean adjacent surfaces.

3.4 SCHEDULE

JOINT LOCATION OR TYPE	SEALER TYPE
Interior Joints:	
Joints at plumbing fixtures and countertops	2
Other joints	1

END OF SECTION  
(01/2012)

## **SECTION 09 29 00 - GYPSUM BOARD**

### **PART 1 GENERAL**

#### 1.1 SUMMARY

- A. Section Includes:
1. Gypsum board.
  2. Taping and bedding of gypsum board.

#### 1.2 REFERENCES

- A. ASTM International (ASTM):
1. C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  2. C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Board.
  3. C1047 - Standard Specifications for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
  4. C1396 - Standard Specification for Gypsum Board.
- B. Gypsum Association (GA):
1. GA-214 - Levels of Gypsum Board Finish.
  2. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.
- C. Underwriters Laboratories, Inc. (UL) - Fire Resistance Directory.

#### 1.3 SUBMITTALS

- A. Submittals for Review: Product Data: for each type of product.

#### 1.4 QUALITY ASSURANCE

- A. Fire Resistance Ratings:
1. Construct assemblies to achieve fire resistance ratings indicated on Drawings, in accordance with referenced GA or UL design number.
  2. If requirements of assembly numbers referenced conflict with Contract Document requirements, conform to assembly requirements.

#### 1.5 PROJECT CONDITIONS

- A. Do not install paper-faced gypsum board panels until building is enclosed and conditioned.
- B. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- C. Do not install panels that are wet, moisture damaged, or mold damaged.

### **PART 2 PRODUCTS**

#### 2.1 MATERIALS - GYPSUM PANELS

- A. Regular Gypsum Board: ASTM C1396; 48 inches wide x thickness indicated, maximum practical length, tapered edge.
- B. Fire Resistant Gypsum Board: ASTM C1396, Type X; 48 inches wide x thickness indicated, maximum practical length, tapered edge; apply to fire rated assemblies.

## 2.2 ACCESSORIES

- A. Fasteners: ASTM C1002, Type S screws, minimum 5/8 inch penetration into framing.
- B. Joint Treatment Materials: Reinforcing tape and joint compound; ASTM C475.

## PART 3 EXECUTION

### 3.1 INSTALLATION OF GYPSUM PANELS

- A. Install panels and accessories in accordance with ASTM C754, GA-216, and manufacturer's instructions.
- B. Accurately cut panels to fit around openings and projections. Do not tear face paper or break gypsum core.
- C. Mechanically fasten panels to framing. Place fasteners minimum 3/8 inch from edges of panels; drive heads slightly below surface. Stagger fasteners at abutting edges.
- D. Treat cut edges and holes with joint sealer for gypsum panel products prone to exposure to moisture.

### 3.2 JOINT TREATMENT

- A. Treat joints and fasteners in gypsum board in accordance with GA-214.
- B. Levels of Finish:
  - 1. Surfaces in concealed areas: Level 1 finish and cover fastener heads.
  - 2. Wall and ceiling surfaces to receive paints: Level 4 finish.

END OF SECTION  
(10/2022)

## **SECTION 09 65 13 - RESILIENT BASE**

### **PART 1 GENERAL**

#### 1.1 SUMMARY

- A. Section Includes: Resilient wall base.

#### 1.2 REFERENCES

- A. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)) F1861 - Standard Specification for Resilient Wall Base.
- B. Resilient Floor Covering Institute (RFCI) - FloorScore Certification Program.

#### 1.3 SUBMITTALS

- A. Submittals for Review:
  - 1. Samples: 4 inch long samples showing available colors.

### **PART 2 PRODUCTS**

#### 2.1 MATERIALS

- A. Resilient Base:
  - 1. Type: ASTM F1861, thermoset vulcanized rubber.
  - 2. Thickness: 0.125 inch.
  - 3. Profile: Coved.
  - 4. Height: 4 inches.
  - 5. Length: Continuous rolls.
  - 6. Color: as indicated on drawings.
  - 7. Finish: Matte.

#### 2.2 ACCESSORIES

- A. Adhesive: Water based, waterproof, recommended by base manufacturer.

### **PART 3 EXECUTION**

#### 3.1 PREPARATION

- A. Prepare surfaces to receive base:
  - 1. Remove materials that could interfere with adhesion.
  - 2. Fill low spots with patching compound; finish flush with adjacent surface.
  - 3. Remove high spots, ridges and nibs.

#### 3.2 INSTALLATION

- A. Apply adhesive continuously to back of base.

- B. Maintain top edge true to line and bottom edge in continuous contact with floor. Butt joints tight; butt base tight to adjacent construction.
- C. Do not install pieces less than 6 inches long.
- D. Miter and butt inside corners.
- E. At outside corners "V" cut back of base to 2/3 of its thickness and bend around corner.
- F. Scribe to door frames and other interruptions.

END OF SECTION  
(08/2015)

**SECTION 09 65 19 - RESILIENT TILE FLOORING**

**PART 1 GENERAL**

1.1 SUMMARY

- A. Section Includes: Resilient tile flooring.

1.2 REFERENCES

- A. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)) F1066 - Standard Specification for Vinyl Composition Tile.
- B. Resilient Floor Covering Institute (RFCI) - FloorScore Certification Program.

1.3 PROJECT CONDITIONS

- A. Maintain temperature in spaces to receive flooring between 70 and 90 degrees F for 24 hours before, during, and for minimum 48 hours after installation.
- B. Maintain minimum temperature of 55 degrees F after flooring is installed, except as otherwise specified.

**PART 2 PRODUCTS**

2.1 MATERIALS

- A. Vinyl Composition Tile:
  - 1. ASTM F1066, Class 2 - Through Pattern.
  - 2. Product: Armstrong Standard Excelon Imperial Texture.
  - 3. Size: 12 x 12 inches x 1/8 inch thick.
  - 4. Color: 51830 - Cottage Tan.

2.2 ACCESSORIES

- A. Leveling Compound: White, premixed, latex based.
- B. Adhesive: Water based, waterproof, recommended by flooring manufacturer.

**PART 3 EXECUTION**

3.1 EXAMINATION

- A. Verify that concrete floors have cured a minimum 28 days and do not exhibit negative alkalinity, carbonization, or dusting.

3.2 PREPARATION

- A. Clean substrate; remove loose and foreign matter that could impede adhesion or performance of flooring.

- B. Fill cracks, voids, and depressions in substrate with leveling compound.
- C. Grind off high spots and projections in substrate; leave smooth and level to 1/4 inch in 10 feet.

### 3.3 INSTALLATION OF TILE

- A. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent when tile is placed.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Lay flooring with joints parallel to building lines to produce symmetrical tile pattern.
- E. Install tile to pattern. Allow minimum half-size tiles at room or area perimeter.
- F. Set flooring in place; press with heavy roller to attain full adhesion.
- G. Scribe flooring to walls, columns, cabinets, and other appurtenances to produce tight joints. Ensure that base, trim, plates, or escutcheons will completely cover cut edges.
- H. Extend tile into recesses and under equipment.
- I. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

### 3.4 ADJUSTING

- A. Correct tiles that are not seated; replace damaged tiles.

### 3.5 CLEANING

- A. VCT: Clean, wax, and machine buff in accordance with manufacturer's instructions and as directed by Owner.

### 3.6 PROTECTION

- A. Do not allow traffic on flooring until adhesive has set.
- B. Cover areas subject to traffic with protective covering.

END OF SECTION  
(08/2015)

## SECTION 09 91 00 - PAINTING

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Surface preparation and field application of paints.

#### 1.2 REFERENCES

- A. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)):
  - 1. D4442 - Standard Test Method for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
- B. Green Seal, Inc. (GS) 11 - Standard for Paints and Coatings.
- C. Master Painters Institute (MPI) - Architectural Painting Specification Manual.
- D. Society for Protective Coatings (SSPC) - Painting Manual.

#### 1.3 SUBMITTALS

- A. Submittals for Review:
  - 1. Product Data: Manufacturer's data on materials proposed for use including:
    - a. Product designation and grade.
    - b. Product analysis and performance characteristics.
    - c. Standards compliance.
    - d. Material content.
    - e. Mixing and application procedures.
  - 2. Samples:
    - a. 8 x 10 inch brush-out samples of each coating system. Step back successive coats so that all coats remain exposed. Indicate type of material used for each coat.
    - b. 12 x 12 inch texture samples on gypsum board backing.
  - 3. Paint Schedule: Indicate types and locations of each surface, paint materials, and number of coats to be applied.

#### 1.4 QUALITY ASSURANCE

- A. Materials, Preparation, and Workmanship: Conform to MPI Painting Manual.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Container Labels: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage rates, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- B. Paint Materials: Store at ambient temperature from 45 to 90 degrees F in ventilated area, or as required by manufacturer's instructions.

## 1.6 PROJECT CONDITIONS

- A. Do not apply materials when surface and ambient temperatures or relative humidity are outside ranges required by paint manufacturer.
- B. Maintain ambient and substrate temperatures above manufacturer's minimum requirements for 24 hours before, during, and after paint application.
- C. Do not apply materials when relative humidity is above 85 percent or when dew point is less than 5 degrees F different than ambient or surface temperature.
- D. Provide lighting level of 30 footcandles at substrate surface.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Products: Products manufactured by the Sherwin Williams Company as listed in this Section as shall serve as a basis-of-design reference for quality and performance characteristics. Provide equivalent products by one of the following manufacturers:
- B. Acceptable Manufacturers:
  - 1. Sherwin Williams. ([www.sherwin-williams.com](http://www.sherwin-williams.com))
  - 2. Benjamin Moore and Co. ([www.benjaminmoore.com](http://www.benjaminmoore.com))
  - 3. PPG Industries. ([www.ppg.com](http://www.ppg.com))

### 2.2 MATERIALS

- A. Paints:
  - 1. As scheduled at the end of this Section, or equal.
  - 2. Free from all forms of lead and mercury.
- B. Gloss Ratings:

Gloss Designation	Units at 60 Degrees	Units at 85 Degrees
G1 - Flat	0 to 5	Maximum 10
G2 - Low Sheen	0 to 10	10 to 35
G3 - Eggshell	10 to 25	10 to 35
G4 - Satin	20 to 35	Minimum 35
G5 - Semigloss	35 to 70	
G6 - Gloss	70 to 85	
G7 - High Gloss	Minimum 85	

### 2.3 ACCESSORIES

- A. Accessory Materials: Block fillers, primers, paint thinners, and other materials required to achieve specified finishes; commercial quality.

- B. Patching Materials: Latex filler.
- C. Patching Compound: Type recommended by coating manufacturer; compatible with substrate materials.
- D. Fastener Head Cover Materials: Latex filler.

#### 2.4 MIXES

- A. Deliver paints pre-mixed and pre-tinted.
- B. Uniformly mix to thoroughly disperse pigments.
- C. Do not thin in excess of manufacturer's recommendations.
- D. Re-mix paint during application; ensure complete dispersion of settled pigment and uniformity of color and gloss.

### **PART 3 EXECUTION**

#### 3.1 EXAMINATION

- A. Test shop applied primer for compatibility with subsequent coatings.

#### 3.2 PREPARATION

- A. General:
  - 1. Protect adjacent and underlying surfaces.
  - 2. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
  - 3. Correct defects and clean surfaces capable of affecting work of this section.
  - 4. Seal marks that may bleed through surface finishes with shellac.
- B. Impervious Surfaces: Remove mildew by scrubbing with solution of trisodium phosphate and bleach. Rinse with clean water and allow to dry.
- C. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair. Apply spray-applied texture, to match existing, in accordance manufacturer's instructions.
- D. Concrete Masonry:
  - 1. Remove dirt, loose mortar, scale, salt and alkali powder, and other foreign matter.
  - 2. Remove oil and grease with solution of trisodium phosphate; rinse and allow to dry.
- E. Interior Wood:
  - 1. Wipe off dust and grit.
  - 2. Seal knots, pitch streaks, and sappy sections with sealer.
  - 3. Fill nail holes and cracks after primer has dried; sand between coats.
- F. Existing Surfaces:
  - 1. Remove loose, flaking, powdery, and peeling paints.
  - 2. Lightly sand glossy painted surfaces.

3. Fill holes, cracks, depressions and other imperfections with patching compound; sand flush with surface.
4. Remove oil, grease, and wax by scraping; solvent wash and thoroughly rinse.

G. Rust Removal:

1. Remove rust by wire brushing to expose base metal.
2. Treat previously coated and bare metal areas with OSPHO or approved equal leave-on rust remover and metal treatment. Allow to dry overnight before applying new coatings.

### 3.3 APPLICATION

- A. Apply paints in accordance with MPI Painting Manual, Premium Grade finish requirements.
- B. Apply primer or first coat closely following surface preparation to prevent recontamination.
- C. Do not apply finishes to surfaces that are not dry.
- D. Apply coatings to minimum dry film thickness recommended by manufacturer.
- E. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- F. Apply coatings to uniform appearance without laps, sags, curtains, holidays, and brush marks.
- G. Allow applied coats to dry before next coat is applied.
- H. When required on deep and bright colors apply an additional finish coat to ensure color consistency.
- I. Continue paint finishes behind wall-mounted accessories.
- J. Sand between coats on interior wood and metal surfaces.
- K. Match final coat to approved color samples.
- L. Mechanical and Electrical Components:
  1. Paint factory primed equipment.
  2. Remove unfinished and primed louvers, grilles, covers, and access panels; paint separately.
  3. Paint exposed and insulated pipes, conduit, boxes, ducts, hangers, brackets, collars, and supports unless factory finished.
  4. Do not paint name tags or identifying markings.
  5. Paint exposed conduit and electrical equipment in finished areas.
  6. Paint duct work behind louvers, grills, and diffusers flat black to minimum of 18 inches or beyond sight line.
- M. Do Not Paint:
  1. Surfaces indicated on Drawings or specified to be unpainted or unfinished.
  2. Surfaces with factory applied finish coat or integral finish.
  3. Electrical panelboard covers, unless specifically indicated otherwise.
  4. Architectural metals, including brass, bronze, stainless steel, and chrome plating.

### 3.4 ADJUSTING

- A. Touch up or refinish disfigured surfaces.

3.5 CLEANING

- A. Remove paint from adjacent surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Ferrous Metal Substrates: Structural Iron & Steel

- 1. Latex System; G6 – Gloss:
  - 1st Coat: S-W Pro Industrial™ Pro-Cryl Universal Primer, B66-310 Series (2.0 mils DFT)
  - 2nd Coat: S-W A-100 Exterior Latex, A8 Series
  - 3rd Coat: S-W A-100 Exterior Latex, A8 Series (1.3 mils DFT per coat)

3.7 INTERIOR PAINTING SCHEDULE

- A. Wood Substrates, Doors and Trim:

- 1. Water Based Acrylic Alkyd System; G5 – Semigloss:
  - 1st Coat: S-W Premium Wall & Wood Primer, B28W8111 (1.8 mils DFT)
  - 2nd Coat: S-W ProMar 200 Waterbased Alkyd, B34-8200 Series
  - 3rd Coat: S-W ProMar 200 Waterbased Alkyd, B34-8200 Series (1.7 mils DFT per coat)

- B. Drywall (Walls, Ceilings, Gypsum Board):

- 1. Latex System; G5 – Semigloss:
  - 1st Coat: S-W ProMar 200 Zero VOC Latex Primer, B28W2600 (1.0 mils DFT)
  - 2nd Coat: S-W ProMar 200 Zero VOC Latex, B31-2600 Series
  - 3rd Coat: S-W ProMar 200 Zero VOC Latex, B31-2600 Series (1.6 mils DFT per coat)

- C. Concrete Masonry Substrates:

- 1. Latex System; G5 – Semigloss:
  - 1st Coat: S-W ProMar 200 Zero VOC Latex Primer, B28W2600 (1.0 mils DFT)
  - 2nd Coat: S-W ProMar 200 Zero VOC Latex, B31-2600 Series
  - 3rd Coat: S-W ProMar 200 Zero VOC Latex, B31-2600 Series (1.6 mils DFT per coat)

END OF SECTION  
(12/2019)

**SECTION 11 31 00 - APPLIANCES**

**PART 1 GENERAL**

1.1 SUMMARY

- A. Section Includes:
  - 1. Domestic Kitchen Appliances.
  - 2. Connection to utilities.

1.2 SUBMITTALS

- A. Submittals for Review:
  - 1. Product Data: Provide product data on appliances showing materials, finishes, characteristics, limitations, and electrical characteristics.
  - 2. Warranty: Sample warranty form.
- B. Closeout Submittals: Operation and Maintenance Data.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver appliances with manufacturer's protective coverings in place; do not remove until just prior to installation.

**PART 2 PRODUCTS**

2.1 MANUFACTURED UNITS

- A. Appliances: As indicated on drawings, or approved equal.

**PART 3 EXECUTION**

3.1 INSTALLATION

- A. Install appliances in accordance with manufacturer's instructions and approved shop Drawings.
- B. Set plumb, level, and aligned.
- C. Connect to power supply, domestic water, and sanitary waste systems as applicable for each specific appliance.

3.2 ADJUSTING

- A. Adjust appliances for proper operation.

END OF SECTION  
(10/2022)

## SECTION 12 32 00 - MANUFACTURED WOOD CASEWORK

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
1. Factory manufactured cabinet units.
  2. Plastic laminate countertops.
  3. Shop finishing.
  4. Cabinet hardware.

#### 1.2 REFERENCES

- A. Kitchen Cabinet Manufacturers Association (KCMA) A161.1 - Performance & Construction Standard for Kitchen and Vanity Cabinets.
- B. Association of Electrical and Medical Imaging Equipment Manufacturers (NEMA) LD-3 - High Pressure Decorative Laminates.
- C. Virginia Housing Minimum Cabinet Requirements Version 2025.1. See Appendix A.

#### 1.3 SUBMITTALS

- A. Submittals for Review:
1. Shop Drawings:
    - a. Include dimensioned plan, sections, elevations, and details, including interface with adjacent work.
    - b. Designate wood species and finishes.
  2. Product Data: for cabinets and each hardware component.
  3. Samples:
    - a. 3 x 3 inch plastic laminate samples in each color and finish.
    - b. 6 x 6 inch panel product samples for transparent finish.

#### 1.4 QUALITY ASSURANCE

- A. Cabinets shall comply with ANSI/KCMA A161.1 performance requirements.
- B. Cabinets shall be constructed in accordance with Virginia Housing Minimum Cabinet Requirements and as follows:
1. End panels, tops, and bottoms shall be fabricated from plywood panels.
  2. Cabinet back panels shall be plywood or hardboard, 1/4 inch thick.
  3. All shelves shall be solid wood or plywood, minimum 5/8 inch thick.
  4. Doors and drawer fronts shall be solid wood or plywood.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver materials until proper protection can be provided, and until needed for installation.
- B. Deliver cabinets factory assembled.
- C. Store in clean, dry, conditioned space.
- D. Protect from moisture, damage, and temperature extremes.

## 1.6 PROJECT CONDITIONS

- A. Environmental Requirements: Maintain following conditions in building for minimum 7 days prior to, during, and after installation of casework:
  - 1. Temperature: 60 to 80 degrees F.
  - 2. Humidity: 43 to 70 percent.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Wood Panel Products:
  - 1. Cabinets: Exposed and semi-exposed veneers: plain-sliced white birch, of quality suitable for transparent finish. Sheet core: Veneer (plywood).
  - 2. Countertops: Sheet Core: Particleboard.
- B. Lumber: Exposed and semi-exposed locations: white birch, of quality suitable for transparent finish.
- C. Hardboard: Pressed wood fiber with resin binder; tempered grade, 1/4 inch thick, smooth both sides.

### 2.2 ACCESSORIES

- A. Fasteners: As indicated on drawings, or type and size as required by conditions of use where not specifically called out.
- B. Adhesives: Waterproof, compatible with backing and veneer materials.
- C. Finish Hardware:
  - 1. Door and Drawer Pull: 4-inch wire pull, solid brass, satin chrome finish.
  - 2. Full-Extension Drawer Slide: Blum Tandem plus Blumotion 568.
  - 3. Door Hinge: Blum Clip Top Blumotion 110 degree +.
  - 4. Shelf Rests: Hafele 282.24.720 (Front); 282.24.710 (Rear); or approved equal.
- D. Joint Sealers: Specified in Section 07 92 00.

### 2.3 FABRICATION

- A. Cabinets - Transparent Finish:
  - 1. Quality: ANSI/KCMA A161.1 Certified.
  - 2. Construction type: Face frame.
  - 3. Door and Drawer Front Style: Flush.
  - 4. Interface style: Full Overlay.
  - 5. Semi-exposed surfaces: Low pressure decorative laminate (melamine): NEMA LD-3, Grade VGL.
  - 6. Fit exposed and semi-exposed sheet edges with matching wood edging.
  - 7. Fabricate drawer bodies to full depth of drawer fronts less 1/2 inch.
- B. Factory-Manufactured Plastic Laminate Countertops:

1. Fabricate from composite wood core product with high-pressure decorative laminate surface.
  2. Front edge post-formed to continuous radius without seams.
  3. Integral backsplash minimum 4-inches high, post-formed or factory-applied, with coved transition between horizontal and vertical surfaces.
  4. Plastic Laminate: NEMA LD-3, Grade HGP. Color, Pattern, and Finish as indicated.
  5. Locate end joints centered or symmetrical. Join sections with concealed clamp fasteners. Locate plastic laminate butt joints minimum 2 feet away from sinks.
  6. Provide holes and cutouts for mounting of sinks.
- C. Where field fitting is required, provide ample allowance for cutting. Provide trim for fillers, scribes, and ceiling closure panels. Trim to fit as required for site conditions.
- D. Provide cutouts and reinforcement for plumbing, electrical, appliances, and accessories. Prime paint surfaces of cut edges.

## 2.4 FINISHES

### A. Factory Finishing:

1. Catalyzed Polyurethane.
2. Color: As selected from manufacturer's full color range.
3. Clear finish over wood stain.
4. Sheen: Satin.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Prior to installation, condition cabinets to average humidity that will prevail after installation.

### 3.2 INSTALLATION

- A. Set units plumb, rigid, and level and secure to wall framing or blocking with specified fasteners.
- B. Scribe to adjacent construction with maximum 1/16 inch gaps.
- C. Adhere countertops, splashes, and skirts with beads of adhesive.
- D. Fill joints between cabinets, tops, and splashes with joint sealer as specified in Section 07 92 00; finish flush.

### 3.3 ADJUSTING

- A. Adjust doors, drawers, and hardware for smooth operation.
- B. Align doors and drawer fronts to be in-plane and align reveals uniformly between doors and drawers, and between cabinet units.
- C. Clean cabinets of dust and construction debris.

END OF SECTION  
(02/2026)

**SECTION 224100  
RESIDENTIAL PLUMBING FIXTURES**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASME A112.18.1 - Plumbing Supply Fittings; 2024.
- B. ASME A112.18.2 - Plumbing Waste Fittings; 2020.
- C. ASME A112.18.6 - Flexible Water Connectors; 2017 (Reaffirmed 2021).
- D. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2022.
- E. NSF 61 - Drinking Water System Components - Health Effects; 2024.
- F. NSF 372 - Drinking Water System Components - Lead Content; 2024.

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Kitchen sinks.
  - 2. Sink faucets.
  - 3. Supply fittings.
  - 4. Waste fittings.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For plumbing fixtures and faucets to include in emergency, operation, and operation and maintenance manuals.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Domestic water faucets intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

**2.02 KITCHEN SINKS**

- A. Stainless Steel Kitchen Sink, Counter Mounted KS-1 & KS-2:
  - 1. KS-1 shall be equal to Elkay model LRAD252255.
  - 2. KS-2 shall be equal to Elkay model LR2522.
- B. Fixture:
  - 1. ASME A112.19.3/CSA B45.4 for stainless steel kitchen sinks.
  - 2. Overall Dimensions: 25" x 22".
  - 3. Metal Thickness: 18 gauge.
  - 4. Bowl:
    - a. Dimensions: 21" x 15-3/4" x 5-1/8" (KS-1), 21" x 15-3/4" x 7-3/4" (KS-2).
    - b. Drain: 3-1/2-inch (89-mm) crumb cup for KS-2, grid for KS-1.
      - 1) Location: KS-1: near back of bowl, KS-2: centered in bowl.
  - 5. Hole drilling configuration: Single hole, centered.
  - 6. Sound deadening pads: Required.
  - 7. ADA-compliant: Required for KS-1.

- C. Faucet: KS-1/KS-2 faucet.
- D. Supply Fittings: Comply with requirements in "Supply Fittings" Article.
- E. Waste Fittings: Comply with requirements in "Waste Fittings" Article.

### **2.03 SINK FAUCETS**

- A. NSF Standard: Comply with NSF 61 and NSF 372 for faucet materials that will be in contact with potable water.
- B. General-Duty, Solid-Brass Sink Faucets, KS-1/KS-2 faucet:
  - 1. KS-1/KS-2 faucet shall be equal to Delta model 101LF-WF.
  - 2. Standards:
    - a. ASME A112.18.1
    - b. ICC/ANSI A117.1
  - 3. Source Limitations: Obtain sink faucets from single source from single manufacturer.
  - 4. Description: Manually-operated, single lever faucet. Include hot-and cold-water indicators.
  - 5. Body Type: Single hole.
  - 6. Body Material: Solid brass.
  - 7. Finish: Chrome-plated.
  - 8. Spout Type: 8" swing.

### **2.04 SUPPLY FITTINGS**

- A. NSF Standard: Comply with NSF 61 and NSF 372 for faucet materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
  - 1. Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression stop with inlet connection matching water-supply piping type and size.
    - a. Operation: Wheel handle.
  - 2. Risers:
    - a. Size:
      - 1) NPS 3/8 (DN 10) for lavatories.
      - 2) NPS 1/2 (DN 15) for kitchen sinks.
    - b. Material: ASME A112.18.6/CSA B125.6, braided- or corrugated-stainless-steel flexible hose riser.

### **2.05 WASTE FITTINGS**

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain:
  - 1. Grid type with NPS 1-1/2 (DN 40) offset tailpiece for accessible kitchen sinks.
  - 2. NPS 1-1/2 (DN 40) straight tailpiece for standard kitchen sinks.
- C. Trap:
  - 1. Size:
    - a. NPS 1-1/2 (DN 40) for kitchen sinks.
  - 2. Material:
    - a. Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch- (0.83-mm-) thick brass tube to wall; and chrome-plated-brass or -steel wall flange.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine roughing-in of water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing-fixture installation.
- B. Examine walls, floors, cabinets, and counters for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION OF RESIDENTIAL PLUMBING FIXTURES**

- A. Install plumbing fixtures level and plumb in accordance with roughing-in drawings.
- B. Install counter-mounting fixtures in and attached to casework.
- C. Install stops in locations where they can be easily reached for operation.
- D. Install traps on fixture outlets.
- E. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories and sinks.
- F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings.
- G. Seal joints between plumbing fixtures, counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color.

### **3.03 PIPING CONNECTIONS**

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

### **3.04 ADJUSTING**

- A. Operate and adjust plumbing fixtures and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

### **3.05 CLEANING AND PROTECTION**

- A. After completing installation of plumbing fixtures, inspect and repair damaged finishes.
- B. Clean plumbing fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

**END OF SECTION**

**SECTION 230130.51  
HVAC AIR-DISTRIBUTION SYSTEM CLEANING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cleaning of HVAC duct system, equipment, and related components.
- B. Testing and inspection agency employed by Owner.

**1.02 RELATED REQUIREMENTS**

- A. Section 014000 - Quality Requirements: Additional requirements for testing and inspection agencies.

**1.03 DEFINITIONS**

- A. HVAC System: For purposes of this section, the surfaces to be cleaned include all interior surfaces of the heating, air-conditioning and ventilation system from the points where the air enters the system to the points where the air is discharged from the system, including the inside of air distribution equipment, coils, and condensate drain pans; see NADCA ACR for more details.
  - 1. Concealed risers and above-ceiling makeup air duct is not required to be cleaned.
  - 2. Concealed kitchen exhaust risers and above-ceiling exhaust are required to be cleaned.

**1.04 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- B. NADCA ACR - The NADCA Standard for Assessment, Cleaning, and Restoration of HVAC Systems; 2025.
- C. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.
- D. UL 181A - Closure Systems for Use with Rigid Air Ducts; Current Edition, Including All Revisions.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
- C. Qualifications Statement: Submit qualifications of proposed cleaning contractor for approval.
- D. Qualifications Statement: Submit qualifications of proposed testing and inspection agency for approval.
- E. Project Cleanliness Evaluation and Cleaning Plan, as specified.
- F. Material Safety Data Sheets (MSDS): For all chemical products proposed to be used in the cleaning process; submit directly to Owner.
- G. Project Closeout Report: Include field quality control reports, evidence of satisfactory cleaning, and documentation of items needing further repair.

**1.06 QUALITY ASSURANCE**

- A. Information Available to Contractor: Upon request, Owner will provide the following:
  - 1. One copy of available original construction, project record, or facility manager's updated drawings of HVAC system.
  - 2. One copy of available original construction, project record, or facility manager's updated specifications of HVAC system.
  - 3. Cleanliness inspection report performed by separate contractor.
  - 4. Indoor air quality report performed by separate contractor.
  - 5. Hazardous material report performed by separate contractor.

- B. Cleaning Contractor Qualifications: Company specializing in the cleaning and restoration of HVAC systems as specified in this section.
  - 1. Certified by one of the following:
    - a. NADCA, National Air Duct Cleaners Association: [www.nadca.com](http://www.nadca.com).
    - b. Nationally recognized certification program and organization dedicated to the cleaning of HVAC systems.
  - 2. Having minimum of three years documented experience.
  - 3. Employing for this project a supervisor certified as an Air Systems Cleaning Specialist by NADCA.
  - 4. Employing for this project a supervisor certified by same organization that certified the cleaning contractor.
- C. Testing and Inspection Agency Qualifications: Experienced in inspection and testing using methods defined in NADCA ACR.

## **PART 2 PRODUCTS**

### **2.01 TOOLS AND EQUIPMENT**

- A. Vacuum Devices and Other Tools: Exceptionally clean, in good working order, and sealed when brought into the facility.
- B. Vacuum Devices That Exhaust Air Inside Building, Including Hand-Held and Wet Vacuums: Equipped with HEPA filtration with 99.97 percent collection efficiency for minimum 0.3-micron size particles and DOP test number.
- C. Vacuum Devices That Exhaust Air Outside Building, Including Truck- and Trailer-Mounted Types: Equipped with particulate collection including adequate filtration to contain debris removed from the HVAC system; exhausted in manner that prevents contaminant re-entry to building; compliant with applicable regulations as to outdoor environmental contamination.

### **2.02 REPLACEMENT PRODUCTS**

- A. Fibrous Glass Insulation: Provide material complying with UL 181 equivalent to existing material in quality and thickness.

### **2.03 SURFACE TREATMENTS**

- A. Anti-Microbial Materials: EPA registered specifically for use on non-porous HVAC system surfaces and applied per manufacturer's instructions.
- B. Surface Coating for Fibrous Glass Materials: Water-based, zero VOC; flame spread index less than 25, smoke developed index less than 450, Class A, when tested in accordance with ASTM E84.

## **PART 3 EXECUTION**

### **3.01 PROJECT CONDITIONS**

- A. Comply with applicable federal, state, and local requirements.
- B. Perform cleaning, inspection, and remediation in accordance with the recommendations of NADCA "Assessment, Cleaning and Restoration of HVAC Systems" (ACR) and as specified herein.
- C. Where NADCA ACR uses the terms "recommended", "highly recommended", or "ideally" in regard to a certain procedure or activity, do that unless it is clearly inapplicable to the project.
- D. Take precautions to prevent introduction of additional hazards into occupied spaces.
- E. Comply with requirements of Section 015719.
- F. Obtain Owner's approval of proposed temporary locations for large equipment.
- G. Designate a decontamination area and obtain Owner's approval.
- H. When portions of the facility are to remain occupied or in operation during cleaning activities, provide adequate controls or containment to prevent access to spaces being cleaned by

unauthorized persons and provide detailed instructions to Owner as to these controls or containment.

- I. If unforeseen mold or other biological contamination is encountered, notify Architect immediately, identifying areas affected and extent and type of contamination.

### **3.02 EXAMINATION**

- A. Prior to the commencement of any cleaning work, prepare and submit to Architect a project evaluation and plan for this project, including considerations recommended in NADCA ACR.
- B. Coordinate cleaning plan with indoor air quality control plan specified in Section 015719.
- C. Inspect the system as required to determine appropriate methods, tools, equipment, and protection.
- D. Start of cleaning work constitutes acceptance of existing conditions.
- E. When concealed spaces are later made accessible, examine and document interior conditions prior to beginning cleaning.
- F. Document all instances of mold growth, rodent droppings, other biological hazards, and damaged system components.

### **3.03 PREPARATION**

- A. When cleaning work might adversely affect life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with authorities having jurisdiction.
- B. Ensure that electrical components that might be adversely affected by cleaning are de-energized, locked out, and protected prior to beginning work.
- C. Air-Volume Control Devices: Mark the original position of dampers and other air-directional mechanical devices inside the HVAC system prior to starting cleaning.
- D. Access to Concealed Spaces: Use existing service openings and make additional service openings as required to accomplish cleaning and inspection.
  1. Do not cut openings in non-HVAC components without obtaining the prior approval of Owner.
  2. Make new openings in HVAC components in accordance with NADCA Standard 05; do not compromise the structural integrity of the system.
  3. Do not cut service openings into flexible duct; disconnect at ends for cleaning and inspection.
- E. Ceiling Tile: Lay-in ceiling tile may be removed to gain access to HVAC systems during the cleaning process; protect tile from damage and reinstall upon completion; replace damaged tile.

### **3.04 CLEANING**

- A. Use any cleaning method recommended by NADCA ACR unless otherwise specified; do not use methods prohibited by NADCA ACR, or that will damage HVAC components or other work, or that will significantly alter the integrity of the system.
- B. Obtain Owner's approval before using wet cleaning methods; ensure that drainage is adequate before beginning.
- C. Ducts: Mechanically clean all portions of ducts.
- D. Hoses, Cables, and Extension Rods: Clean using suitable sanitary damp wipes at the time they are being removed or withdrawn from their normal position.
- E. Registers, Diffusers, and Grilles: When removing, take care to prevent containment exposure due to accumulated debris.
- F. Coils: Follow NADCA ACR completely including measuring static pressure drop before and after cleaning; do not remove refrigeration coils from system to clean; report coils that are permanently impacted.

- G. Fibrous Glass Material: Use HEPA vacuuming equipment, under constant negative pressure, do not permit to get wet, and do not damage surfaces; replace material damaged by cleaning operations.
- H. Existing Damaged Fibrous Glass Material: Report to Architect all evidence of damage, deterioration, delaminating, friable material, mold or fungus growth, or moisture that cannot be remedied by cleaning or resurfacing with an acceptable insulation repair coating.
  - 1. Material with active fungal growth is considered unremediable.
  - 2. Remove unremediable material and clean underlying surfaces.
  - 3. Where surface damage can be repaired by applying a coating, do so at no extra cost to Owner.
  - 4. Replace unremediable material at no extra cost to Owner.
- I. Collect debris removed during cleaning; ensure that debris is not dispersed outside the HVAC system during the cleaning process.
- J. Store contaminated tools and equipment in polyethylene bags until cleaned in the designated decontamination area.

### **3.05 REPAIR**

- A. Repair openings cut in the ventilation system so that they do not significantly alter the airflow or adversely impact the facility's indoor air quality.
- B. At insulated ducts and components, accomplish repairs in such a manner as to achieve the equivalent thermal value.
- C. Reseal new openings in accordance with NADCA Standard 05.
- D. Reseal rigid fiber glass duct systems using closure techniques that comply with UL 181 or UL 181A.
- E. When new openings are intended to be capable of being re-opened in the future, clearly mark them and report their locations to Owner in project report documents.

### **3.06 FIELD QUALITY CONTROL**

- A. Ensure that the following field quality control activities are completed prior to application of any treatments or coatings and prior to returning HVAC system to normal operation.
- B. Visually inspect all portions of the cleaned components; if not visibly clean as defined in NADCA ACR, re-clean and reinspect.
- C. Coils: Cleaning must restore the coil pressure drop to within 10 percent of the coil's original installed pressure drop; if original pressure drop is not known, coil will be considered clean if free of foreign matter and chemical residue based on visual inspection.
- D. Notify Architect when cleaned components are ready for inspection.
- E. Notify Owner's testing and inspection agency when cleaned components are ready for inspection.
- F. Owner reserves the right to verify cleanliness using NADCA ACR Surface Comparison Testing or NADCA Vacuum Test.
- G. When directed, re-clean components until they pass.
- H. Contractor shall bear the costs of retesting due to inadequate cleaning.
- I. Submit evidence that all portions of the system required to be cleaned have been cleaned satisfactorily.

### **3.07 ANTI-MICROBIAL TREATMENT**

- A. When directed, apply anti-microbial treatment to internal surfaces.
- B. Apply anti-microbial agent after removal of surface deposits and debris.
- C. Apply anti-microbial treatments and coatings in strict accordance with the manufacturer's written recommendations and EPA registration listing.

D. Spray coatings directly onto interior ductwork surfaces; do not "fog" into air stream.

**3.08 ADJUSTING**

A. After satisfactory completion of field quality control activities, restore adjustable devices to original settings, including, but not limited to, dampers, air directional devices, valves, fuses, and circuit breakers.

**3.09 WASTE MANAGEMENT**

- A. Double-bag waste and debris in 6 mil, 0.006 inch (0.1524 mm) thick polyethylene plastic bags.
- B. Dispose of debris off-site in accordance with applicable federal, state and local requirements.

**END OF SECTION**

**SECTION 230523  
GENERAL-DUTY VALVES FOR HVAC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Ball valves.
- B. Butterfly valves.

**1.02 RELATED REQUIREMENTS**

- A. Section 230548 - Vibration and Seismic Controls for HVAC.
- B. Section 230553 - Identification for HVAC Piping and Equipment.
- C. Section 230719 - HVAC Piping Insulation.
- D. Section 232113 - Hydronic Piping.

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. PTFE: Polytetrafluoroethylene.
- G. RS: Rising stem.
- H. TFE: Tetrafluoroethylene.
- I. WOG: Water, oil, and gas.
- J. WSP: Working steam pressure.

**1.04 REFERENCE STANDARDS**

- A. API STD 594 - Check Valves: Flanged, Lug, Wafer, and Butt-Welding; 2022.
- B. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).
- C. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2020.
- D. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24 Metric/Inch Standard; 2025.
- E. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves; 2022, with Errata (2023).
- F. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- G. ASME B16.34 - Valves — Flanged, Threaded, and Welding End; 2025.
- H. ASME B31.1 - Power Piping; 2024.
- I. ASME B31.9 - Building Services Piping; 2025.
- J. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2025, with Errata.
- K. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2022.
- L. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings; 2004 (Reapproved 2023).
- M. ASTM A216/A216M - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service; 2021.

- N. ASTM A351/A351M - Standard Specification for Castings, Austenitic, for Pressure-Containing Parts; 2024, with Editorial Revision (2025).
- O. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures; 1999 (Reapproved 2022).
- P. ASTM A536 - Standard Specification for Ductile Iron Castings; 2024.
- Q. ASTM A582/A582M - Standard Specification for Free-Machining Stainless Steel Bars; 2022.
- R. ASTM B61 - Standard Specification for Steam or Valve Bronze Castings; 2015 (Reapproved 2021).
- S. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings; 2017 (Reapproved 2025).
- T. AWWA C606 - Grooved and Shouldered Joints; 2022.
- U. MSS SP-45 - Drain and Bypass Connections; 2020.
- V. MSS SP-67 - Butterfly Valves; 2022.
- W. MSS SP-68 - High Pressure Butterfly Valves with Offset Design; 2021.
- X. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service; 2010a.
- Y. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .

#### **1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer:
  - 1. Obtain valves for each valve type from single manufacturer.
- B. Welding Materials and Procedures: Comply with ASME BPVC-IX.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Prepare valves for shipping as follows:
  - 1. Minimize exposure of operable surfaces by setting ball valves to open position.
  - 2. Protect valve parts exposed to piped medium against rust and corrosion.
  - 3. Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
  - 4. Adjust globe valves to the closed position to avoid clattering.
  - 5. Secure check valves in either the closed position or open position.
  - 6. Adjust butterfly valves to closed or partially closed position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection and protect flanges and specialties from dirt.
    - a. Provide temporary inlet and outlet caps.
    - b. Maintain caps in place until installation.
  - 2. Store valves in shipping containers and maintain in place until installation.
    - a. Store valves indoors in dry environment.
    - b. Store valves off the ground in watertight enclosures when indoor storage is not an option.
- C. Exercise the following precautions for handling:

1. Handle large valves with sling, modified to avoid damage to exposed parts.
2. Avoid the use of operating handles or stems as rigging or lifting points.

## **PART 2 PRODUCTS**

### **2.01 APPLICATIONS**

- A. See drawings for specific valve locations.
- B. Listed pipe sizes shown using nominal pipe sizes (NPS) and nominal diameter (DN).
- C. Provide the following valves for the applications if not indicated on drawings:
  1. Isolation (Shutoff): Butterfly and Ball.
- D. Substitutions of valves with higher CWP classes or WSP ratings for same valve types are permitted when specified CWP ratings or WSP classes are not available.
- E. Required Valve End Connections for Non-Wafer Types:
  1. Steel Pipe:
    - a. Size 2 inch (50 mm, DN) and Smaller: Threaded ends.
    - b. Size 2-1/2 inch (65 mm, DN) and Larger: Grooved ends.
  2. Copper Tube:
    - a. Size 2 inch (50 mm, DN) and Smaller: Threaded ends, except solder-joint valve-ends.
    - b. Size 2-1/2 inch (65 mm, DN) and Larger: Grooved ends.
- F. Chilled Water Valves:
  1. Size 2 inch (50 mm, DN) and Smaller, Brass and Bronze Valves:
    - a. Threaded; Solder-joint; or Press ends.
    - b. Ball: Full port, one piece, brass or bronze trim.
    - c. Globe: Bronze disc, Class 125.
  2. Size 2-1/2 inch (65 mm, DN) and Larger, Iron Valves:
    - a. 2-1/2 inch (65 mm, DN) to 4 inch (100 mm, DN): Threaded or flanged ends.
    - b. Ball: 2-1/2 NPS (65 DN) to 10 inch (250 mm, DN), Class 150.
    - c. Single-Flange Butterfly: 2-1/2 inch (65 mm, DN) to 12 inch (300 mm, DN), aluminum-bronze disc, EPDM seat, 200 CWP.
    - d. Grooved-End Butterfly: 2-1/2 inch (65 mm, DN) to 12 inch (300 mm, DN), 300 CWP.
    - e. Butterfly: High performance, single flange, Class 150.
- G. Heating Hot Water Valves:
  1. Size 2 inch (50 mm, DN) and Smaller, Brass and Bronze Valves:
    - a. Threaded ends.
    - b. Ball: Full port, one piece, brass trim.
  2. Size 2-1/2 inch (65 mm, DN) and Larger, Iron Valves:
    - a. 2-1/2 inch (65 mm, DN) to 4 inch (100 mm, DN): Threaded ends.

### **2.02 GENERAL REQUIREMENTS**

- A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
- B. Valve Sizes: Match upstream piping unless otherwise indicated.
- C. Valve Actuator Types:
  1. Hand Lever: Quarter-turn valves 6 inch (150 mm, DN) and smaller.
- D. Valves in Insulated Piping: Provide 2 inch (50 mm, DN) stem extensions and the following features:
  1. Ball Valves: Extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
  2. Butterfly Valves: Extended neck.
  3. Memory Stops: Fully adjustable after insulation is installed.

- E. Memory Stops: Fully adjustable after insulation is installed.
- F. Valve-End Connections:
  - 1. Threaded End Valves: ASME B1.20.1.
  - 2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
  - 3. Pipe Flanges and Flanged Fittings 1/2 inch (15 mm, DN) through 24 inch (600 mm, DN): ASME B16.5.
  - 4. Solder Joint Connections: ASME B16.18.
  - 5. Grooved End Connections: AWWA C606.
- G. General ASME Compliance:
  - 1. Ferrous Valve Dimensions and Design Criteria: ASME B16.10 and ASME B16.34.
  - 2. Power Piping Valves: ASME B31.1.
  - 3. Building Services Piping Valves: ASME B31.9.
- H. Bronze Valves:
  - 1. Fabricate from dezincification resistant material.
  - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- I. Valve Bypass and Drain Connections: MSS SP-45.
- J. Source Limitations: Obtain each valve type from a single manufacturer.

### **2.03 BRASS, BALL VALVES**

- A. One Piece, Full Port with Brass Trim and Press, Threaded, or Soldered Connections:
  - 1. Comply with MSS SP-110.
  - 2. CWP Rating: 200 psi (1,379 kPa).
  - 3. Body: Forged brass.
  - 4. Ends: Threaded.
  - 5. Seats: PTFE or TFE.
  - 6. Stem: Brass.
  - 7. Ball: Chrome-plated brass.
  - 8. Operator: Handle.
  - 9. Manufacturers:
    - a. Including but not limited to: Apollo Valves, NIBCO, Milwaukee Valve, Viega, Watts.
    - b. Substitutions: See Section 016000 - Product Requirements.

### **2.04 BRONZE, BALL VALVES**

- A. General:
  - 1. Fabricate from dezincification resistant material.
  - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. One Piece, Reduced Port with Bronze Trim:
  - 1. Comply with MSS SP-110.
  - 2. CWP Rating: 400 psi (2,758 kPa).
  - 3. Ends: Threaded.
  - 4. Seats: PTFE.
  - 5. Stem: Bronze.
  - 6. Ball: Stainless steel, vented or chrome plated brass.
  - 7. Manufacturers:
    - a. Including but not limited to: Apollo Valves, NIBCO, Milwaukee Valve, Viega, Watts.

### **2.05 IRON, BALL VALVES**

- A. Split Body, Full Port:
  - 1. Comply with MSS SP-72.
  - 2. CWP Rating: 200 psi (1380 kPa).
  - 3. Body: ASTM A126, gray iron.
  - 4. Ends: Flanged.

5. Seats: PTFE.
6. Stem: Stainless steel.
7. Ball: Stainless steel.
8. Manufacturers:
  - a. Substitutions: See Section 016000 - Product Requirements.

## 2.06 IRON, GROOVED-END BALL VALVES

- A. Class 200:
  1. CWP Rating: 600 psi (4,140 kPa).
  2. Body: Ductile iron; ASTM A536, Grade 65-45-12.
  3. Ends: Grooved.
  4. Seats: Teflon.
  5. Stem: Nickel plated carbon steel.
  6. Ball: Nickel plated carbon steel.
  7. Manufacturers:
    - a. Include but are not limited to: Apollo, FNW, American Valve, Milwaukee Valve.
    - b. Substitutions: See Section 016000 - Product Requirements.

## 2.07 IRON, SINGLE FLANGE BUTTERFLY VALVES

- A. Wafer and Lug Style:
  1. Class 150.
  2. Comply with MSS SP-67, Type I.
  3. Wafer Style, CWP Ratings:
    - a. Sizes 2 to 12 inches (50 to 300 mm, DN): 200 psi (1380 kPa).
  4. Lug Style, CWP Ratings:
    - a. Sizes 2 to 12 inches (50 to 300 mm, DN): 250 psi (1725 kPa).
  5. Body Material: ASTM A126 cast iron or ASTM A536 ductile iron.
  6. Stem: One or two-piece stainless steel, blowout-proof.
  7. Seat: EPDM.
  8. Disc: Aluminum-bronze or Nickel-plated ductile iron.
  9. Removable Manual Actuator: Lockable handle or worm-gear-connected handwheel with open/close position indication.
  10. Service Temperature Range: Minus 30 to 250 degrees F (Minus 34.4 to 121.1 degrees C).
  11. Operator: Lockable handle over direct-mount actuator base.
  12. Manufacturers:
    - a. Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
    - b. Bray International, Inc: [www.bray.com/#sle](http://www.bray.com/#sle).
    - c. Effebi: [www.effebi.com/#sle](http://www.effebi.com/#sle).
    - d. FNW: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - e. Kitz Corporation of America: [www.kitzus-kca.com/#sle](http://www.kitzus-kca.com/#sle).
    - f. Nexus Valve, Inc: [www.nexusvalve.com/#sle](http://www.nexusvalve.com/#sle).
    - g. NIBCO INC: [www.nibco.com/#sle](http://www.nibco.com/#sle).
    - h. Arita Valve, a Unimech brand: [www.unimechflow.com/#sle](http://www.unimechflow.com/#sle).
    - i. Substitutions: See Section 016000 - Product Requirements.

## 2.08 IRON, GROOVED-END BUTTERFLY VALVES

- A. CWP Rating: 300 psi (2070 kPa).
  1. Comply with MSS SP-67, Type I.
  2. Body: Coated ductile iron.
  3. Stem: Two-piece stainless steel.
  4. Disc: Coated ductile iron.
  5. Disc Seal: EPDM.
  6. Manufacturers:

- a. Include but are not limited to: Apollo, FNW, NIBCO, Milwaukee Valves.
- b. Substitutions: See Section 016000 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Discard all packing materials and verify that valve interior, including threads and flanges, are completely clean without signs of damage or degradation that could result in leakage.
- B. Verify valve parts to be fully operational in all positions from closed to fully open.
- C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.
- D. Should valve is determined to be defective, replace with new valve.

#### **3.02 INSTALLATION**

- A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.
- B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.
- C. Where valve support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welds.

**END OF SECTION**

**SECTION 230529  
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Support and attachment components.
- B. Retrofit piping cover system.

**1.02 RELATED REQUIREMENTS**

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 230548 - Vibration and Seismic Controls for HVAC.

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping; 2025.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.
- G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures; 1999 (Reapproved 2022).
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.
- J. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- K. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
- L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- M. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- N. FM (AG) - FM Approval Guide; Current Edition.
- O. MFMA-4 - Metal Framing Standards Publication; 2004.
- P. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2025.
- Q. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- R. UL (DIR) - Online Certifications Directory; Current Edition.
- S. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
  - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
  - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
  - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
  - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems and post-installed concrete and masonry anchors.
  - 1. Fiberglass Channel (Strut) Framing Systems: Include requirements for strength derating according to ambient temperature.
- B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
  - 1. Application of protective inserts, saddles, and shields at pipe hangers for each type of insulation and hanger.
- C. Derating Calculations for Fiberglass Channel (Strut) Framing Systems: Indicate load ratings adjusted for applicable service conditions.
- D. Installer's Qualifications: Include evidence of compliance with specified requirements.
- E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with applicable building code.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Installer Qualifications for Powder-Actuated Fasteners (when specified): Certified by fastener system manufacturer with current operator's license.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:
  - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
  - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
  - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.

4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
  5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    - a. Indoor Dry Locations: Use zinc-plated steel unless otherwise indicated.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel unless otherwise indicated.
    - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Prefabricated Trapeze-Framed Metal Strut Systems:
1. Manufacturers:
    - a. ABB Installation Products: [electrification.us.abb.com/#sle](http://electrification.us.abb.com/#sle).
    - b. B-Line, a brand of Eaton Corporation: [www.eaton.com/#sle](http://www.eaton.com/#sle).
    - c. Custom Strut and Roll Forming, LLC: [www.customstrut.com/#sle](http://www.customstrut.com/#sle).
    - d. Elgen Manufacturing Company, Inc: [www.elgenmfg.com/#sle](http://www.elgenmfg.com/#sle).
    - e. Gripple, Inc: [www.gripple.com/#sle](http://www.gripple.com/#sle).
    - f. Unistrut, a brand of Atkore International Inc: [www.unistrut.com/#sle](http://www.unistrut.com/#sle).
    - g. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  2. MFMA-4 compliant, pre-fabricated, MSS SP-58 type 59 continuous-slot metal strut channel with associated tracks, fittings, and related accessories.
  3. MFMA-4 compliant, prefabricated, side-loading continuous-slot metal strut channel bracket with associated tracks, fittings, and related accessories.
  4. Strut Channel or Bracket Material:
    - a. Indoor Dry Locations: Use zinc-plated steel.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
- C. Strut Channels:
1. ASTM A653/A653M galvanized steel bracket with clamps for surface mounting of piping or plumbing equipment support.
  2. Channel or Bracket Kits: Include rods, brackets, end-fixed fittings, covers, clips, and other related hardware required to complete sectional trapeze section for piping or other support.
- D. Hanger Rods:
1. Threaded zinc-plated steel unless otherwise indicated.
- E. Cable Hanging System Kits:
1. Manufacturers:
    - a. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  2. Provide cable-wire in bulk or pre-cut lengths with respective cable hangers as required to hold minimum weight of 120 lb (54.4 kg).
  3. Accessories: Provide brackets, clip or c-clip hangers, covers, and y-hook hangers.
- F. Thermal Insulated Pipe Supports:
1. General Requirements:
    - a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
    - b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
    - c. Pipe supports to be provided for nominally sized, 1/2 to 30 inch (15 to 750 mm, DN) iron pipes.
    - d. Insulation inserts to consist of rigid polyisocyanurate (urethane) insulation surrounded by a 360 degree, PVC jacketing.

2. PVC Jacket:
    - a. Pipe insulation protection shields to be provided with a ball bearing hinge and locking seam.
    - b. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
    - c. Maximum Service Temperature: 180 degrees F (82 degrees C).
    - d. Moisture Vapor Transmission: 0.0071 perm inch (0.0092 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
    - e. Thickness: 60 mil (1.524 mm).
    - f. Connections: Brush on welding adhesive.
  3. Pipe insulation protection shields to be provided at the hanger points and guide locations on pipes requiring insulation as indicated on drawings.
- G. Pipe Supports:
1. Manufacturers:
    - a. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  2. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
  3. Liquid Temperatures Up To 180 degrees F:
    - a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
    - b. Support From Below: MSS SP-58 Types 35 through 38.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.
- H. Equipment Support and Attachment:
  1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
  2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 3 inch (80 mm) high concrete pad constructed in accordance with Section 033000.
  5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

- I. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.
- J. Secure fasteners according to manufacturer's recommended torque settings.
- K. Remove temporary supports.

**3.03 FIELD QUALITY CONTROL**

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.

**END OF SECTION**

**SECTION 230553  
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nameplates.
- B. Tags.
- C. Adhesive-backed duct markers.
- D. Stencils.
- E. Pipe markers.
- F. Ceiling tacks.

**1.02 REFERENCE STANDARDS**

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2023.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2025.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- D. Product Data: Provide manufacturers catalog literature for each product required.
- E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- F. Project Record Documents: Record actual locations of tagged valves.

**PART 2 PRODUCTS**

**2.01 IDENTIFICATION APPLICATIONS**

- A. Instrumentation: Tags.
- B. Major Control Components: Nameplates.
- C. Piping: Pipe markers.
- D. Pumps: Nameplates.
- E. Valves: Tags and ceiling tacks where located above lay-in ceiling.

**2.02 NAMEPLATES**

- A. Manufacturers:
  - 1. Advanced Graphic Engraving, LLC: [www.advancedgraphicengraving.com/#sle](http://www.advancedgraphicengraving.com/#sle).
  - 2. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 3. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  - 4. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  - 5. Seton Identification Products, a Tricor Direct Company: [www.seton.com/#sle](http://www.seton.com/#sle).
  - 6. Substitutions: See Section 016000 - Product Requirements.
- B. Letter Color: White.
- C. Letter Height: 1/2 inch (13 mm).
- D. Background Color: Black.
- E. Plastic: Comply with ASTM D709.

**2.03 TAGS**

- A. Manufacturers:
  - 1. Advanced Graphic Engraving: [www.advancedgraphicengraving.com/#sle](http://www.advancedgraphicengraving.com/#sle).

2. Brady Corporation: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
  3. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  4. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  5. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  6. Seton Identification Products, a Tricor Company: [www.seton.com/#sle](http://www.seton.com/#sle).
  7. Substitutions: See Section 016000 - Product Requirements.
- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.
- C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch (40 mm) diameter with smooth edges.
- D. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

#### **2.04 PIPE MARKERS**

- A. Manufacturers:
1. Brady Corporation: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
  2. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  3. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  4. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  5. Seton Identification Products, a Tricor Company: [www.seton.com/#sle](http://www.seton.com/#sle).
  6. Substitutions: See Section 016000 - Product Requirements.
- B. Color: Comply with ASME A13.1.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- E. Color code as follows:

#### **2.05 CEILING TACKS**

- A. Manufacturers:
1. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  2. Substitutions: See Section 016000 - Product Requirements.
- B. Description: Steel with 3/4 inch (20 mm) diameter color coded head.
- C. Color code as follows:
1. HVAC Equipment: Yellow.
  2. Fire Dampers and Smoke Dampers: Red.
  3. Heating/Cooling Valves: Blue.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Degrease and clean surfaces to receive adhesive for identification materials.

#### **3.02 INSTALLATION**

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- E. Use tags on piping 3/4 inch (20 mm) diameter and smaller.
1. Identify service, flow direction, and pressure.

2. Install in clear view and align with axis of piping.
  3. Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
- F. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

**END OF SECTION**

**SECTION 230593  
TESTING, ADJUSTING, AND BALANCING FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic systems.
- C. Field quality-control testing of Laboratory fume hoods.
- D. Measurement of final operating condition of HVAC systems.
- E. Sound measurement of equipment operating conditions.
- F. Vibration measurement of equipment operating conditions.
- G. Commissioning activities.

**1.02 RELATED REQUIREMENTS**

- A. Section 012100 - Allowances: Inspection and testing allowances.
- B. Section 014000 - Quality Requirements: Employment of testing agency and payment for services.

**1.03 PRICE AND PAYMENT PROCEDURES**

- A. Cash Allowance: See Section 012100 for additional requirements.
- B. Allowance includes testing, adjusting, and balancing of mechanical systems.

**1.04 REFERENCE STANDARDS**

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. ASHRAE Std 110 - Methods of Testing Performance of Laboratory Fume Hoods; 2016, with Errata.
- C. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2024, with Errata (2025).
- D. NEBB (TAB) - Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems; 2019, with Errata (2022).
- E. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2023.

**1.05 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. Submit to Architect.
  - 2. Submit to the Construction Manager.
  - 3. Submit 2 weeks prior to starting the testing, adjusting, and balancing work.
  - 4. Include certification that the plan developer has reviewed Contract Documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.
  - 5. 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, water 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. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
  - f. Final test report forms to be used.
  - g. Detailed step-by-step procedures for TAB work for each system and issue, including:
    - 1) Terminal flow calibration (for each terminal type).
    - 2) Diffuser proportioning.
    - 3) Branch/submain proportioning.
    - 4) Total flow calculations.
    - 5) Rechecking.
    - 6) Diversity issues.
  - h. Expected problems and solutions, etc.
  - i. Criteria for using air flow straighteners or relocating flow stations and sensors; analogous explanations for the water side.
  - j. Details of how TOTAL flow will be determined; for example:
    - 1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
    - 2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.
  - k. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
  - l. Confirmation of understanding of the outside air ventilation criteria under all conditions.
  - m. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
  - n. Method of checking building static and exhaust fan and/or relief damper capacity.
  - o. Proposed selection points for sound measurements and sound measurement methods.
  - p. Methods for making coil or other system plant capacity measurements, if specified.
  - q. Time schedule for TAB work to be done in phases (by floor, etc.).
  - r. Description of TAB work for areas to be built out later, if any.
  - s. Time schedule for deferred or seasonal TAB work, if specified.
  - t. False loading of systems to complete TAB work, if specified.
  - u. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.
  - v. Interstitial cavity differential pressure measurements and calculations, if specified.
  - w. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).
  - x. Procedures for formal progress reports, including scope and frequency.
  - y. Procedures for formal deficiency reports, including scope, frequency and distribution.
- C. Field Quality-control Testing of Laboratory Fume Hoods:
- 1. Product Data sheets for all equipment proposed for use in on-site as-installed testing.
  - 2. Sample Test Report.
- D. Field Logs: Submit at least once a week to the Construction Manager.
- E. 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.
- F. Progress Reports.
- G. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- 1. Submit under provisions of Section 014000.

2. Submit to the Construction Manager within two weeks after completion of testing, adjusting, and balancing.
3. Revise TAB plan to reflect actual procedures and submit as part of final report.
4. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
5. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
6. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
7. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
8. Units of Measure: Report data in I-P (inch-pound) units only.
9. 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 Engineer.
  - h. Project Contractor.
  - i. Project altitude.
  - j. Report date.

H. 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. Perform total system balance in accordance with one of the following:
  1. AABC (NSTSB), AABC National Standards for Total System Balance.
  2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
  3. SMACNA (TAB).
  4. Maintain at least one copy of the standard to be used at project site at all times.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
  1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
  2. Having minimum of three years documented experience.
  3. Certified by one of the following:
    - a. AABC, Associated Air Balance Council: [www.aabc.com/#sle](http://www.aabc.com/#sle); upon completion submit AABC National Performance Guaranty.
    - b. NEBB, National Environmental Balancing Bureau: [www.nebb.org/#sle](http://www.nebb.org/#sle).
    - c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: [www.tabbcertified.org/#sle](http://www.tabbcertified.org/#sle).

- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.
- F. TAB Supervisor Qualifications: Professional Engineer licensed in the State in which the Project is located.

### **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. Duct systems are clean of debris.
  - 6. Fans are rotating correctly.
  - 7. Fire and volume dampers are in place and open.
  - 8. Air coil fins are cleaned and combed.
  - 9. Access doors are closed and duct end caps are in place.
  - 10. Air outlets are installed and connected.
  - 11. Duct system leakage is minimized.
  - 12. Hydronic systems are flushed, filled, and vented.
  - 13. Pumps are rotating correctly.
  - 14. Proper strainer baskets are clean and in place.
  - 15. Service and balance valves are open.
- 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. Hold a pre-balancing meeting at least one week prior to starting TAB work.
  - 1. Require attendance by all installers whose work will be tested, adjusted, or balanced.
- B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.
- C. 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.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

### **3.05 RECORDING AND ADJUSTING**

- A. Field Logs: Maintain written logs including:
  - 1. Running log of events and issues.
  - 2. Discrepancies, deficient or uncompleted work by others.
  - 3. Contract interpretation requests.
  - 4. Lists of completed tests.
- B. Ensure recorded data represents actual measured or observed conditions.
- C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

- E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.
- H. 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, return, and exhaust air quantities.
- 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. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. 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.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Measure building static pressure and adjust supply, return, 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 WATER SYSTEM PROCEDURE**

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- D. Effect system balance with automatic control valves fully open to heat transfer elements.
- E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.
- F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

**END OF SECTION**

**SECTION 230719  
HVAC PIPING INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Piping insulation.
- B. Jacketing and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 232113 - Hydronic Piping: Placement of hangers and hanger inserts.

**1.03 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 B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2026.
- C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- D. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
- E. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2024).
- F. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2024).
- G. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- H. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2017 (Reapproved 2023).
- I. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2025.
- J. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.
- K. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2022.
- L. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.
- M. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.
- N. ASTM C585 - Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing; 2022.
- O. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation; 2022.
- P. ASTM C610 - Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation; 2017 (Reapproved 2023).
- Q. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).
- R. ASTM C1126 - Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation; 2024.
- S. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation; 2023.

- T. ASTM C1393 - Standard Specification for Perpendicularly Oriented Mineral Fiber Roll and Sheet Thermal Insulation for Pipes and Tanks; 2025.
- U. ASTM C1410 - Standard Specification for Cellular Melamine Thermal and Sound-Absorbing Insulation; 2017 (Reapproved 2023).
- V. ASTM C1423 - Standard Guide for Selecting Jacketing Materials for Thermal Insulation; 2021.
- W. ASTM C1775 - Standard Specification for Laminate Protective Jacket and Tape for Use Over Thermal Insulation for Outdoor Applications; 2022.
- X. ASTM D93 - Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester; 2025.
- Y. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).
- Z. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.
- AA. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces; 2025.
- BB. ASTM D1056 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber; 2020.
- CC. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2016 (Reapproved 2023).
- DD. ASTM D1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics; 2017 (Reapproved 2023).
- EE. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2025.
- FF. ASTM D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay; 2017 (Reapproved 2021).
- GG. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- HH. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- II. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- JJ. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).
- KK. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- LL. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- MM. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013 (Reapproved 2021).
- NN. FM 4924 - Examination Standard for Pipe and Duct Insulation; 2024.
- OO. SAE AMS3779 - Tape, Adhesive, Pressure-Sensitive Thermal Radiation Resistant, Aluminum Coated Glass Cloth; 2016b.
- PP. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.

- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 2 years of experience and approved by manufacturer.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

#### **1.07 FIELD CONDITIONS**

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

### **PART 2 PRODUCTS**

#### **2.01 REGULATORY REQUIREMENTS**

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

#### **2.02 GLASS FIBER, FLEXIBLE**

- A. Manufacturers:
  - 1. JP Lamborn Co: [www.jpflex.com/#sle](http://www.jpflex.com/#sle).
  - 2. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
  - 3. Manson Insulation, a company of Knauf Insulation: [www.imanson.com/#sle](http://www.imanson.com/#sle).
  - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
  - 1. K (Ksi) Value: 0.25 at 75 degrees F (0.036 at 24 degrees C), when tested in accordance with ASTM C518.
  - 2. Maximum Service Temperature: 250 degrees F (121 degrees C).
  - 3. Maximum Water Vapor Absorption: 5.0 percent by weight.
- C. Insulation: ASTM C1393; pipe and tank, end grain adhered to jacket.
  - 1. K (Ksi) Value: ASTM C177, 0.27 at 75 degrees F (0.034 at 24 degrees C).
  - 2. Maximum Service Temperature: 850 degrees F (454 degrees C).
  - 3. Maximum Moisture Absorption: 0.2 percent by volume.
  - 4. Products:
    - a. Knauf Insulation; Performance+ Earthwool Pipe and Tank Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
    - b. Knauf Insulation; Performance+ KwikFlex Pipe and Tank Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
    - c. Manson Insulation, a company of Knauf Insulation; AK FLEX with ECOSE: [www.imanson.com/#sle](http://www.imanson.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.
- D. Aluminum-Foil Laminate Jacket:
  - 1. Manufacturers include but are not limited to:
    - a. H.B. Fuller Construction Products, Inc; Foster - Vapor-Fas: [www.fosterproducts.com/#sle](http://www.fosterproducts.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
  - 2. Factory-applied, pressure sensitive adhesive jacketing to comply with ASTM C1775.

- E. Vapor Barrier Jacket:
  1. Kraft paper with glass fiber yarn and bonded to aluminized film or 0.0032 inch vinyl.
  2. Moisture Vapor Permeability: 0.02 perm inch (0.029 ng/(Pa s m)), when tested in accordance with ASTM E96/E96M.
  3. Secure with pressure-sensitive tape.
- F. Vapor Barrier Tape:
  1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film with pressure-sensitive rubber-based adhesive.
- G. Outdoor Vapor Barrier Mastic:
  1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
- H. Tie Wire: Annealed steel, 16 gauge, 0.0508 inch diameter (1.29 mm diameter).

### 2.03 GLASS FIBER, RIGID

- A. Manufacturers include but are not limited to:
  1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  2. Johns Manville Corporation: [www.jm.com/#sle](http://www.jm.com/#sle).
  3. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
  4. Manson Insulation, a company of Knauf Insulation: [www.imanson.com/#sle](http://www.imanson.com/#sle).
  5. Owens Corning Corporation: [www.owenscorning.com/en-us/#sle](http://www.owenscorning.com/en-us/#sle).
  6. Owens Corning Corporation: [www.owenscorning.com/en-us/#sle](http://www.owenscorning.com/en-us/#sle).
  7. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
  1. K (Ksi) Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
  2. Maximum Service Temperature: 850 degrees F (454 degrees C).
  3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
  1. K (Ksi) Value: ASTM C177, 0.24 at 75 degrees F (0.035 at 24 degrees C).
  2. Maximum Service Temperature: 650 degrees F (343 degrees C).
  3. Maximum Moisture Absorption: 0.2 percent by volume.
- D. Aluminum-Foil Laminate Jacket:
  1. Manufacturers include but are not :
    - a. H.B. Fuller Construction Products, Inc; Foster - Vapor-Fas: [www.fosterproducts.com/#sle](http://www.fosterproducts.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
  2. Factory-applied, pressure sensitive adhesive jacketing to comply with ASTM C1775.
- E. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches (0.029 ng/(Pa s m)).
- F. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.
- G. Vapor Barrier Lap Adhesive: Compatible with insulation.
- H. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
- I. Outdoor Vapor Barrier Mastic: Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
- J. Insulating Cement: ASTM C449.

### 2.04 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturers:
  1. Aeroflex USA; AEROFLEX Self-Seal: [www.aeroflexusa.com/#sle](http://www.aeroflexusa.com/#sle).

2. Armacell LLC; AP ArmaFlex: [www.armacell.us/#sle](http://www.armacell.us/#sle).
  3. K-Flex USA LLC; Insul-Tube: [www.kflexusa.com/#sle](http://www.kflexusa.com/#sle).
  4. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
1. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
  2. Maximum Service Temperature: 180 degrees F (82 degrees C).
  3. Connection: Waterproof vapor barrier adhesive.
  4. Flammability Rating: FM 4924 approval for reduced combustibility testing.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
- D. Weather Barrier Coating: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.

## 2.05 JACKETING AND ACCESSORIES

- A. PVC Plastic.
1. Manufacturers include but are not limited to:
    - a. Johns Manville Corporation: [www.jm.com/#sle](http://www.jm.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
  2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
    - a. Minimum Service Temperature: 0 degrees F (minus 18 degrees C).
    - b. Maximum Service Temperature: 150 degrees F (66 degrees C).
    - c. Moisture Vapor Permeability: 0.002 perm inch (0.0029 ng/(Pa s m)), maximum, when tested in accordance with ASTM E96/E96M.
    - d. Thickness: 10 mil, 0.010 inch (0.25 mm).
    - e. Connections: Brush on welding adhesive.
  3. Covering Adhesive Mastic: Compatible with insulation.
- B. Reinforced Tape:
1. Manufacturers include but are not limited to:
    - a. Ideal Tape Co., Inc: [www.idealtape.com/#sle](http://www.idealtape.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
  2. FSK tape suitable for sealing seams between insulation, insulated pipe bends, and fittings resulting in a tight, smooth surface without wrinkles.
  3. Comply with UL 723, ASTM E84.
  4. Moisture Vapor Permeability: 0.00 perm inch (0.00 ng/(Pa s m)), when tested in accordance with ASTM E96/E96M.
  5. Finish: Match insulation.
- C. Plain Foil Tape:
1. Manufacturers include but are not limited to:
    - a. Ideal Tape Co., Inc: [www.idealtape.com/#sle](http://www.idealtape.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
  2. Aluminum foil with pressure-sensitive adhesive on paper release liner.
  3. Finish: Plain foil.
- D. Vapor Barrier Membranes: ASTM C1136, Type IX.
1. Multilayer Laminate Vapor Barrier:
    - a. Provide multilayer laminate with 1.0 mil, 0.001 inch (0.025 mm) foil, reversible.
    - b. Thickness: 2.4 mil, 0.002 inch (0.06 mm).
    - c. Moisture Vapor Permeability: 0.00 perm inch (0.00 ng/(Pa s m)), when tested in accordance with ASTM E96/E96M.
    - d. Manufacturers include but are not limited to:
      - 1) Polyguard Products: [www.polyguardproducts.com/#sle](http://www.polyguardproducts.com/#sle).
      - 2) Substitutions: See Section 016000 - Product Requirements.

## 2.06 ACCESSORIES

- A. General Requirements:
  - 1. Provide required accessories in accordance with and subject to the recommendations of the insulation manufacturer.
  - 2. Furnish compatible materials which do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state.
  - 3. Supply materials that are asbestos free.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated Pipes Conveying Fluids Below Ambient Temperature:
  - 1. Insulate entire system, including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass Fiber Insulated Pipes Conveying Fluids Below Ambient Temperature:
  - 1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. For hot piping conveying fluids 140 degrees F (60 degrees C) or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G. For hot piping conveying fluids over 140 degrees F (60 degrees C), insulate flanges and unions at equipment.
- H. Glass Fiber Insulated Pipes Conveying Fluids Above Ambient Temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied, or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- I. Inserts and Shields:
  - 1. Application: Piping 1-1/2 inches (40 mm) diameter or larger.
  - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
  - 3. Insert location: Between support shield and piping and under the finish jacket.
  - 4. Insert Configuration: Minimum 6 inches (150 mm) long, of same thickness and contour as adjoining insulation; may be factory fabricated.
  - 5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- J. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with PVC jacket and fitting covers.

**END OF SECTION**

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

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Compressed-Air Stations:
  - 1. Pressure reducing stations.
- B. Control Valves:
  - 1. Electronic valve operators.
- C. Pressure independent valves and actuators.
- D. Wall-, Surface-, and Duct-Mounted Sensors:
  - 1. Temperature sensors.
- E. Thermostats:
  - 1. Electric thermostats.
  - 2. Freezestats.
  - 3. Line voltage thermostats.
  - 4. Room-mount thermostat accessories.
  - 5. Immersion thermostats.
  - 6. Airstream thermostats.
  - 7. Electric high/low limit duct thermostats.
- F. Fan and pump motor run-status monitoring.

**1.02 RELATED REQUIREMENTS**

- A. Section 232113 - Hydronic Piping: Installation of control valves, flow switches, temperature sensor sockets, and gauge taps.
- B. Section 232114 - Hydronic Specialties.
- C. Section 253619 - Integrated Automation Current Sensors.
- D. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.
- E. Section 262726 - Wiring Devices: Elevation of exposed components.

**1.03 REFERENCE STANDARDS**

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2018.
- B. ANSI C12.1 - Electric Meters - Code for Electricity Metering; 2024.
- C. ANSI C12.10 - American National Standard for Physical Aspects of Electricity Meters - Safety Standard; 2024.
- D. ANSI C12.20 - American National Standard for Electricity Meters - 0.1, 0.2, and 0.5 Accuracy Classes; 2022.
- E. ANSI/FCI 70-2 - Control Valve Seat Leakage; 2021.
- F. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2024, with Errata (2025).
- G. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).
- H. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- I. ASTM B32 - Standard Specification for Solder Metal; 2020.
- J. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- K. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- L. ASTM B819 - Standard Specification for Seamless Copper Tube for Medical Gas Systems; 2019.

- M. ASTM D1693 - Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics; 2021.
- N. AWWA C700 - Cold-Water Meters -- Displacement Type, Metal Alloy Main Case; 2024.
- O. AWWA C707 - Encoder-Type Remote-Registration Systems for Cold-Water Meters; 2022.
- P. Bluetooth CS - Bluetooth Core Specification; 2016, Addendum 2017.
- Q. FieldComm Group (FFTS) - Foundation Fieldbus Technical Specifications; 2014.
- R. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code); 1989 (Corrigendum 2019).
- S. IEEE 802.3 - IEEE Standard for Ethernet; 2022 (Corrigendum 2024).
- T. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems Local and Metropolitan Area Networks--Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications; 2024, with Amendment (2025).
- U. IEEE 802.15.4 - IEEE Standard for Low-Rate Wireless Networks; 2024.
- V. LonMark Interoperability Guide - LonMark Application-Layer Interoperability Guide and LonMark Layer 1-6 Interoperability Guide; Version 3.4; 2005.
- W. Modbus (PS) - The Modbus Organization Communications Protocol.; Latest Update.
- X. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- Y. NEMA BS 31032 - Residential Controls--Electrical Wall-Mounted Room Thermostats; 2025.
- Z. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- AA. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- BB. NSF 61 - Drinking Water System Components - Health Effects; 2024.
- CC. NSF 372 - Drinking Water System Components - Lead Content; 2024.
- DD. ODVA (CIP) - The Common Industrial Protocol (CIP) Standards: EtherNet/IP, DeviceNet, ControlNet, and CompoNet; Current Edition.
- EE. ProfiBus/ProfiNet SSG - ProfiBus, ProfiNet, and IO-Link Specifications, Standards and Guidelines; Current Edition.
- FF. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances; Current Edition, Including All Revisions.
- GG. UL 916 - Energy Management Equipment; Current Edition, Including All Revisions.
- HH. UL 917 - Clock-Operated Switches; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. **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.
- B. **Shop Drawings:** Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.
- C. **Manufacturer's Instructions:** Provide for all manufactured components.
- D. **Operation and Maintenance Data:** Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.
- E. **Project Record Documents:** Record actual location of control components, including panels, thermostats, and sensors.
  - 1. Revise shop drawings to reflect actual installation and operating sequences.

- F. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

## **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 FACTORY CONTROL INTERFACES (CSTI) – AHUS AND FCUS**

- A. Fan coil units (FCU-1 through FCU-12) and air handling units (AHU-1 through AHU-7) shall be furnished with factory control packages using a Customer Supplied Terminal Interface (CSTI) board, including 24 VAC transformer, terminal blocks, and internal wiring to motors, valves, and safety devices, as indicated in the manufacturer's submittals.
- B. CSTI boards shall provide low-voltage terminals for:
  - 1. Fan speed commands (HIGH/MED/LOW) or ECM 0–10 VDC speed input, as applicable to the unit type.
  - 2. Analog cooling and heating valve signals (2–10 VDC) and associated 24 VAC power for factory or field-supplied valve actuators.
  - 3. Condensate overflow float switch (normally closed dry contact), factory wired to a terminal block for field BAS connection.
  - 4. Freezestat / low temperature cutout contacts for blower coil units.
- C. Field-supplied BAS controllers and/or thermostats shall connect to the CSTI terminals as shown on Drawings M-702 and M-704. All control signals shall be Class 2 and comply with the voltage/current ratings indicated in the Trane submittals and this Section.

### **2.03 CONTROL VALVES**

- A. Electronic Valve Actuators:
  - 1. Where serving factory-provided coils, actuators shall accept a 2–10 VDC analog signal and be suitable for direct connection to the Trane CSTI analog valve terminals as indicated in the manufacturer wiring diagrams.
  - 2. Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
  - 3. Select operator for full shut-off at maximum pump differential pressure.

### **2.04 THERMOSTATS**

- A. Electric Thermostats:
  - 1. Type: NEMA BS 31032, 24 volts, with setback/setup temperature control.
  - 2. Service: Cooling and heating.
- B. Freezestats:
  - 1. Configuration: Vapor-filled capillary.
  - 2. Probe Sensing Length: 4 feet (1.2 m).
  - 3. Setpoint Adjust Control: Screw with manual reset switch.
  - 4. Switch Type: SPDT, snap-action, form C in dust-protected enclosure.
  - 5. Sensing Range: 10 to 54 deg F (minus 10 to 12 deg C).
  - 6. Mounting: Locate on as indicated on drawings.
  - 7. Field Interface: Connect load line-voltage as indicated on drawings.
  - 8. Electrical Rating: Pilot duty, 125 VA at 125 to 600 VAC.
- C. Line Voltage Thermostats:
  - 1. Integral manual On/Off/Auto selector switch, single or two pole as required.
  - 2. Dead Band: Maximum 2 degrees F (one degree C).
- D. Room-Mounted Thermostat Accessories:
  - 1. Thermostat Covers: Brushed aluminum.

2. Insulating Bases: For thermostats located on exterior walls.
  3. Thermostat Guards: Metal mounted on separate base.
  4. Adjusting Key: As required for device.
  5. Aspirating Boxes: Where indicated for thermostats requiring flush installation.
- E. Airstream Thermostats:
1. Remote bulb or bimetallic rod and tube type, proportional action with adjustable setpoint in middle of range and adjustable throttling range.
  2. Averaging service remote bulb element: 7.5 feet (2.3 m).
- F. Electric High/Low Limit Duct Thermostats:
1. Snap acting, single pole, single throw, manual reset switch that trips if temperature sensed across any 12 inches (300 mm) of bulb length is above, equal to, or below setpoint,
  2. Bulb length: Minimum 20 feet (6 m).
  3. Provide one thermostat for every 20 sq ft (1.86 sq m) of coil surface.

## **2.05 FAN AND PUMP MOTOR RUN-STATUS MONITORING**

- A. Current Switches:
1. Micro-Split Core: 2-state, On/Off digital output of motor status with adjustable trip point to detect belt loss or mechanical failure.
  2. Mini Solid-Core: 2-State, On/Off digital output of motor status with adjustable trip point to detect belt loss or mechanical failure.
  3. Mini Split-Core: 2-state, On/Off digital output of inverter-duty motor status with adjustable trip point to detect belt loss or mechanical failure.
  4. Solid Core: 2-state, On/Off digital output of motor status with adjustable trip point to detect belt loss or mechanical failure and built-in pilot duty relay.
  5. Split Core: 2-state, On/Off digital output of inverter-duty motor status with adjustable trip point to detect belt loss or mechanical failure and built-in pilot duty relay.
  6. Maximum AC Current Monitoring Value: As indicated on drawings.
- B. Current Transducers: See Section 253619 for analog output, current monitoring devices.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that systems are ready to receive work.
- C. Beginning of installation means installer accepts existing conditions.
- D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
- E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.
- F. Ensure installation of components is complementary to installation of similar components.
- G. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Use copper tubing in mechanical rooms, where subject to damage or temperatures in excess of 200 degrees F (93 degrees C), where adjacent to heating pipes passing through common sleeve, and where not readily accessible. In mechanical rooms, bundled plastic tubing with suitable junction boxes or single plastic tubing with tray or raceway may be used.
- C. Solder copper tubing except at instruments or equipment where compression fittings may be used.

- D. Conceal tubing. Run exposed only in mechanical rooms, storage rooms and like, in neat manner and properly supported.
- E. Mechanically attach tubing to supporting surfaces. Sleeve through concrete surfaces in minimum 1 inch (25 mm) sleeves, extended 6 inches (150 mm) above floors and 1 inch (25 mm) below bottom surface of slabs.
- F. Purge tubing with dry, oil-free compressed air before connecting control instruments.
- G. Provide instrument air tubing with check and hand valves to expansion tanks with Schrader fittings and hose; see Section 232114.
- H. Provide instrument air tubing with check and hand valves to chiller.
- I. Check and verify location of thermostats with plans and room details before installation. Locate 48 inches (1200 mm) above floor. Align with lighting switches; see Section 262726.
- J. Mount freeze protection thermostats using flanges and element holders.
- K. Provide separable sockets for liquids and flanges for air bulb elements.
- L. Provide guards on thermostats in public areas.
- M. Provide valves with position indicators and with pilot positioners where sequenced with other controls.
- N. Provide isolation (two-position) dampers of parallel blade construction.
- O. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.
- P. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.
- Q. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

**END OF SECTION**

**SECTION 230923  
DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. System description.
- B. Operator interface.
- C. Controllers.
- D. Power supplies and line filtering.
- E. System software.
- F. Controller software.
- G. HVAC control programs.
- H. Chiller control programs.

**1.02 RELATED REQUIREMENTS**

- A. Section 230913 - Instrumentation and Control Devices for HVAC.
- B. Section 230993 - Sequence of Operations for HVAC Controls.
- C. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

**1.03 REFERENCE STANDARDS**

- A. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2024, with Errata (2025).
- B. ASHRAE Std 147 - Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment and Systems; 2019, with Addendum (2025).
- C. Bluetooth CS - Bluetooth Core Specification; 2016, Addendum 2017.
- D. CTA-709.1 - Control Network Protocol Specification; 2019.
- E. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems Local and Metropolitan Area Networks--Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications; 2024, with Amendment (2025).
- F. IEEE 802.15.4 - IEEE Standard for Low-Rate Wireless Networks; 2024.
- G. LonMark Interoperability Guide - LonMark Application-Layer Interoperability Guide and LonMark Layer 1-6 Interoperability Guide; Version 3.4; 2005.
- H. LonMark SCPT List - LonMark SCPT Master List; Version 15; 2014.
- I. LonMark SNVT List - LonMark SNVT Master List; Version 15; 2014.
- J. MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests; 2019h, with Editorial Revision (2022).
- K. Modbus (PS) - The Modbus Organization Communications Protocol.; Latest Update.
- L. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- M. UL (DIR) - Online Certifications Directory; Current Edition.

**1.04 SUBMITTALS**

- A. Product Data: Provide data for each system component and software module.
- B. Shop Drawings:
  - 1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
  - 2. List connected data points, including connected control unit and input device.

3. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
  4. Indicate description and sequence of operation of operating, user, and application software.
- C. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.
- D. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
1. Revise shop drawings to reflect actual installation and operating sequences.
- E. Operation and Maintenance Data:
1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
  2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
  3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

### **1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with NFPA 70.
- B. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for purpose specified and indicated.

### **1.06 WARRANTY**

- A. Correct defective Work within a five year period after Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Delta Controls: [www.deltacontrols.com/#sle](http://www.deltacontrols.com/#sle).

### **2.02 SYSTEM DESCRIPTION**

- A. Include operator input/output devices and control units.
- B. Controls for variable air volume terminals, radiation, reheat coils, unit heaters, fan coils, and the like when directly connected to the control units. Individual terminal unit control is specified in Section 230913.
- C. Provide control systems consisting of thermostats, control valves, dampers and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.
- D. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

### **2.03 OPERATOR INTERFACE**

- A. Workstation, controllers, and control backbone to communicate using BACnet protocol and addressing.
- B. BACnet protocol to comply with ASHRAE Std 135.

### **2.04 CONTROLLERS**

- A. Building Controllers: (Existing to remain)
  1. Communication:
    - a. Controller shall reside on a BACnet MSTP network for field-level control of fan coil units and blower coil air handling units, as indicated on the control diagrams, and shall integrate to the existing JCI BAS head end.
    - b. Perform routing when connected to a network of custom application and application specific controllers. Each blower coil AHU controller shall provide sufficient native

universal inputs and analog/digital outputs to serve, at a minimum: space temperature sensor, entering/mixed/supply air temperature sensors, supply fan status, condensate overflow switch, freezestat/low limit switch, preheat valve (2–10 VDC), cooling valve (2–10 VDC), and mixing box/outdoor air damper actuator (2–10 VDC or 2-position per drawings).

2. External Input-Output (I-O) Data Bus:
  - a. Input only modules.
  - b. Output only modules.
  - c. Variable frequency drives (VFD's).
  - d. Universal I-O module (configurable).
  - e. Access control module for single door.
  - f. Specific wired data integration modules.
  - g. DALI (Digital addressable lighting interface) modules.
  - h. Motor control of devices like blinds, roller shutters, and sun protection systems.
  - i. Multiple Input Output (I-O) Module:
    - 1) IAQ: Temperature, humidity, and CO2.
    - 2) Audio: Microphone, tone generator, and speaker.
    - 3) Input and output terminals to monitor or control local devices.
    - 4) Occupancy: Light and thermal sensing with multi-colored LED feedback.

## **2.05 SYSTEM SOFTWARE**

- A. Operating System:
  1. Concurrent, multi-tasking capability.
    - a. Common Software Applications Supported: Microsoft Excel, WordPerfect, and Microsoft Access.
  2. System Graphics:
    - a. Integrate new graphics into existing front end.

## **2.06 CHILLER CONTROL PROGRAMS**

- A. Control function of condenser water reset, chilled water reset, and chiller sequencing. Support inch-pounds and SI (metric) units of measurement.
- B. Condenser Water Reset: Automatically reset controlled condenser water temperature using measured outside wet bulb temperature and load being handled.
- C. Chilled Water Reset: Automatically reset controlled chilled water temperature satisfying cooling coil requiring greatest cooling.
- D. Chiller Sequencing: Determine which combination of chillers will most efficiently satisfy chilled water load, by cycling chillers, based on comparing load to switchover limits defined for each chiller.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

### **3.02 INSTALLATION**

- A. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation.
- B. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.
- C. The mechanical equipment manufacturer's control board shall be used as an I/O termination interface only. All primary control logic (unit enable, fan speed selection, valve modulation,

damper modulation, safety and alarm handling) shall reside in the BAS controllers. The BAS contractor shall provide all low-voltage control wiring between BAS controllers and unit terminal interface terminal blocks (fan speed, analog valve signals, condensate overflow, freezestat, damper actuation) as indicated on M-702 and M-703.

**3.03 MANUFACTURER'S FIELD SERVICES**

- A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.
- B. Provide service engineer to instruct Owner's representative in operation of systems plant and equipment.

**3.04 DEMONSTRATION AND INSTRUCTIONS**

- A. Demonstrate complete and operating system to Owner.

**3.05 SCHEDULES**

- A. Refer to drawings.

**END OF SECTION**

**SECTION 230934  
VARIABLE-FREQUENCY MOTOR CONTROLLERS FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Variable-frequency motor controllers for low-voltage (600 V and less) AC motor applications.
- B. Overcurrent protective devices for motor controllers, including overload relays.

**1.02 RELATED REQUIREMENTS**

- A. Section 230529 - Hangers and Supports for HVAC Piping and Equipment.
- B. Section 230548 - Vibration and Seismic Controls for HVAC.
- C. Section 230553 - Identification for HVAC Piping and Equipment: Identification products and requirements.
- D. Section 260526 - Grounding and Bonding for Electrical Systems.
- E. Section 262813 - Fuses.

**1.03 REFERENCE STANDARDS**

- A. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code); 1989 (Corrigendum 2019).
- B. IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers; 2016.
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).
- E. NEMA IA 10039 - Control Circuit and Pilot Devices; 2025.
- F. NEMA IA 10030 - Industrial Control and Systems: Enclosures; 2024.
- G. NEMA IS 10033 - Adjustable Speed Drives; 2020 (Reapproved 2025).
- H. NEMA IS 10034 - Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable Speed Drive Systems; 2022 (Reapproved 2025).
- I. NEMA IS 10035 - Application Guide for AC Adjustable Speed Drive Systems; 2021 (Reaffirmed 2025).
- J. NEMA ICS 61800-2 - Adjustable Speed Electrical Power Drive Systems, Part 2: General Requirements-Rating Specifications for Low Voltage Adjustable Frequency AC Power Drive Systems; 2005.
- K. NEMA BS 31047 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013 (Reaffirmed 2023).
- L. NEMA MG 00001 - Motors and Generators; 2024.
- M. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- N. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- O. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.
- P. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- Q. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.
- R. UL 61800-5-1 - Standard for Adjustable Speed Electrical Power Drive Systems - Part 5-1: Safety Requirements – Electrical, Thermal, and Energy (Ed. 2); Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate work to provide motor controllers suitable for use with actual motors to be installed.
  - 2. Coordinate work to provide controllers and associated wiring suitable for interface with control devices to be installed.
  - 3. Coordinate arrangement with dimensions and clearance requirements of actual equipment to be installed.
  - 4. Verify with manufacturer that conductor terminations are suitable for use with conductors to be installed.
  - 5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for motor controllers, enclosures, overcurrent protective devices, and other installed components and accessories.
- B. Shop Drawings: Indicate dimensions, voltage, controller sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
  - 1. Include dimensioned plan and elevation views of controllers and adjacent equipment with required clearances indicated.
  - 2. Include wiring diagrams showing factory and field connections.
  - 3. Identify mounting conditions required for equipment seismic qualification.
- C. Specimen Warranty: Submit sample of manufacturer's warranty.
- D. Manufacturer qualification statement.
- E. Installer qualification statement.
- F. Manufacturer's certification that products meet or exceed specified requirements.
- G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H. Field quality control test reports.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.
- B. Maintain copy of each referenced document that prescribes execution requirements at project site.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Store in clean, dry space. Maintain factory wrapping or provide additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to internal components, enclosure, and finish.

#### **1.08 FIELD CONDITIONS**

- A. Maintain field conditions within required service conditions during and after installation.

#### **1.09 WARRANTY**

- A. Provide minimum 18 month manufacturer warranty covering repair or replacement due to defective materials or workmanship.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. ABB: [www.abb.com/#sle](http://www.abb.com/#sle).

- B. Danfoss: [www.danfoss.com/#sle](http://www.danfoss.com/#sle).
- C. Yaskawa America, Inc; : [www.yaskawa.com/#sle](http://www.yaskawa.com/#sle).
- D. Trane Technologies.
- E. Source Limitations: Furnish variable-frequency motor controllers and associated components produced by a single manufacturer and obtained from a single supplier.

## 2.02 VARIABLE-FREQUENCY MOTOR CONTROLLERS

- A. Provide variable-frequency motor control system consisting of required controller assemblies, operator interfaces, control power transformers, instrumentation and control wiring, sensors, accessories, system programming, etc. as necessary for complete operating system.
- B. Provide products listed, classified, and labeled as suitable for purpose intended.
- C. Variable-Frequency Motor Controller:
  - 1. Configuration: Packaged controller, nonbypass.
  - 2. Power Conversion System: Diode-based, 6-pulse type.
  - 3. Control Method: Vector.
  - 4. Filtering: Provide input/line reactor.
  - 5. Features:
    - a. Braking chopper/resistor.
    - b. PID control.
    - c. Firefighter's override.
    - d. Safety interlock.
    - e. Damper/valve control.
    - f. PTC motor thermistor input.
- D. Controller Assemblies: Comply with UL 61800-5-1 or UL 508A as applicable.
- E. Provide controllers selected for actual installed motors and coupled mechanical loads in accordance with NEMA IS 10035, Part 30, and recommendations of manufacturers of both controller and load, where not in conflict with specified requirements; considerations include, but are not limited to:
  - 1. Motor type (e.g., induction, reluctance, and permanent magnet); consider NEMA MG 00001 design letter or inverter duty rating for induction motors.
  - 2. Motor load type (e.g., constant torque, variable torque, and constant horsepower); consider duty cycle, impact loads, and high inertia loads.
  - 3. Motor nameplate data.
  - 4. Requirements for speed control range, speed regulation, and braking.
  - 5. Motor suitability for bypass starting method, where applicable.
- F. Devices on Load Side of Controller: Suitable for application across full controller output frequency range.
- G. Operating Requirements:
  - 1. Input Voltage Tolerance: Plus/minus 10 percent of nominal.
  - 2. Input Frequency Tolerance: Plus/minus 5 percent of nominal.
  - 3. Efficiency: Minimum of 96 percent at full speed and load.
  - 4. Input Displacement Power Factor: Minimum of 0.96 throughout speed and load range.
  - 5. Overload Rating:
    - a. Variable Torque Loads: Minimum of 110 percent of nominal for 60 seconds.
    - b. Constant Torque Loads: Minimum of 150 percent of nominal for 60 seconds.
- H. Power Conversion System: Microprocessor-based, pulse width modulation type.
  - 1. Diode-based, 6-pulse type unless otherwise indicated.
- I. Control System:

1. Provide microprocessor-based control system for automatic control, monitoring, and protection of motors. Include sensors, wiring, and connections necessary for functions and status/alarm indications specified.
2. Control Functions:
  - a. Adjustable acceleration and deceleration time; linear and S-curve ramps; selectable coast to stop.
  - b. Selectable braking control.
  - c. Adjustable minimum/maximum speed limits.
  - d. Adjustable pulse width modulation switching carrier frequency.
  - e. Adjustable motor slip compensation.
  - f. Selectable autorestart after noncritical fault; programmable number of time delay between restart attempts.
  - g. PID Control: Provide integral PID controller employing feedback for closed-loop control.
  - h. Selectable frequency-skipping.
  - i. Automatic catching of rotating motor.
  - j. Energy-saving algorithms.
  - k. Firefighter's Override: Provide firefighter's override capability.
  - l. Safety Interlock: Provide permissive run safety interlock capability.
  - m. Damper/Valve Control: Provide damper/valve control capability.
3. Status Indications:
  - a. Motor run/stop status.
  - b. Motor forward/reverse status.
  - c. Local/remote control status.
  - d. Output voltage.
  - e. Output current.
  - f. Output frequency.
  - g. DC bus voltage.
  - h. Motor speed.
  - i. Speed reference.
  - j. Instantaneous power.
  - k. Energy.
  - l. Elapsed run time.
  - m. Controller temperature.
  - n. Discrete input/output status.
  - o. Analog input/output values.
4. Protective Functions/Alarm Indications:
  - a. Overcurrent.
  - b. Motor overload.
  - c. Undervoltage.
  - d. Overvoltage.
  - e. Controller overtemperature.
  - f. Input/output phase loss.
  - g. Output short circuit protection.
  - h. Output ground fault protection.
  - i. Motor stalled/overtorque.
  - j. Motor underload.
  - k. External fault.
5. Inputs:
  - a. Digital Input(s): Three.
  - b. Analog Input(s): Two.
  - c. PTC motor thermistor input where indicated.
6. Outputs:

- a. Analog Output(s): One.
- b. Relay Output(s): Two.
- 7. Communications: Compatible with connected systems. Provide accessories necessary for proper interface.
  - a. Serial Communications: RS-485; support for BACnet MS/TP protocol.
  - b. Ethernet Communications: Support for BACnet IP protocol.
  - c. Remote Monitoring Capabilities:
    - 1) Motor run/stop status.
    - 2) Hand-off-auto status.
    - 3) Fault information.
    - 4) Discrete input/output status.
    - 5) Analog input/output values.
  - d. Remote Control Capabilities:
    - 1) Motor run/stop command.
    - 2) Hand-off-auto selection.
    - 3) Speed adjustment.
    - 4) Fault reset.
- 8. Features:
  - a. Password-protected security access.
  - b. Event log.
  - c. Remote monitoring and programming capability via web browser.
- J. Power Conditioning/Filtering:
  - 1. Provide DC link choke or input/line reactor or DC link choke and input/line reactor for each controller unless otherwise indicated or required.
- K. Packaged Controllers: Controllers factory-mounted in separate enclosure with externally operable disconnect and specified accessories.
  - 1. Disconnects: Circuit breaker or disconnect switch type.
    - a. Disconnect Switches: Fusible type or nonfusible type with separate input fuses.
    - b. Provide externally operable handle with means for locking in OFF position. Provide safety interlock to prevent opening cover with disconnect in ON position with capability of overriding interlock for testing purposes.
    - c. Provide auxiliary interlock for disconnection of external control power sources where applicable.
  - 2. Provide door-mounted remote operator interface.
- L. Service Conditions:
  - 1. Provide controllers and associated components suitable for operation at indicated ratings under service conditions at installed location.
- M. Conductor Terminations: Suitable for use with conductors to be installed.
- N. Enclosures:
  - 1. Comply with NEMA IA 10030.
  - 2. Finish: Manufacturer's standard unless otherwise indicated.
  - 3. Cooling: Forced air or natural convection as determined by manufacturer.
- O. Products:
  - 1. ABB; ACH580: [www.abb.com/#sle](http://www.abb.com/#sle).
  - 2. Danfoss; VLT HVAC Drive FC 102: [www.danfoss.com/#sle](http://www.danfoss.com/#sle).
  - 3. Yaskawa America, Inc; HV600 Drive: [www.yaskawa.com/#sle](http://www.yaskawa.com/#sle).
  - 4. Trane; TR200

## 2.03 OVERCURRENT PROTECTIVE DEVICES

- A. Overload Relays:
  - 1. Provide overload relays and, where applicable, associated current elements/heaters selected for actual installed motor nameplate data, in accordance with manufacturer's

- recommendations and NFPA 70; include consideration for motor service factor and ambient temperature correction, where applicable.
2. Comply with NEMA ICS 2.
  3. Inverse-Time Trip Class Rating: Class 20 unless otherwise indicated or required.
  4. Trip-free operation.
  5. Visible trip indication.
  6. Resettable:
    - a. Employ manual reset unless otherwise indicated.
    - b. Do not employ automatic reset with two-wire control.
  7. Bimetallic Thermal Overload Relays:
    - a. Provide ambient temperature compensation where motor is located in constant ambient temperature and controller is located in varying ambient temperature.
    - b. Interchangeable current elements/heaters.
    - c. Adjustable trip; plus/minus 10 percent of nominal, minimum.
    - d. Designed for quicker trip response under phase loss condition.
    - e. Trip test function.
    - f. Provide isolated alarm contact.
  8. Melting Alloy Thermal Overload Relays:
    - a. Interchangeable current elements/heaters.
    - b. Provide isolated alarm contact.
- B. Fusible Disconnect Switches:
1. Description: Quick-make, quick-break, dead-front fusible switch units complying with NEMA BS 31047, and listed and labeled as complying with UL 98; ratings, configurations, and features as indicated or as required.
  2. Fuse Clips: As required to accept indicated fuses.
    - a. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.
  3. Provide externally operable handle with means for locking in OFF position. Provide means for locking switch cover in closed position. Provide safety interlock to prevent opening of cover with switch in ON position with capability of overriding interlock for testing purposes.
- C. Circuit Breakers:
1. Motor Circuit Protectors:
    - a. Description: Instantaneous-trip circuit breakers furnished with magnetic instantaneous tripping elements for short circuit protection, but not with thermal inverse time tripping elements for overload protection; UL 489 recognized only for use as part of listed combination motor controller with overload protection; ratings, configurations, and features as indicated or as required.
    - b. Provide field-adjustable magnetic instantaneous trip setting.

## **2.04 ACCESSORIES**

- A. Auxiliary Contacts:
1. Comply with NEMA IA 10039.
  2. Provide number and type of contacts indicated or required to perform necessary functions, including holding (seal-in) circuit and interlocking, plus one normally open (NO) and one normally closed (NC) spare contact for each bypass motor starter, minimum.
- B. Pilot Devices:
1. Comply with NEMA IA 10039.
- C. Control and Timing Relays:
1. Comply with NEMA IA 10039.
  2. Provide number and type of relays indicated or required to perform necessary functions.
- D. Control Power Transformers:

1. Size to accommodate burden of contactor coil(s) and connected auxiliary devices; plus spare capacity.
  2. Include primary and secondary fuses.
- E. Control Terminal Blocks: Include 25 percent spare terminals.

## **2.05 SOURCE QUALITY CONTROL**

- A. Factory test controllers in accordance with NEMA ICS 61800-2.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that ratings of controllers are consistent with indicated requirements.
- C. Verify that mounting surfaces are ready to accept controllers.
- D. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install in accordance with NEMA IS 10034 and manufacturer's instructions.
- C. Do not exceed manufacturer's recommended maximum cable length between controller and motor.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 230529.
- F. Provide required seismic controls in accordance with Section 230548.
- G. Install controllers plumb and level.
- H. Provide grounding and bonding.
- I. Install field-installed devices, components, and accessories.
- J. Provide fuses for fusible switches as indicated.
- K. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
- L. Set field-adjustable settings of controllers and associated components according to installed motor requirements, in accordance with recommendations of manufacturers of controller and load.
- M. Identify controllers in accordance with Section 230553.

### **3.03 FIELD QUALITY CONTROL**

- A. Provide services of manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's reports with submittals.
- B. Test for proper interface with other systems.
- C. Correct deficiencies and replace damaged or defective controllers or associated components.
- D. Submit detailed reports indicating inspection and testing results and corrective actions taken.

### **3.04 ADJUSTING**

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

### **3.05 CLEANING**

- A. Clean dirt and debris from controller enclosures and components according to manufacturer's instructions.

- B. Repair scratched or marred exterior surfaces to match original factory finish.

**3.06 CLOSEOUT ACTIVITIES**

- A. Demonstration: Demonstrate proper operation of controllers to Owner, and correct deficiencies or make adjustments as directed.

**3.07 PROTECTION**

- A. Protect installed controllers from subsequent construction operations.

**END OF SECTION**

**SECTION 232113  
HYDRONIC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hydronic system requirements.
- B. Heating water piping, above grade.
- C. Chilled water piping, above grade.
- D. Pipe hangers and supports.
- E. Unions, flanges, mechanical couplings, and dielectric connections.
- F. Valves:
  - 1. Ball valves.
  - 2. Butterfly valves.

**1.02 RELATED REQUIREMENTS**

- A. Section 230523 - General-Duty Valves for HVAC Piping.
- B. Section 230548 - Vibration and Seismic Controls for HVAC.
- C. Section 230553 - Identification for HVAC Piping and Equipment.
- D. Section 230719 - HVAC Piping Insulation.
- E. Section 232500 - HVAC Water Treatment: Pipe cleaning.

**1.03 REFERENCE STANDARDS**

- A. ANSI/FCI 70-2 - Control Valve Seat Leakage; 2021.
- B. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2025, with Errata.
- C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.
- D. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24 Metric/Inch Standard; 2025.
- E. ASME B16.15 - Cast Copper Alloy Threaded Fittings: Classes 125 and 250; 2024.
- F. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- G. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- H. ASME B16.34 - Valves — Flanged, Threaded, and Welding End; 2025.
- I. ASME B16.51 - Copper and Copper Alloy Press-Connect Pressure Fittings; 2021.
- J. ASME B31.9 - Building Services Piping; 2025.
- K. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.
- L. ASTM A106/A106M - Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service; 2019a.
- M. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- N. ASTM A183 - Standard Specification for Carbon Steel Track Bolts and Nuts; 2014 (Reapproved 2020).
- O. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2025.
- P. ASTM A536 - Standard Specification for Ductile Iron Castings; 2024.

- Q. ASTM B32 - Standard Specification for Solder Metal; 2020.
- R. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- S. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- T. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.
- U. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications; 2018, with Editorial Revision (2024).
- V. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings; 2022.
- W. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2025a.
- X. ASTM D2310 - Standard Classification for Machine-Made "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe; 2006 (Reapproved 2012).
- Y. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2024.
- Z. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80; 2024.
- AA. ASTM D2680 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping; 2020 (Reapproved 2025).
- BB. ASTM D2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Piping; 2025.
- CC. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020 (Reapproved 2024).
- DD. ASTM F438 - Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40; 2023.
- EE. ASTM F439 - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80; 2024.
- FF. ASTM F441/F441M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80; 2023.
- GG. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings; 2022.
- HH. ASTM F1960 - Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-Linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing; 2024.
- II. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 2024.
- JJ. ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing; 2025.
- KK. ASTM F877 - Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems; 2025.
- LL. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007 (Reapproved 2024).
- MM. ASTM F2389 - Standard Specification for Pressure-Rated Polypropylene (PP) Piping Systems; 2023.
- NN. ASTM F1960 - Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-Linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing; 2024.

- OO. ASTM F3226/F3226M - Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems; 2019 (Reaffirmed 2024).
- PP. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.
- QQ. AWS D10.12M/D10.12 - Guide for Welding Mild Steel Pipe; 2000.
- RR. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2018.
- SS. AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings; 2021.
- TT. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2023.
- UU. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast; 2023.
- VV. AWWA C606 - Grooved and Shouldered Joints; 2022.
- WW. DIN 4726 - Warm Water Surface Heating Systems and Radiator Connections - Plastics and Multilayer Piping Systems; 2024.
- XX. IAPMO (UMC) - 2024 Uniform Mechanical Code; 2024.
- YY. IAPMO/ANSI/CAN Z1117 - Standard for Press Connections; 2022.
- ZZ. ICC (IMC) - International Mechanical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- AAA. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2025.
- BBB. PPI TR-4 - PPI HSB Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe; 2024.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- B. 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. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.
- C. Product Data:
  - 1. Include data on pipe materials, pipe fittings, valves, and accessories.
  - 2. Provide manufacturers catalog information.
  - 3. Indicate valve data and ratings.
- D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.
- E. Project Record Documents: Record actual locations of valves.
- F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of experience.
- B. Date stamp all castings used for coupling housings, fittings, valve bodies, etc. for quality assurance and traceability.
- C. Welder Qualifications: Certify in accordance with ASME BPVC-IX.
  - 1. Provide certificate of compliance from authority having jurisdiction, indicating approval of welders.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

## PART 2 PRODUCTS

### 2.01 HYDRONIC SYSTEM REQUIREMENTS

- A. Comply with ASME B31.9 and applicable federal, state, and local regulations.
- B. Piping: Provide piping, fittings, hangers, and supports as required, as indicated, and as follows:
  - 1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
  - 2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
  - 3. Grooved mechanical joints are not permitted in any location.
  - 4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.
- C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
- D. Valves: Provide valves where indicated:
  - 1. Provide drain valves where indicated, and if not indicated, provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch (20 mm) gate valves with cap; pipe to nearest floor drain.
  - 2. Isolate equipment using butterfly valves with lug end flanges or grooved mechanical couplings.
  - 3. For shut-off and to isolate parts of systems or vertical risers, use ball or butterfly valves.
- E. Welding Materials and Procedures: Comply with ASME BPVC-IX.

### 2.02 HEATING WATER PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
  - 1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D10.12M/D10.12 welded.
  - 2. Threaded Joints: ASME B16.3, malleable iron fittings.
  - 3. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
  - 4. Mechanical Press Sealed Fittings: ASTM F3226/F3226M, ICC (IMC), and IAPMO (UMC) approved, with EPDM seals.
    - a. Manufacturers:
      - 1) Viega
      - 2) MegaPress
      - 3) Mueller Streamline, Co; STL: [www.muellerstreamline.com/#sle](http://www.muellerstreamline.com/#sle).
      - 4) NIBCO INC; Bench Press: [www.nibco.com/#sle](http://www.nibco.com/#sle).
      - 5) Substitutions: See Section 016000 - Product Requirements.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type L (Type B), drawn temper, using one of the following joint types:
  - 1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
    - a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.

- b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.
- 2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.
- 3. Mechanical Press Sealed Fittings: ASME B16.51 or IAPMO/ANSI/CAN Z1117, ICC (IMC), and IAPMO (UMC) approved, with EPDM seals.
  - a. Manufacturers:
    - 1) Viega ProPre
    - 2) Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
    - 3) Bonomi North America, Inc: [www.bonominorthamerica.com/#sle](http://www.bonominorthamerica.com/#sle).
    - 4) FNW: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - 5) Mueller Streamline, Co: [www.muellerstreamline.com/#sle](http://www.muellerstreamline.com/#sle).
    - 6) NIBCO INC: [www.nibco.com/#sle](http://www.nibco.com/#sle).
    - 7) Substitutions: See Section 016000 - Product Requirements.

### 2.03 CHILLED WATER PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black; using one of the following joint types:
  - 1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D10.12M/D10.12 welded.
  - 2. Threaded Joints: ASME B16.3, malleable iron fittings.
  - 3. Mechanical Press Sealed Fittings: ASTM F3226/F3226M, ICC (IMC), and IAPMO (UMC) approved, with EPDM seals.
    - a. Manufacturers:
      - 1) Mueller Streamline, Co: [www.muellerstreamline.com/#sle](http://www.muellerstreamline.com/#sle).
      - 2) NIBCO INC: [www.nibco.com/#sle](http://www.nibco.com/#sle).
      - 3) Substitutions: See Section 016000 - Product Requirements.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type L (Type B), drawn temper.
  - 1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22, solder wrought copper fittings.
    - a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
    - b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.
  - 2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.
  - 3. Mechanical Press Sealed Fittings: ASME B16.51 or IAPMO/ANSI/CAN Z1117, ICC (IMC), and IAPMO (UMC) approved, with EPDM seals.
    - a. Manufacturers:
      - 1) Viega ProPress
      - 2) Apollo Valves: [www.apollovalves.com/#sle](http://www.apollovalves.com/#sle).
      - 3) Bonomi North America, Inc: [www.bonominorthamerica.com/#sle](http://www.bonominorthamerica.com/#sle).
      - 4) FNW: [www.fnw.com/#sle](http://www.fnw.com/#sle).
      - 5) Mueller Streamline, Co: [www.muellerstreamline.com/#sle](http://www.muellerstreamline.com/#sle).
      - 6) NIBCO INC: [www.nibco.com/#sle](http://www.nibco.com/#sle).
      - 7) Substitutions: See Section 016000 - Product Requirements.

### 2.04 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
  - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inches (13 to 38 mm): Malleable iron, adjustable swivel, split ring.
  - 3. Hangers for Cold Pipe Sizes 2 Inches (50 mm) and Greater: Carbon steel, adjustable, clevis.
  - 4. Hangers for Hot Pipe Sizes 2 to 4 Inches (50 to 100 mm): Carbon steel, adjustable, clevis.
  - 5. Wall Support for Pipe Sizes to 3 Inches (76 mm): Cast iron hook.
  - 6. Wall Support for Pipe Sizes 4 Inches (100 mm) and Greater: Welded steel bracket and wrought steel clamp.

7. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
8. Floor Support for Hot Pipe Sizes to 4 Inches (100 mm): Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
10. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
11. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

## **2.05 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS**

- A. Unions for Pipe of 2 Inches (50 mm, DN) and Less:
  1. Ferrous Piping: 150 psi (1034 kPa) brass or malleable iron, threaded, sweat, or press.
  2. Copper Pipe: Bronze, soldered joints.
- B. Flanges for Pipe 2 Inches (50 mm, DN) and Greater:
  1. Ferrous Piping: 150 psig (1034 kPa) forged steel, slip-on.
  2. Copper Piping: Bronze.
  3. Gaskets: 1/16 inch (1.6 mm) thick, preformed neoprene.
- C. Dielectric Connections:
  1. Waterways:
    - a. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
    - b. Dry insulation barrier able to withstand 600-volt breakdown test.
    - c. Construct of galvanized steel with threaded end connections to match connecting piping.
    - d. Suitable for the required operating pressures and temperatures.
  2. Flanges:
    - a. Dielectric flanges with same pressure ratings as standard flanges.
    - b. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
    - c. Dry insulation barrier able to withstand 600-volt breakdown test.
    - d. Construct of galvanized steel with threaded end connections to match connecting piping.
    - e. Suitable for the required operating pressures and temperatures.
  3. Unions:
    - a. 1/2 to 1 Inches (15 to 25 mm): Brass solder to galvanized FPT.
    - b. 1/2 to 2 Inches (15 to 50 mm): Brass solder to galvanized FPT.
    - c. 1/2 to 1 Inches (15 to 25 mm): Brass to galvanized FPT or FIP (Female Iron Pipe).
    - d. 3/4 to 1/2 Inch (20 to 15 mm) Reducer: Brass solder to galvanized FPT.
    - e. Service: 250 psi (1,723.6 kPa), minus 20 to 180 deg F (minus 28.9 to 82.2 deg F).

## **2.06 BALL VALVES**

- A. Refer to Section 230523.

## **2.07 BUTTERFLY VALVES**

- A. Refer to Section 230523.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment using jointing system specified.

- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.
- E. After completion, fill, clean, and treat systems. See Section 232500 for additional requirements.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install heating water, glycol, chilled water, condenser water, and engine exhaust piping to ASME B31.9 requirements.
- C. Route piping in orderly manner, parallel to building structure, and maintain gradient.
- D. Install piping to conserve building space and to avoid interference with use of space.
- E. Group piping whenever practical at common elevations.
- F. Sleeve pipe passing through partitions, walls, and floors.
- G. Slope piping and arrange to drain at low points.
- H. Grooved Joints:
  - 1. Install in accordance with the manufacturer's latest published installation instructions.
  - 2. Gaskets to be suitable for the intended service, molded, and produced by the coupling manufacturer.
- I. Inserts:
  - 1. Provide inserts for placement in concrete formwork.
  - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches (100 mm).
  - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
  - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.
- J. Pipe Hangers and Supports:
  - 1. Install in accordance with MSS SP-58.
  - 2. Support horizontal piping as scheduled.
  - 3. Install hangers to provide minimum 1/2-inch (13 mm) space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
  - 5. Use hangers with 1-1/2 inches (38 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 6. Where several pipes can be installed in parallel and at same elevation, provide multiple hangers.
  - 7. Provide copper plated hangers and supports for copper piping.
- K. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. See Section 230719.
- L. Use eccentric reducers to maintain top of pipe level.
- M. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welds.

### 3.03 SCHEDULES

- A. Hanger Spacing for Copper Tubing.
  - 1. 1/2 Inch (15 mm) and 3/4 inch (20 mm): Maximum span, 5 feet (1500 mm); minimum rod size, 1/4 inch (6 mm).
  - 2. 1 Inch (25 mm): Maximum span, 6 feet (1800 mm); minimum rod size, 1/4 inch (6 mm).

3. 1-1/2 Inches (40 mm) and 2 Inches (50 mm): Maximum span, 8 feet (2400 mm); minimum rod size, 3/8 inch (9 mm).
  4. 2-1/2 Inches (65 mm): Maximum span, 9 feet (2700 mm); minimum rod size, 3/8 inch (9 mm).
  5. 3 Inches (80 mm): Maximum span, 10 feet (3.0 m); minimum rod size, 3/8 inch (9 mm).
  6. 4 Inches (100 mm): Maximum span, 12 feet (3.6 m); minimum rod size, 1/2 inch (13 mm).
  7. 6 Inches (150 mm): Maximum span, 14 feet (4.2 m); minimum rod size, 1/2 inch (13 mm).
- B. Hanger Spacing for Steel Piping.
1. 1/2 Inch (15 mm), 3/4 Inch (20 mm), and 1 Inch (25 mm): Maximum span, 7 feet (2100 mm); minimum rod size, 1/4 inch (6 mm).
  2. 1-1/4 Inches (32 mm): Maximum span, 8 feet (2400 mm); minimum rod size, 3/8 inch (9 mm).
  3. 1-1/2 Inches (40 mm): Maximum span, 9 feet (2700 mm); minimum rod size, 3/8 inch (9 mm).
  4. 2 Inches (50 mm): Maximum span, 10 feet (3.0 m); minimum rod size, 3/8 inch (9 mm).
  5. 2-1/2 Inches (65 mm): Maximum span, 11 feet (3.4 m); minimum rod size, 3/8 inch (9 mm).
  6. 3 Inches (80 mm): Maximum span, 12 feet (3.6 m); minimum rod size, 3/8 inch (9 mm).
  7. 4 Inches (100 mm): Maximum span, 14 feet (4.3 m); minimum rod size, 1/2 inch (13 mm).
  8. 6 Inches (150 mm): Maximum span, 17 feet (5.1 m); minimum rod size, 1/2 inch (13 mm).

**END OF SECTION**

**SECTION 232123  
HYDRONIC PUMPS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Circulators.

**1.02 RELATED REQUIREMENTS**

- A. Section 230513 - Common Motor Requirements for HVAC Equipment.
- B. Section 230719 - HVAC Piping Insulation.
- C. Section 232113 - Hydronic Piping.
- D. Section 232114 - Hydronic Specialties.
- E. Section 253500 - Integrated Automation Instrumentation and Terminal Devices for HVAC.
- F. Section 260583 - Wiring Connections.
- G. Section 262419 - Motor-Control Centers.
- H. Section 262913 - Enclosed Controllers.

**1.03 REFERENCE STANDARDS**

- A. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2024, with Errata (2025).
- B. Bluetooth CS - Bluetooth Core Specification; 2016, Addendum 2017.
- C. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems Local and Metropolitan Area Networks--Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications; 2024, with Amendment (2025).
- D. IEEE 802.15.4 - IEEE Standard for Low-Rate Wireless Networks; 2024.
- E. LonMark Interoperability Guide - LonMark Application-Layer Interoperability Guide and LonMark Layer 1-6 Interoperability Guide; Version 3.4; 2005.
- F. Modbus (PS) - The Modbus Organization Communications Protocol.; Latest Update.
- G. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- H. NEMA MG 00001 - Motors and Generators; 2024.
- I. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013 (Reaffirmed 2020).
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Indicate hanging and support requirements and recommendations.
- D. Operation and Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

## 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture, assembly, and field performance of pumps, with minimum three years of experience.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. Provide pumps that operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- B. Minimum Quality Standard: UL 778.
- C. Electrical Requirements:
  - 1. Listed and classified by UL or testing agency acceptable to authority having jurisdiction as suitable for the purpose specified and indicated.
  - 2. Enclosures: Provide unspecified product(s) required to fit motor:
    - a. Starter(s) inside motor-control center as indicated on drawings; see Section 262419.
    - b. Starter(s) inside enclosed controller as indicated on drawings; see Section 262913.

### 2.02 CIRCULATORS

- A. Horizontal shaft, single-stage pump with direct connected, resilient-mount, oil lubricated motor for discharge pressures of up to 175 psi (1200 kPa).
- B. Casing: Cast iron, with flanged pump connections.
- C. Impeller: Stamped brass or cast bronze, keyed to shaft.
- D. Bearings: Permanently-lubricated ball bearings.
- E. Shaft: Stainless steel with bronze sleeve, integral thrust collar.
- F. Seal: Manufacturer's standard seal.
- G. Drive: Flexible coupling.
- H. Performance:
  - 1. Flow Capacity: Refer to drawings for pump performance characteristics.
- I. Electrical:
  - 1. Refer to drawings for pump electrical characteristics.
  - 2. See Section 260583.
  - 3. Electronically Commutated Motor (ECM): 1,750 rpm unless indicated otherwise; see Section 230513.
  - 4. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Verify that electric power is available and of the correct characteristics.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide access space around pumps for service. Provide no less than minimum space recommended by manufacturer.
- C. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings.
- D. Provide line sized shut-off valve and strainer on pump suction, and line sized soft seat check valve and balancing valve on pump discharge.
- E. Provide air cock and drain connection on horizontal pump casings.
- F. Provide drains for bases and seals, piped to and discharging into floor drains.

G. Lubricate pumps before start-up.

H. Controls Human-Machine Interface (HMI): HVAC operator terminal; see Section 253500.

### **3.03 SCHEDULES**

A. Refer to drawings.

**END OF SECTION**

**SECTION 233300  
AIR DUCT ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flexible duct connectors.

**1.02 REFERENCE STANDARDS**

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2018.
- B. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2024, with Errata (2025).
- C. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2024, with Errata (2025).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- E. Bluetooth CS - Bluetooth Core Specification; 2016, Addendum 2017.
- F. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems Local and Metropolitan Area Networks--Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications; 2024, with Amendment (2025).
- G. IEEE 802.15.4 - IEEE Standard for Low-Rate Wireless Networks; 2024.
- H. LonMark Interoperability Guide - LonMark Application-Layer Interoperability Guide and LonMark Layer 1-6 Interoperability Guide; Version 3.4; 2005.
- I. Modbus (PS) - The Modbus Organization Communications Protocol.; Latest Update.
- J. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- K. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025.
- L. Bluetooth CS - Bluetooth Core Specification; 2016, Addendum 2017.
- M. LonMark Interoperability Guide - LonMark Application-Layer Interoperability Guide and LonMark Layer 1-6 Interoperability Guide; Version 3.4; 2005.
- N. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems Local and Metropolitan Area Networks--Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications; 2024, with Amendment (2025).
- O. IEEE 802.15.4 - IEEE Standard for Low-Rate Wireless Networks; 2024.
- P. Modbus (PS) - The Modbus Organization Communications Protocol.; Latest Update.
- Q. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- R. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- S. NFPA 92 - Standard for Smoke Control Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- T. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2024.
- U. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2025.
- V. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- W. UL 33 - Safety Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.
- X. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

- Y. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- Z. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances; Current Edition, Including All Revisions.
- AA. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.
- BB. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.
- CC. UL 555C - Standard for Safety Ceiling Dampers; Current Edition, Including All Revisions.
- DD. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.
- EE. UL 1978 - Grease Ducts; Current Edition, Including All Revisions.
- FF. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; Current Edition, Including All Revisions.

### **1.03 SUBMITTALS**

- A. Product Data: Provide for shop-fabricated assemblies. Include electrical characteristics and connection requirements.
- B. Manufacturer's Installation Instructions: Provide instructions.

### **1.04 DELIVERY, STORAGE, AND HANDLING**

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

## **PART 2 PRODUCTS**

### **2.01 FLEXIBLE DUCT CONNECTORS**

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
  - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd (1.0 kg/sq m).
    - a. Net Fabric Width: Approximately 2 inches (50 mm) wide.
  - 2. Metal: 3 inches (75 mm) wide, 24 gauge, 0.0239 inch (0.61 mm) thick galvanized steel.
- C. Leaded Vinyl Sheet: Minimum 0.55 inch (14 mm) thick, 0.87 lbs per sq ft (4.2 kg/sq m), 10 dB attenuation in 10 to 10,000 Hz range.
- D. Maximum Installed Length: 14 inch (356 mm).

## **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. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- C. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- D. For fans developing static pressures of 5.0 inches (1250 Pa) and over, cover flexible connections with leaded vinyl sheet, held in place with metal straps.

**END OF SECTION**

**SECTION 238200  
CONVECTION HEATING AND COOLING UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hydronic or steam finned tube radiation.
- B. Fan-coil units.
- C. Blower-coil units.
- D. Thermostatic controls.

**1.02 REFERENCE STANDARDS**

- A. AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI); Current Edition.
- B. AHRI 350 (SI/I-P) - Sound Performance Rating of Non-Ducted Indoor Air-Conditioning and Heat Pump Equipment; 2025.
- C. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils; 2001, with Addenda (2011).
- D. AHRI 440 - Performance Rating of Room Fan-Coils; 2008.
- E. AHRI 840 (I-P) - Performance Rating of Unit Ventilators; 2021.
- F. AHRI 841 (SI) - Performance Rating of Unit Ventilators; 2021.
- G. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; Most Recent Edition Cited by Referring Code or Reference Standard.
- H. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2024, with Errata (2025).
- I. ASHRAE Std 62.1 - Ventilation for Acceptable Indoor Air Quality; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- K. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- L. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- M. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- N. Bluetooth CS - Bluetooth Core Specification; 2016, Addendum 2017.
- O. Modbus (PS) - The Modbus Organization Communications Protocol; Latest Update.
- P. LonMark Interoperability Guide - LonMark Application-Layer Interoperability Guide and LonMark Layer 1-6 Interoperability Guide; Version 3.4; 2005.
- Q. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems Local and Metropolitan Area Networks--Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications; 2024, with Amendment (2025).
- R. IEEE 802.15.4 - IEEE Standard for Low-Rate Wireless Networks; 2024.
- S. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- T. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- U. NSF 61 - Drinking Water System Components - Health Effects; 2024.
- V. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- W. UL 674 - Electrical Motors and Generators for Use in Hazardous (Classified) Locations; Current Edition, Including All Revisions.

## **PART 2 PRODUCTS**

### **2.01 HYDRONIC FINNED TUBE RADIATION**

- A. Manufacturers:
  - 1. Modine Manufacturing Company: [www.modineHVAC.com/#sle](http://www.modineHVAC.com/#sle).
  - 2. Slant/Fin Corporation: [www.slantfin.com/#sle](http://www.slantfin.com/#sle).
  - 3. Zehnder Rittling: [www.rittling.com/#sle](http://www.rittling.com/#sle).
  - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Required Directory Listing: AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI); current edition at [www.ahrinet.org](http://www.ahrinet.org).

### **2.02 FAN-COIL UNITS**

- A. Performance Data and Safety Requirements:
  - 1. Unit capacities certified in accordance with AHRI 440.
  - 2. Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL) as suitable for purpose indicated.
  - 3. Insulation to comply with NFPA 90A requirements for flame spread and smoke generation.
  - 4. Equipment wiring to comply with requirements of NFPA 70.
- B. Required Directory Listings: AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI).
- C. Coils:
  - 1. Evenly spaced aluminum fins mechanically bonded to copper tubes.
  - 2. Water Coil: Suitable for working temperatures not less than 200 degrees F (93 degrees C).
  - 3. Steam Coil: Suitable for working pressures not less than 15 psi (103 kPa).
  - 4. Provide drain pan under cooling coil easily removable for cleaning.
- D. Coil Piping Packages:
  - 1. Hoses:
    - a. Provide hoses for all units for connection to main water supply and return headers.
    - b. Length: 2 feet (0.61 m).
    - c. Material: Braided stainless steel rated to minimum 400 psi (3,758 kPa) at 265 degrees F (129.4 degrees C).
  - 2. Automatic Balancing Valves:
    - a. Brass body for shutoff and hydronic balancing.
  - 3. Ball Valves:
    - a. Brass body for shutoff and hydronic balancing.
    - b. Provide pressure/temperature ports.
  - 4. Y Strainers:
    - a. Bronze body.
    - b. "Y" type configuration with brass cap.
    - c. Maximum Operating Pressure: Minimum 450 psi (3103 kPa).
    - d. Screen: Stainless steel.
  - 5. Auto-flow regulators as indicated in the schedule.
- E. Vertical Cabinet and Horizontal Exposed Units: Minimum 18 gauge, 0.0478 inch (1.21 mm) thick sheet steel with exposed corners and edges rounded, easily removed panels, glass fiber insulation, integral air outlet, and inlet grilles.
- F. Finish: Factory applied baked enamel of color as selected on visible surfaces of enclosure or cabinet.
- G. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven.
- H. Motor: Electronically commutated.

- I. Controls:
  - 1. Provide units with control valves furnished by the fan coil unit manufacturer.
  - 2. Fan Coil Unit Manufacturer's Controls:
    - a. Fan speed switch for wall mounting.
    - b. Disconnect switch.
    - c. Programmable thermostat.
  - 3. Controls Interface:
    - a. Relay board.
    - b. 24-volt transformer.
    - c. Contactors for electric heat units.
    - d. Inverting relays for use with standard thermostats and normally open valves.
- J. Filter: Easily removed 1 inch (25 mm) thick glass fiber throw-away type, located to filter air before coil.
- K. Electrical Characteristics:
  - 1. Refer to drawings.

### **2.03 BLOWER-COIL UNITS**

- A. Performance Data and Safety Requirements:
  - 1. Coils rated and tested in accordance with AHRI 410.
  - 2. Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL) or Intertek (ETL) as suitable for purpose indicated.
  - 3. Comply with NFPA 90A for unit construction, including filters and related equipment, for protection of life and property from fire, smoke, and gases resulting from conditions having manifestations similar to fire.
- B. Unit Casing:
  - 1. Fabricate from heavy gauge galvanized steel sheet.
  - 2. Insulate inside walls with 1 inch (25 mm) thick, fiberglass insulation for thermal and acoustical control.
  - 3. Provide access panels allowing servicing of coils, drain pan, fan, motor, and drive.
  - 4. Provide knockouts or hanger rod holes at all four corners for suspended units.
- C. Air Coils:
  - 1. Aluminum fins mechanically expanded or bonded to copper tubes having standard sweat connections.
    - a. Water: Manual, automatic or self-venting, designed to a working pressure and temperature of not less than 250 psig (1,724 kPa) and 200 degrees F (93 degrees C).
    - b. Direct Expansion (DX): Thermal expansion valve and distributor, dehydrated, sealed with dry charge, and factory proof tested for leaks.
- D. Fans: Forward curved, centrifugal blower, dynamically balanced, adjustable speed V-belt drive with fan shaft supported by heavy-duty, permanently sealed ball bearings.
- E. Drain Pan: Cleanable, one-piece construction of stainless steel; with drain connection and sloped for positive drainage.
- F. Filters: Fully accessible, flat filter rack with throw-away filters.
- G. Motors: Single speed with sleeve or ball bearings, 1,750 rpm, wired to unit junction box, and mounted on a resilient motor base.
- H. Mixing Box: Factory assembled fresh air and return air dampers including linkage and ready for field installation of damper actuator.
- I. Thermostatic Controls: Electromechanical thermostat.
- J. Electrical Controls:
  - 1. 24-volt control circuit transformer.
  - 2. Motor circuit fusing.

3. Fan contactor.
  4. Terminal strip for connection of field wiring.
  5. Disconnecting means for main incoming power.
- K. Electrical Characteristics:
1. Refer to drawings.

## **2.04 THERMOSTATIC CONTROLS**

- A. Non-Programmable Thermostats:
1. Digital electronic type with key- or pushbutton-operated display.
  2. User configurable precoded options aligned with equipment functions.
  3. Surface or single-gang mounted base; include accessories for pipe-mounted.
  4. Internal digital controller with platinum or thermistor sensor:
    - a. Setpoint adjustment control.
    - b. Fan ON-OFF-AUTO control switch.
    - c. 2-Speed fan control switch with override.
    - d. 3-Speed fan control switch with override.
    - e. Automatic heating and cooling changeover.
    - f. Units in degrees F and degrees C, selectable.
    - g. Operational status indicator with manual override.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are suitable for installation.
- B. Verify that field measurements are as indicated on drawings.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's recommendations.
- B. Install equipment exposed to finished areas after walls and ceilings are finished and painted.
- C. Do not damage equipment or finishes.
- D. Fan-Coil Units:
  1. Install as indicated.
  2. Coordinate to ensure correct recess size for recessed units.
- E. Units with Hydronic Coils:
  1. Provide with shut-off valve on supply piping and tamper-proof, balancing valve with memory stop on return piping.
  2. If not easily accessible, extend air vent to exterior surface of cabinet for ease of servicing.
  3. Provide float operated automatic air vents with stop valve for cabinet unit heaters, fan coil units, and unit heaters.
- F. Units with Cooling Coils: Connect drain pan to condensate drain.
- G. Blower-Coil Units:
  1. Verify all surfaces and openings at unit location can suitably accommodate unit(s).
  2. Install in accordance with manufacturer's recommendations.
  3. Provide manual shut-off valve on hydronic supply side of coil and balancing valve with memory stop on return side.
  4. General piping installation requirements are specified in other Sections and drawings indicate general arrangement of piping, fittings, and specialties.
  5. Connect hydronic and condensate drain to unit.

### **3.03 CLEANING**

- A. After construction and painting is completed, clean exposed surfaces of units.
- B. Vacuum clean coils and inside of units.

- C. Touch-up marred or scratched surfaces of factory-finished cabinets using finish materials furnished by the manufacturer.
- D. Install new filters.

**3.04 PROTECTION**

- A. Provide finished cabinet units with protective covers during the balance of construction.

**3.05 EQUIPMENT SCHEDULES**

- A. Refer to drawings.

**END OF SECTION**

**SECTION 260519**  
**LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Single conductor building wire.
- B. Nonmetallic-sheathed cable.
- C. Underground feeder and branch-circuit cable.
- D. Service entrance cable.
- E. Armored cable.
- F. Metal-clad cable.
- G. Power and control tray cable.
- H. Variable-frequency drive cable.
- I. Photovoltaic wire.
- J. Manufactured wiring systems.
- K. Wiring connectors.
- L. Electrical tape.
- M. Heat shrink tubing.
- N. Oxide inhibiting compound.
- O. Wire pulling lubricant.
- P. Cable ties.
- Q. Firestop sleeves.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

**1.03 REFERENCE STANDARDS**

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2024).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).
- E. ASTM B800 - Standard Specification for 8000 Series Aluminum Alloy Wire for Electrical Purposes - Annealed and Intermediate Tempers; 2005 (Reapproved 2021).
- F. ASTM B801 - Standard Specification for Concentric-Lay-Stranded Conductors of 8000 Series Aluminum Alloy for Subsequent Covering or Insulation; 2018 (Reapproved 2023).
- G. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2024.
- H. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2020.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.

- J. FM 3971 - Examination Standard for Fire Protective Coatings and Wraps for Grouped Cables; 2023.
- K. FS A-A-59544 - Cable and Wire, Electrical (Power, Fixed Installation); 2008a (Validated 2019).
- L. IEEE 1210 - IEEE Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable; 2004 (Corrigendum 2014).
- M. IEEE 383 - IEEE Standard for Qualifying Electric Cables and Splices for Nuclear Facilities; 2015.
- N. IEEE 1210 - IEEE Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable; 2004 (Corrigendum 2014).
- O. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- P. NECA 104 - Standard for Installing Aluminum Building Wire and Cable; 2012.
- Q. NECA 120 - Standard for Installing Armored Cable (AC) and Type Metal-Clad (MC) Cable; 2018.
- R. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF); 2024.
- S. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.
- T. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- U. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- V. NFPA 79 - Electrical Standard for Industrial Machinery; 2021.
- W. UL 4 - Armored Cable; Current Edition, Including All Revisions.
- X. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- Y. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- Z. UL 183 - Manufactured Wiring Systems; Current Edition, Including All Revisions.
- AA. UL 267 - Outline of Investigation for Wire-Pulling Compounds; Current Edition, Including All Revisions.
- BB. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- CC. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- DD. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- EE. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables; Current Edition, Including All Revisions.
- FF. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
- GG. UL 719 - Nonmetallic-Sheathed Cables; Current Edition, Including All Revisions.
- HH. UL 854 - Service-Entrance Cables; Current Edition, Including All Revisions.
- II. UL 1277 - Electrical Power and Control Tray Cables with Optional Optical-Fiber Members; Current Edition, Including All Revisions.
- JJ. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.
- KK. UL 2277 - Outline of Investigation for Flexible Motor Supply Cable and Wind Turbine Tray Cable; Current Edition, Including All Revisions.
- LL. UL 4703 - Standard for Photovoltaic Wire; Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate the installation of direct burial cable with other trades to avoid conflicts with piping or other potential conflicts.
3. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

#### **1.05 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

#### **1.07 FIELD CONDITIONS**

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F (-10 degrees C), unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

### **PART 2 PRODUCTS**

#### **2.01 CONDUCTOR AND CABLE APPLICATIONS**

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
  1. Exceptions:
    - a. Use variable-frequency drive cable for connection between variable-frequency motor controllers and associated motors.

#### **2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS**

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Provide new conductors and cables manufactured not more than one year prior to installation.
- D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- E. Comply with NEMA WC 70.
- F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- H. Conductors for Grounding and Bonding: Also comply with Section 260526.
- I. Conductor Material:

1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
  2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
  3. Tinned Copper Conductors: Comply with ASTM B33.
- J. Minimum Conductor Size: 12 AWG.
1. Branch Circuits: 12 AWG.
- K. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- L. Conductor Color Coding:
1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
  2. Color Coding Method: Integrally colored insulation.
    - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
  3. Color Code:
    - a. 208Y/120 V, 3 Phase, 4 Wire System:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
      - 4) Neutral/Grounded: White.
    - b. Equipment Ground, All Systems: Green.
    - c. Isolated Ground, All Systems: Green with yellow stripe.
    - d. For control circuits, comply with manufacturer's recommended color code.

### **2.03 SINGLE CONDUCTOR BUILDING WIRE**

- A. Description: Single conductor insulated wire.
- B. Conductor Stranding:
1. Feeders and Branch Circuits:
    - a. Size 10 AWG and Smaller: Solid.
    - b. Size 8 AWG and Larger: Stranded.
  2. Control Circuits: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation:
1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.

### **2.04 VARIABLE-FREQUENCY DRIVE CABLE**

- A. Description: Flexible motor supply cable listed and labeled as complying with UL 2277 in accordance with NFPA 79; specifically designed for use with variable frequency drives and associated nonlinear power distortions.
- B. Conductor Stranding: Stranded.
- C. Insulation Voltage Rating: 1000 V.
- D. Insulation: Use only thermoset insulation types; thermoplastic insulation types are not permitted.
- E. Grounding: Full-size integral equipment grounding conductor or symmetrical arrangement of multiple conductors of equivalent size.
- F. Provide metallic shielding.
- G. Jacket: PVC or Chlorinated Polyethylene (CPE).

## 2.05 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 260526.
- C. Wiring Connectors for Splices and Taps:
  - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
  - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Wiring Connectors for Terminations:
  - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
  - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
  - 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
  - 4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
  - 5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
  - 6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
- E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
- G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
- H. Push-in Wire Connectors: Rated 600 V, 221 degrees F (105 degrees C).
- I. Mechanical Connectors: Provide bolted type.
- J. Compression Connectors: Provide circumferential type crimp configuration.
- K. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

## 2.06 ACCESSORIES

- A. Electrical Tape:
  - 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
  - 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
  - 3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil (0.76 mm); suitable for continuous temperature environment up to 194 degrees F (90 degrees C) and short-term 266 degrees F (130 degrees C) overload service.

4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil (3.2 mm); suitable for continuous temperature environment up to 176 degrees F (80 degrees C).
  5. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil (0.18 mm); suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
  6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil (2.3 mm).
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
  - C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
  - D. Wire Pulling Lubricant:
    1. Listed and labeled as complying with UL 267.
    2. Suitable for use with conductors/cables and associated insulation/jackets to be installed, when tested in accordance with IEEE 1210; approved by conductor/cable manufacturer.
    3. Suitable for use at installation temperature.
  - E. Cable Ties: Material and tensile strength rating suitable for application.
  - F. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 PREPARATION**

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

#### **3.03 INSTALLATION**

- A. Circuiting Requirements:
  1. Unless dimensioned, circuit routing indicated is diagrammatic.
  2. When circuit destination is indicated without specific routing, determine exact routing required.
  3. Arrange circuiting to minimize splices.
  4. Include circuit lengths required to install connected devices within 10 ft (3.0 m) of location indicated.
  5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
  6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
  7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
  8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Installation in Raceway:
  - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
  - 2. Pull all conductors and cables together into raceway at same time.
  - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
  - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
  - 1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
  - 2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.
- G. Variable-Frequency Drive Cable: Terminate shielding at both variable-frequency motor controller and associated motor using glands or termination kits recommended by manufacturer.
- H. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.
- I. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet (1.5 m) of slack.
- J. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- K. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- L. Make wiring connections using specified wiring connectors.
  - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
  - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
  - 3. Do not remove conductor strands to facilitate insertion into connector.
  - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminants. Do not use wire brush on plated connector surfaces.
  - 5. Connections for Aluminum Conductors: Fill connectors with oxide inhibiting compound where not pre-filled by manufacturer.
  - 6. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  - 7. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- M. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
  - 1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

**SECTION 260526**  
**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.
- E. Ground rod electrodes.
- F. Chemically-enhanced ground electrodes.
- G. Ground plate electrodes.
- H. Ground enhancement material.
- I. Ground access wells.
- J. Pre-fabricated signal reference grids.

**1.02 RELATED REQUIREMENTS**

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

**1.03 REFERENCE STANDARDS**

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System; 2025.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2022.
- D. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 99 - Health Care Facilities Code; 2024, with Errata.
- G. NFPA 780 - Standard for the Installation of Lightning Protection Systems; 2026.
- H. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Verify exact locations of underground metal water service pipe entrances to building.
  - 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
  - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

**1.05 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

- C. **Manufacturer Qualifications:** Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 GROUNDING AND BONDING REQUIREMENTS**

- A. **Existing Work:** Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- E. **Bonding and Equipment Grounding:**
  - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
  - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
  - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
  - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
  - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
  - 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

#### **2.02 GROUNDING AND BONDING COMPONENTS**

- A. **General Requirements:**
  - 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
  - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. **Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:**
  - 1. Use insulated copper conductors unless otherwise indicated.
    - a. **Exceptions:**
      - 1) Use bare copper conductors where installed underground in direct contact with earth.
      - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. **Connectors for Grounding and Bonding:**
  - 1. **Description:** Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
  - 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
  - 3. Unless otherwise indicated, use mechanical connectors for accessible connections.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.
  - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
  - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
  - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
  - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 260553.

**END OF SECTION**

**SECTION 260529  
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

**1.02 RELATED REQUIREMENTS**

- A. Section 260533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- B. Section 260533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- D. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026.
- F. MFMA-4 - Metal Framing Standards Publication; 2004.
- G. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.
  - 2. Coordinate work to provide additional framing and materials required for installation.
  - 3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
  - 4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
  - 5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not install products on or provide attachment to concrete surfaces until concrete has cured.

**1.05 QUALITY ASSURANCE**

- A. Maintain at project site one copy of each referenced document that prescribes execution requirements.

- B. Installer Qualifications for Powder-Actuated Fasteners: Certified by fastener system manufacturer with current operator's license.
- C. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 SUPPORT AND ATTACHMENT COMPONENTS**

- A. General Requirements:
  - 1. Comply with the following. Where requirements differ, comply with most stringent.
    - a. NFPA 70.
    - b. Applicable building code.
    - c. Requirements of authorities having jurisdiction.
  - 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
  - 3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
  - 4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
  - 5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
  - 6. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
  - 7. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
    - a. Indoor Dry Locations: Use zinc-plated steel unless otherwise indicated.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel unless otherwise indicated.
    - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.
  - 1. Conduit Straps: One-hole or two-hole type; steel.
  - 2. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
- D. Metal Channel/Strut Framing Systems:
  - 1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
  - 2. Comply with MFMA-4.
- E. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.
  - 1. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2-inch (13 mm) diameter.
    - b. Busway Supports: 1/2-inch (13 mm) diameter.
    - c. Single Conduit Larger than 1-inch (27 mm) Trade Size diameter.
    - d. Trapeze Support for Multiple Conduits: 3/8-inch (10 mm) diameter.
    - e. Outlet Boxes: 1/4-inch (6 mm) diameter.
- F. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
4. Hollow Masonry: Use toggle bolts.
5. Hollow Stud Walls: Use toggle bolts.
6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
7. Sheet Metal: Use sheet metal screws.
8. Wood: Use wood screws.
9. Preset Concrete Inserts: Continuous metal channel/strut and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
  - a. Manufacturer: Same as manufacturer of metal channel/strut framing system.
  - b. Comply with MFMA-4.
  - c. Channel Material: Use galvanized steel.
  - d. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch (2.66 mm) minimum base metal thickness.
10. Post-Installed Concrete Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install hangers and supports in accordance with NECA 1.
- C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- H. Equipment Support and Attachment:
  1. Use metal, fabricated supports or supports assembled from metal channel/strut to support equipment as required.
  2. Use metal channel/strut secured to studs to support equipment surface mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  3. Use metal channel/strut to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  4. Unless otherwise indicated, mount floor-mounted equipment on properly sized concrete pad 3 inches (80 mm) in height.
  5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- I. Conduit Support and Attachment: See Section 260533.13 for additional requirements.
- J. Box Support and Attachment: See Section 260533.16 for additional requirements.

- K. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
- L. Secure fasteners in accordance with manufacturer's recommended torque settings.
- M. Remove temporary supports.

**3.03 FIELD QUALITY CONTROL**

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.

**END OF SECTION**

**SECTION 260533.13  
CONDUIT FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Galvanized steel rigid metal conduit (RMC).
- B. Stainless steel rigid metal conduit (RMC).
- C. Aluminum rigid metal conduit (RMC).
- D. Flexible metal conduit (FMC).
- E. Liquidtight flexible metal conduit (LFMC).
- F. Galvanized steel electrical metallic tubing (EMT).
- G. Stainless steel electrical metallic tubing (EMT).
- H. Aluminum electrical metallic tubing (EMT).

**1.02 RELATED REQUIREMENTS**

- A. Section 078400 - Firestopping.
- B. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Cable assemblies consisting of conductors protected by integral metal armor.
- C. Section 260526 - Grounding and Bonding for Electrical Systems.
  - 1. Includes additional requirements for fittings for grounding and bonding.
- D. Section 260529 - Hangers and Supports for Electrical Systems.
- E. Section 260533.16 - Boxes for Electrical Systems.
- F. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- G. Section 262100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.

**1.03 REFERENCE STANDARDS**

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2025.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.
- C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit - Aluminum (ERMC-A); 2025.
- D. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit; 2025.
- E. ASTM D1002 - Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal); 2010 (Reapproved 2019).
- F. ASTM D1598 - Standard Test Methods for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure; 2024.
- G. ASTM D1599 - Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings; 2018 (Reapproved 2024).
- H. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing; 2020.
- I. ASTM D3261 - Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing; 2024.
- J. ASTM F1055 - Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing; 2016a (Reapproved 2022).

- K. ASTM F2160 - Standard Specification for Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD); 2016.
- L. ASTM F2176 - Standard Specification for Mechanical Couplings Used on Polyethylene Conduit, Duct and Innerduct; 2017.
- M. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- N. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.
- O. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit; 2004.
- P. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2025.
- Q. NEMA BI 50058 - Electrical Nonmetallic Tubing (ENT); 2014 (Reaffirmed 2019).
- R. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- S. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit; 2018.
- T. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.
- U. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.
- V. NEMA TC 7 - Solid-Wall Coilable and Straight Electrical Polyethylene Conduit; 2021.
- W. NEMA TC 14 (SERIES) - Reinforced Thermosetting Resin Conduit and Fittings Series; 2015.
- X. NEMA TC 14.AG - Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings; 2015 (Reaffirmed 2021).
- Y. NEMA TC 14.BG - Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings; 2015 (Reaffirmed 2020).
- Z. NEMA TC 14.XW - Extra Heavy Wall Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings; 2015 (Reaffirmed 2021).
- AA. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- BB. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- CC. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- DD. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless Steel; Current Edition, Including All Revisions.
- EE. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.
- FF. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.
- GG. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- HH. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- II. UL 651A - High Density Polyethylene (HDPE) Conduit; Current Edition, Including All Revisions.
- JJ. UL 746C - Polymeric Materials – Use in Electrical Equipment Evaluations; Current Edition, Including All Revisions.
- KK. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- LL. UL 797A - Electrical Metallic Tubing - Aluminum and Stainless Steel; Current Edition, Including All Revisions.
- MM. UL 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations; Current Edition, Including All Revisions.
- NN. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.
- OO. UL 1653 - Electrical Nonmetallic Tubing; Current Edition, Including All Revisions.

- PP. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.
- QQ. UL 2419 - Outline of Investigation for Electrically Conductive Corrosion Resistant Compounds; Current Edition, Including All Revisions.
- RR. UL 2420 - Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings; Current Edition, Including All Revisions.
- SS. UL 2515 - Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings; Current Edition, Including All Revisions.
- TT. UL 2515A - Standard for Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings; Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
  - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
  - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
  - 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
  - 5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not begin installation of conductors and cables until installation of conduit between termination points is complete.

#### **1.05 QUALITY ASSURANCE**

- A. Documents at Project Site: Maintain at project site one copy of manufacturer's instructions, shop drawings, and reference standard documents containing execution requirements.
- B. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 CONDUIT APPLICATIONS**

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements.
- C. Embedded Within Concrete:
  - 1. Within Slab on Grade: Use galvanized steel rigid metal conduit (RMC). Embed within structural slabs only where approved by Structural Engineer.
  - 2. Within Slab Above Ground: Use galvanized steel rigid metal conduit (RMC), PVC-coated galvanized steel rigid metal conduit (RMC), galvanized steel electrical metallic tubing (EMT), rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC). Embed within structural slabs only where approved by Structural Engineer.
  - 3. Within Concrete Walls Above Ground: Use galvanized steel rigid metal conduit (RMC).
- D. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit (RMC).

- E. Concealed Within Hollow Stud Walls: Use galvanized steel electrical metallic tubing (EMT) or stainless steel electrical metallic tubing (EMT).
- F. Concealed Above Accessible Ceilings: Use stainless steel electrical metallic tubing (EMT).
- G. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit (RMC), stainless steel intermediate metal conduit (IMC), galvanized steel electrical metallic tubing (EMT), or stainless steel electrical metallic tubing (EMT).
- H. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), galvanized steel electrical metallic tubing (EMT), or stainless steel electrical metallic tubing (EMT).
- I. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC).
  - 1. Locations subject to physical damage include, but are not limited to:
    - a. Where exposed below 8 feet (2.4 m), except within electrical and communication rooms or closets.
- J. Exposed, Interior, Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).
  - 1. Locations subject to severe physical damage include, but are not limited to:
    - a. High traffic industrial and warehouse areas where exposed below 8 feet (2.4 m), except within electrical and communication rooms or closets.
- K. Exposed, Exterior, Not Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).
- L. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit (RMC).
- M. Flexible Connections to Vibrating Equipment:
  - 1. Dry Locations: Use flexible metal conduit (FMC).
  - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
  - 3. Maximum Length: 6 feet (1.8 m) unless otherwise indicated.
  - 4. Vibrating equipment includes, but is not limited to:
    - a. Transformers.
    - b. Motors.

## 2.02 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70.
- B. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling mandrel through them.
- C. Electrical Service Conduits: See Section 262100 for additional requirements.
- D. Fittings for Grounding and Bonding: See Section 260526 for additional requirements.
- E. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- F. Provide products listed, classified, and labeled as suitable for purpose intended.
- G. Minimum Conduit Size, Unless Otherwise Indicated:
  - 1. Branch Circuits: 1/2-inch (16 mm) trade size.
- H. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

## 2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:

1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
2. Material: Use steel.
  - a. Where not subject to severe corrosive influence, stainless steel fittings may be used.
  - b. Do not use die cast zinc fittings.
3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

#### **2.04 FLEXIBLE METAL CONDUIT (FMC)**

- A. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems.
- B. Fittings:
  1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  2. Material: Use steel.
    - a. Do not use die cast zinc fittings.

#### **2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)**

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
  1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  2. Material: Use steel.
    - a. Do not use die cast zinc fittings.

#### **2.06 STAINLESS STEEL ELECTRICAL METALLIC TUBING (EMT)**

- A. Description: NFPA 70, Type EMT stainless steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797A.
  1. Material: Type 304 or 316 stainless steel.
- B. Fittings:
  1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  2. Material: Use stainless steel with corrosion resistance equivalent to conduit.
  3. Connectors and Couplings: Use set-screw type.
  4. Damp or Wet Locations, Where Permitted: Use fittings listed for use in wet locations.

#### **2.07 ACCESSORIES**

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 10 mil, 0.010 inch (0.25 mm).
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.
- C. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf (5.6 kN).
- D. Foam Conduit Sealant:
  1. Removable, two-part, closed-cell foam, specifically designed for sealing conduit openings against water, moisture, gases, and dust.
  2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
  3. Rated to hold minimum of 10 ft (3.0 m) water head pressure.
- E. Conduit Mechanical Seals:
  1. Listed as complying with UL 514B.
  2. Specifically designed for sealing conduit openings against water, moisture, gases, and dust.
  3. Suitable for sealing around conductors/cables to be installed.

- F. Sealing Systems for Concrete Penetrations:
  - 1. Sleeves: Provide water stop ring or cement coating that bonds to concrete to prevent water infiltration.
  - 2. Rate for minimum of 40 psig; suitable for sealing around conduits to be installed.
- G. 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.
- H. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in accordance with NECA 1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Conduit Routing:
  - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
  - 2. When conduit destination is indicated without specific routing, determine exact routing required.
  - 3. Conceal conduits unless specifically indicated to be exposed.
  - 4. Conduits in the following areas may be exposed, unless otherwise indicated:
    - a. Electrical rooms.
    - b. Mechanical equipment rooms.
    - c. Within joists in areas with no ceiling.
  - 5. Unless otherwise approved, do not route exposed conduits:
    - a. Across floors.
    - b. Across roofs.
    - c. Across top of parapet walls.
    - d. Across building exterior surfaces.
  - 6. Conduits installed underground or embedded in concrete may be routed in shortest possible manner unless otherwise indicated. Route other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
  - 7. Arrange conduit to maintain adequate headroom, clearances, and access.
  - 8. Arrange conduit to provide no more than equivalent of four 90-degree bends between pull points.
  - 9. Arrange conduit to provide no more than 150 feet (46 m) between pull points.
  - 10. Route conduits above water and drain piping where possible.
  - 11. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
  - 12. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.
  - 13. Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces. This includes, but is not limited to:
    - a. Heaters.
    - b. Hot water piping.
    - c. Flues.

14. Group parallel conduits in same area on common rack.
- E. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 260529.
  2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
  3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
  4. Use conduit strap to support single surface-mounted conduit.
    - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
  5. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
  6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
  7. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
  8. Use nonpenetrating rooftop supports to support conduits routed across rooftops, where approved.
  9. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with most stringent requirements.
- F. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
  2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
  3. Use suitable adapters where required to transition from one type of conduit to another.
  4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
  5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
  6. Where spare conduits stub up through concrete floors and are not terminated in box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
  7. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
  8. Secure joints and connections to provide mechanical strength and electrical continuity.
- G. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
  2. Make penetrations perpendicular to surfaces unless otherwise indicated.
  3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
  4. Conceal bends for conduit risers emerging above ground.
  5. Provide suitable sealing system where conduits penetrate exterior wall below grade.
  6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
  7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
  8. Provide metal escutcheon plates for conduit penetrations exposed to public view.
  9. Install firestopping to preserve fire resistance rating of partitions and other elements.
- H. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):

1. Maximum Conduit Size: 1-inch (27 mm) trade size unless otherwise approved.
  2. Install conduits within middle one third of slab thickness.
  3. Secure conduits to prevent floating or movement during pouring of concrete.
- I. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings or approved flexible connections to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
  2. Where conduits are subject to earth movement by settlement or frost.
- J. Conduit Sealing:
1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
    - a. Where conduits enter building from outside.
    - b. Where service conduits enter building from underground distribution system.
    - c. Where conduits enter building from underground.
    - d. Where conduits may transport moisture to contact live parts.
  2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
    - a. Where conduits pass from outdoors into conditioned interior spaces.
    - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
    - c. Where conduits penetrate coolers or freezers.
- K. Provide pull string in each empty conduit and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches (300 mm) at each end.
- L. Provide grounding and bonding; see Section 260526.
- M. Identify conduits; see Section 260553.

### **3.03 FIELD QUALITY CONTROL**

- A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- B. Correct deficiencies and replace damaged or defective conduits.

### **3.04 CLEANING**

- A. Clean interior of conduits to remove moisture and foreign matter.

### **3.05 PROTECTION**

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

**END OF SECTION**

**SECTION 260533.16**  
**BOXES FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).
- C. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 083100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
- C. Section 260529 - Hangers and Supports for Electrical Systems.
- D. Section 260533.13 - Conduit for Electrical Systems:
  - 1. Conduit bodies and other fittings.
  - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- E. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 262726 - Wiring Devices:
  - 1. Wall plates.
  - 2. Floor box service fittings.
  - 3. Poke-through assemblies.
  - 4. Access floor boxes.
  - 5. Additional requirements for locating boxes for wiring devices.

**1.03 REFERENCE STANDARDS**

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- E. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013 (Reaffirmed 2020).
- F. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; 2013 (Reaffirmed 2020).
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. SCTE 77 - Specifications for Underground Enclosure Integrity; 2023.
- I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- K. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.
- L. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

- M. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.
- N. UL 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations; Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
  - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  - 3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
  - 4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
  - 5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
  - 6. Coordinate the work with other trades to preserve insulation integrity.
  - 7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
  - 8. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for outlet and device boxes, junction and pull boxes, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

### **PART 2 PRODUCTS**

#### **2.01 BOXES**

- A. General Requirements:
  - 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
  - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
  - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
  - 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
  - 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:

1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
  2. Use cast iron boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
  3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.
  4. Use suitable concrete type boxes where flush-mounted in concrete.
  5. Use suitable masonry type boxes where flush-mounted in masonry walls.
  6. Use raised covers suitable for the type of wall construction and device configuration where required.
  7. Use shallow boxes where required by the type of wall construction.
  8. Do not use "through-wall" boxes designed for access from both sides of wall.
  9. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
  10. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
  11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
  12. Minimum Box Size, Unless Otherwise Indicated:
    - a. Wiring Devices: 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
1. Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
  2. NEMA EN 10250 Environment Type, Unless Otherwise Indicated:
    - a. Indoor Clean, Dry Locations: Type 1, galvanized steel.
    - b. Outdoor Locations: Type 3R, painted steel.
  3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
    - a. Provide screw-cover enclosures unless otherwise indicated.
    - b. Boxes 6 square feet (0.56 sq m) and Larger: Provide sectionalized screw-cover enclosures.
  4. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.

## 2.02 ACCESSORIES

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

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide separate boxes for emergency power and normal power systems.
- E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

- F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- H. Box Locations:
  - 1. Locate boxes to be accessible.
  - 2. Unless dimensioned, box locations indicated are approximate.
  - 3. Locate boxes as required for devices installed under other sections or by others.
  - 4. Locate boxes so that wall plates do not span different building finishes.
  - 5. Locate boxes so that wall plates do not cross masonry joints.
  - 6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
  - 7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches (150 mm) horizontal separation unless otherwise indicated.
  - 8. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
    - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) separation where wall is constructed with individual noncommunicating stud cavities.
    - b. Do not install flush-mounted boxes with area larger than 16 square inches (0.0103 sq m) or such that the total aggregate area of openings exceeds 100 square inches (0.0645 sq m) for any 100 square feet (9.29 sq m) of wall area.
  - 9. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
  - 10. Locate junction and pull boxes in the following areas, unless otherwise indicated:
    - a. Concealed above accessible suspended ceilings.
    - b. Within joists in areas with no ceiling.
    - c. Electrical rooms.
    - d. Mechanical equipment rooms.
- I. Box Supports:
  - 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
  - 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
  - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
  - 4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.
- J. Install boxes plumb and level.
- K. Flush-Mounted Boxes:
  - 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
  - 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
  - 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.
- L. Install boxes as required to preserve insulation integrity.

- M. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified.
- N. Close unused box openings.
- O. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- P. Provide grounding and bonding in accordance with Section 260526.
- Q. Identify boxes in accordance with Section 260553.

**3.03 CLEANING**

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

**3.04 PROTECTION**

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

**END OF SECTION**

**SECTION 260553  
IDENTIFICATION FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Voltage markers.
- E. Underground warning tape.
- F. Floor marking tape.
- G. Warning signs and labels.

**1.02 RELATED REQUIREMENTS**

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- B. Section 262726 - Wiring Devices: Device and wallplate finishes; factory pre-marked wallplates.

**1.03 REFERENCE STANDARDS**

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2023.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2023.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 70E - Standard for Electrical Safety in the Workplace; 2024.
- E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
  - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
  - 2. Do not install identification products until final surface finishes and painting are complete.

**1.05 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.

**1.06 FIELD CONDITIONS**

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

**PART 2 PRODUCTS**

**2.01 IDENTIFICATION REQUIREMENTS**

- A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.
- B. Identification for Equipment:
  - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
    - a. Switchboards:

- 1) Identify power source and circuit number. Include location when not within sight of equipment.
- 2) Use identification nameplate to identify load(s) served for each branch device.
- b. Panelboards:
  - 1) Identify power source and circuit number. Include location when not within sight of equipment.
  - 2) Use typewritten circuit directory to identify load(s) served for panelboards with a door.
  - 3) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
- c. Enclosed switches:
  - 1) Identify voltage and phase.
  - 2) Identify power source and circuit number.
  - 3) Identify load(s) served. Include location.
2. Use identification label on inside of door at each fused switch to identify required NEMA fuse class and size.
3. Use identification label at each motor controller to identify nameplate horsepower, full load amperes, code letter, service factor, voltage, and phase of motor(s) controlled.
4. Use field-painted floor markings, floor marking tape, or warning labels to identify required equipment working clearances where indicated or where required by the authority having jurisdiction.
  - a. Field-Painted Floor Markings: Alternating black and white stripes, 3 inches (76 mm) wide.
- C. Identification for Conductors and Cables:
  1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
- D. Identification for Raceways:
  1. Use voltage markers to identify highest voltage present for accessible conduits 2 inch (53 mm) trade size and larger at maximum intervals of 20 feet (6.1 m).
- E. Identification for Boxes:
  1. Use voltage markers to identify highest voltage present.
- F. Identification for Devices:
  1. Use identification label to identify serving branch circuit for all receptacles.
    - a. For receptacles in public areas, provide identification on inside surface of wallplate.

## 2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
  1. Materials:
    - a. Indoor Clean, Dry Locations: Use plastic nameplates.
    - b. Outdoor Locations: Use stainless steel or aluminum nameplates suitable for exterior use.
  2. Plastic Nameplates: Two-layer or three-layer laminated electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
    - a. Exception: Provide minimum thickness of 1/8 inch (3 mm) when any dimension is greater than 4 inches (100 mm).
  3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
  4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
  5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.
- B. Identification Labels:
  1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.

- a. Use only for indoor locations.
- 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
  - 1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
  - 2. Legend:
    - a. Equipment designation or other approved description.
    - b. Other information as indicated.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height:
    - a. Equipment Designation: 1/2 inch (13 mm).
    - b. Other Information: 1/4 inch (6 mm).
    - c. Exception: Provide minimum text height of 1 inch (25 mm) for equipment located more than 10 feet (3.0 m) above floor or working platform.
  - 5. Color:
    - a. Normal Power System: White text on black background.
- D. Format for General Information and Operating Instructions:
  - 1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
  - 2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 1/4 inch (6 mm).
  - 5. Color: Black text on white background unless otherwise indicated.
- E. Format for Receptacle Identification:
  - 1. Minimum Size: 3/8 inch (10 mm) by 1.5 inches (38 mm).
  - 2. Legend: Power source and circuit number or other designation indicated.
  - 3. Text: All capitalized unless otherwise indicated.
  - 4. Minimum Text Height: 3/16 inch (5 mm).
  - 5. Color: Black text on clear background.

### **2.03 WIRE AND CABLE MARKERS**

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
  - 1. Do not use self-adhesive type markers.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
  - 1. Do not use handwritten text.
- E. Minimum Text Height: 1/8 inch (3 mm).
- F. Color: Black text on white background unless otherwise indicated.

### **2.04 VOLTAGE MARKERS**

- A. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.
- B. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl type markers.
- C. Minimum Size:
  - 1. Markers for Equipment: 1 1/8 by 4 1/2 inches (29 by 110 mm).
  - 2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.

3. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches (29 by 110 mm).
  4. Markers for Junction Boxes: 1/2 by 2 1/4 inches (13 by 57 mm).
- D. Color: Black text on orange background unless otherwise indicated.

## **2.05 FLOOR MARKING TAPE**

- A. Floor Marking Tape for Equipment Working Clearance Identification: Self-adhesive vinyl or polyester tape with overlamine, 3 inches (76 mm) wide, with alternating black and white stripes.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
1. Surface-Mounted Equipment: Enclosure front.
  2. Flush-Mounted Equipment: Inside of equipment door.
  3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
  4. Elevated Equipment: Legible from the floor or working platform.
  5. Branch Devices: Adjacent to device.
  6. Interior Components: Legible from the point of access.
  7. Conduits: Legible from the floor.
  8. Boxes: Outside face of cover.
  9. Conductors and Cables: Legible from the point of access.
  10. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
1. Do not use adhesives on exterior surfaces except where substrate cannot be penetrated.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Secure rigid signs using stainless steel screws.
- G. Mark all handwritten text, where permitted, to be neat and legible.

### **3.03 FIELD QUALITY CONTROL**

- A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

**END OF SECTION**

**SECTION 262416  
PANELBOARDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Overcurrent protective devices for panelboards.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

**1.03 REFERENCE STANDARDS**

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2025.
- D. NEMA BS 31047 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013 (Reaffirmed 2023).
- E. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- F. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).
- G. NEMA PB 1 - Panelboards; 2011.
- H. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000V or Less; 2023.
- I. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- L. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- M. UL 67 - Panelboards; Current Edition, Including All Revisions.
- N. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.
- O. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- P. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.
- Q. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- R. UL 1053 - Ground-Fault Sensing and Relaying Equipment; Current Edition, Including All Revisions.
- S. UL 1699 - Arc-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

#### **1.08 FIELD CONDITIONS**

- A. Maintain ambient temperature within the following limits during and after installation of panelboards:
  1. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

### **PART 2 PRODUCTS**

#### **2.01 OVERCURRENT PROTECTIVE DEVICES**

- A. Molded Case Circuit Breakers:
  1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the drawings.
  2. Interrupting Capacity:
    - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
      - 1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
      - 2) 14,000 rms symmetrical amperes at 480 VAC.
    - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
    - c. Series Rated Systems: Provide circuit breakers listed in combination with upstream devices to provide interrupting rating not less than the short circuit current rating indicated.
  3. Conductor Terminations:
    - a. Provide mechanical lugs unless otherwise indicated.

- b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
- 4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
  - a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
- 5. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
  - a. Provide the following field-adjustable trip response settings:
    - 1) Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
    - 2) Long time delay.
    - 3) Short time pickup and delay.
    - 4) Instantaneous pickup.
- 6. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
- 7. Provide the following circuit breaker types where indicated:
  - a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
  - b. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for protection of equipment.
  - c. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Combination type listed as complying with UL 1699.
  - d. 100 Percent Rated Circuit Breakers: Listed for application within the panelboard where installed at 100 percent of the continuous current rating.
  - e. Current Limiting Circuit Breakers: Without using fusible elements, designed to limit the let-through energy to a value less than the energy of a one-half cycle wave of the symmetrical prospective current when operating within its current limiting range.
- 8. Do not use tandem circuit breakers.
- 9. Do not use handle ties in lieu of multi-pole circuit breakers.
- 10. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 INSTALLATION**

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Provide grounding and bonding in accordance with Section 260526.
  - 1. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on isolated/insulated ground bus.
- D. Install all field-installed branch devices, components, and accessories.
- E. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
- F. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.
- G. Set field-adjustable circuit breaker tripping function settings as indicated.

- H. Provide filler plates to cover unused spaces in panelboards.
- I. Identify panelboards in accordance with Section 260553.

### **3.03 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1. Tests listed as optional are not required.
  - 1. Perform insulation-resistance tests on all control wiring with respect to ground.
  - 2. Test functions of the trip unit by means of secondary injection.
- C. Test GFCI circuit breakers to verify proper operation.
- D. Test AFCI circuit breakers to verify proper operation.
- E. Correct deficiencies and replace damaged or defective panelboards or associated components.

### **3.04 ADJUSTING**

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.

### **3.05 CLEANING**

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

**END OF SECTION**

**SECTION 262726  
WIRING DEVICES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Receptacles.
- B. Wall plates and covers.

**1.02 RELATED REQUIREMENTS**

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
- C. Section 260533.16 - Boxes for Electrical Systems.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

**1.03 REFERENCE STANDARDS**

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2014h (Validated 2022).
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification); 2017g (Validated 2023).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- E. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- F. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2020).
- G. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2021.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- J. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- K. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- L. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- M. UL 1310 - Class 2 Power Units; Current Edition, Including All Revisions.
- N. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.
- O. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.
- P. UL 1699A - Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- Q. UL 1917 - Solid-State Fan Speed Controls; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
  - 2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
  - 3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
  - 4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.

5. Coordinate the core drilling of holes for poke-through assemblies with the work covered under other sections.
  6. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.
- B. Sequencing:
1. Do not install wiring devices until final surface finishes and painting are complete.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- B. Project Record Documents: Record actual installed locations of wiring devices.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Products: Listed, classified, and labeled as suitable for the purpose intended.
- E. Product Evaluation and Listing Organization Qualifications: Organization engaged in evaluation of products and services, including those recognized by OSHA as Nationally Recognized Testing Laboratories (NRTL), and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND PROTECTION**

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

### **PART 2 PRODUCTS**

#### **2.01 WIRING DEVICES - GENERAL REQUIREMENTS**

- A. Provide wiring devices suitable for intended use with ratings adequate for load served.
- B. Wiring Device Applications:
  1. Receptacles Installed Outdoors or in Damp or Wet Locations: Use weather-resistant GFCI receptacles with weatherproof covers.
  2. Receptacles Installed in Dwelling Units: Use tamper-resistant receptacles.
  3. Provide GFCI protection for:
    - a. Receptacles installed within 6 feet (1.8 m) of sinks.
    - b. Receptacles installed in kitchens.
    - c. Receptacles serving electric drinking fountains.
  4. Single Receptacles Installed on Individual Branch Circuits: Provide receptacle ampere rating equal to branch circuit rating.
- C. Wiring Device Finishes:
  1. Provide wiring device finishes as described below, unless otherwise indicated.
  2. Wiring Devices, Unless Otherwise Indicated: Ivory with white nylon wall plate.
  3. Wiring Devices Installed in Finished Spaces: Ivory with white nylon wall plate.
  4. Wiring Devices Installed in Unfinished Spaces: Ivory with galvanized steel wall plate.

#### **2.02 RECEPTACLES**

- A. General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498; types as indicated on the drawings.
  1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
  2. NEMA configurations specified are according to NEMA WD 6.
- B. Convenience Receptacles:

1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
- C. GFCI Receptacles:
1. General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
    - a. Provide test and reset buttons of same color as device.
  2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R.
  3. Tamper Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as tamper resistant type.
- D. AFCI Receptacles:
1. General Requirements: Feed-through protection and light to indicate arc fault tripped condition and loss of protection; listed as complying with UL 1699A.
    - a. Provide test and reset buttons of same color as device.
  2. Tamper Resistant AFCI Receptacles: Commercial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as tamper resistant type.
  3. Dual Function AFCI/GFCI Receptacles: Commercial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as AFCI and GFCI type.

### **2.03 WALL PLATES AND COVERS**

- A. Wall Plates: Comply with UL 514D.
1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
  2. Size: Standard.
  3. Screws: Metal with slotted heads finished to match wall plate finish.
- B. Nylon Wall Plates: Smooth finish, high-impact thermoplastic.
- C. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.

### **3.02 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### **3.03 INSTALLATION**

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.
  1. Mounting Heights: Unless otherwise indicated, as follows:

- a. Receptacles: 18 inches (450 mm) above finished floor or 6 inches (150 mm) above counter.
- 2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.
- E. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- F. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- G. For isolated ground receptacles, connect wiring device grounding terminal only to identified branch circuit isolated equipment grounding conductor. Do not connect grounding terminal to outlet box or normal branch circuit equipment grounding conductor.
- H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.
- I. Unless otherwise indicated, GFCI receptacles may be connected to provide feed-through protection to downstream devices. Label such devices to indicate they are protected by upstream GFCI protection.
- J. Unless otherwise indicated, AFCI receptacles may be connected to provide feed-through protection to downstream devices. Label such devices to indicate they are protected by upstream AFCI protection.
- K. Where split-wired duplex receptacles are indicated, remove tabs connecting top and bottom receptacles.
- L. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- M. Install vertically mounted receptacles with grounding pole on
- N. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings.
- O. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- P. Identify wiring devices in accordance with Section 260553.

#### **3.04 FIELD QUALITY CONTROL**

- A. Inspect each wiring device for damage and defects.
- B. Test each receptacle to verify operation and proper polarity.
- C. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- D. Test each AFCI receptacle for proper tripping operation according to manufacturer's instructions.
- E. Correct wiring deficiencies and replace damaged or defective wiring devices.

#### **3.05 ADJUSTING**

- A. Adjust devices and wall plates to be flush and level.

#### **3.06 CLEANING**

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

**END OF SECTION**

**SECTION 262816.16  
ENCLOSED SWITCHES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Enclosed safety switches.
- B. Enclosed fused power-circuit devices.

**1.02 RELATED REQUIREMENTS**

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 262813 - Fuses.

**1.03 REFERENCE STANDARDS**

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- B. NEMA BS 31047 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013 (Reaffirmed 2023).
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.
- I. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.
- J. UL 977 - Fused Power-Circuit Devices; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
  - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  - 3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
  - 4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

**1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

**1.06 QUALITY ASSURANCE**

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

#### **1.08 FIELD CONDITIONS**

- A. Maintain ambient temperature between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C) during and after installation of enclosed switches.

### **PART 2 PRODUCTS**

#### **2.01 ENCLOSED SAFETY SWITCHES**

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
  - 1. Altitude: Less than 6,600 feet (2,000 m).
  - 2. Ambient Temperature: Between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C).
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
- G. Provide with switch blade contact position that is visible when the cover is open.
- H. Fuse Clips for Fusible Switches: As required to accept fuses indicated.
  - 1. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.
- I. Conductor Terminations: Suitable for use with the conductors to be installed.
- J. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.
- K. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- L. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
  - 1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
    - a. Indoor Clean, Dry Locations: Type 1.
    - b. Outdoor Locations: Type 3R.
  - 2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.
- M. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- N. Heavy Duty Switches:

1. Comply with NEMA BS 31047.
  2. Conductor Terminations:
    - a. Provide mechanical lugs.
    - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
  3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.
- O. Provide the following features and accessories where indicated or where required to complete installation:
1. Hubs: As required for environment type; sized to accept conduits to be installed.
  2. Integral fuse pullers.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed safety switches.
- D. Verify that conditions are satisfactory for installation prior to starting work.

#### **3.02 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 260526.
- H. Provide fuses for fusible switches as indicated or as required by equipment manufacturer's recommendations.
- I. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
- J. Identify enclosed switches in accordance with Section 260553.

#### **3.03 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

#### **3.04 ADJUSTING**

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

#### **3.05 CLEANING**

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

**END OF SECTION**

**APPENDIX A - SUPPLEMENTAL REQUIREMENTS**

**1. Virginia Housing Minimum Cabinet Requirements Version 2025.1**



# Virginia Housing Minimum Cabinet Requirements

To insure durability while also recognizing the needs of different developments, the construction of all new kitchen and bathroom vanity cabinets is to meet or exceed the applicable Virginia Housing Minimum Cabinet Requirement below. These minimum cabinet requirements are to be incorporated into **all** Virginia Housing financed and Low Income Housing Tax Credit (LIHTC) project specifications for cabinets. All cabinets are to comply with the requirements of the American National Standard Institute (**ANSI**) and must be currently certified by either the Kitchen Cabinet Manufacturers' Association (**KCMA**) or the International Code Council (**ICC**).

## MINIMUM CABINET REQUIREMENTS FOR ALL DEVELOPMENTS UTILIZING HOUSING TAX CREDITS (LIHTC):

### FACE FRAMES:

- Solid wood; minimum dimensions 3/4 inch by 1-1/2 inch.

### END PANELS, TOPS, and BOTTOMS:

- Plywood, particleboard, or medium/high-density fiberboard; minimum thickness 1/2 inch.
- Tops and bottoms to be dadoed, glued, and stapled into sides and face frames. No butt joints will be accepted.
- All kitchen sink base bottoms and bathroom vanity sink bottoms to be plywood; minimum thickness 1/2 inch.

### BACKS:

- Plywood, or hardboard; minimum thickness 1/4 inch or 1/8 inch with nailing strip.
- Particleboard, or medium/high-density fiberboard; minimum thickness 3/8 inch or 1/8 inch with nailing strip.
- Backs to be dadoed or rabbeted, glued, and stapled into end panels. No butt joints will be accepted.

### SHELVES:

- Solid wood, plywood, particleboard, or medium/high-density fiberboard.
- Adjustable shelves; minimum thickness 5/8 inch. Fixed shelves; minimum thickness 1/2 inch.
- Edge banding required except on solid wood.

### DOORS and DRAWER FRONTS:

- Solid wood, plywood, or medium/high-density fiberboard; minimum thickness 5/8 inch.
- Inset panel thickness; medium/high-density fiberboard minimum 1/4 inch, solid wood or plywood minimum 1/8 inch.
- Medium/high-density fiberboard (not including inset panel) must have plastic laminate finish on all sides.

### DRAWER BOXES:

- Solid wood or plywood; minimum thickness 1/2 inch.
- Sides to be dadoed, rabbeted, or dove tailed with front and back members. No butt joints will be accepted.

### DRAWER BOTTOMS:

- Plywood; minimum thickness 1/4 inch.
- Bottoms dadoed, and glued and/or factory stapled into drawer box.

### DRAWER GUIDES:

- Dual mounted steel rails.

### EXPOSED PORTIONS OF CABINETRY:

- Thermofoil finishes are prohibited. Melamine-type finishes are prohibited except on inner cabinet surfaces and shelves.

## MINIMUM CABINET REQUIREMENTS FOR ALL DEVELOPMENTS NOT UTILIZING HOUSING TAX CREDITS (LIHTC):

- End panels, frames, tops, bottoms, and backs; solid wood, plywood, particleboard, or medium/high-density fiberboard.
- Frameless cabinets permitted with end panels and full-width front and rear stretchers; minimum thickness 3/4 inch plywood.
- All kitchen sink base bottoms and bathroom vanity sink bottoms to be plywood, minimum thickness 1/2 inch.
- Doors and drawer fronts; solid wood, plywood, or medium/high-density fiberboard.
- Tops, bottoms, sides, and face frames to be glued, with dowels, biscuits, screws, or staples (staples require dadoes).
- Backs to be glued, dadoed or rabbeted, and stapled or screwed into end panels. No butt joints will be accepted.

## Notes

- All cabinets to be factory/manufacturer assembled and **have either KCMA or ICC certification confirmation sticker.**
- All exposed portions of cabinetry must have factory applied finish. Exposed end panels and outside faces may not reveal any fasteners.
- Wall cabinets are to be fastened to in-wall blocking with a minimum of four washer head cabinet screws; two in each upper and lower nailing strip for each wall cabinet.
- Plastic laminate countertops must be post-formed or have back splashes factory attached and sealed.
- Side splashes are required where countertops are adjacent to walls.
- Submit signed Virginia Housing Cabinet Review Form and manufacturer's specification sheets for each property to Virginia Housing's A&E Department for review at [cabinets@virginiahousing.com](mailto:cabinets@virginiahousing.com).
- The Cabinet Review Form requires three signatures:  
**a)** The Cabinet Supply Company Representative **b)** The General Contractor (the person responsible for ordering cabinets) **c)** The Architect
- Written acceptance from Virginia Housing is required before purchasing cabinets.
- If requested, a cabinet sample is to be provided at the job site for inspection and acceptance. Please allow two weeks for the review process.
- Virginia Housing reserves the right to modify these requirements when deemed appropriate.



# Virginia Housing Cabinet Review Form

## Cabinet Supplier to Complete

Project Name: \_\_\_\_\_ Request Date: \_\_\_\_\_

Project Location: \_\_\_\_\_ Cabinet Manufacturer/Model: \_\_\_\_\_

Virginia Housing Deal Number: \_\_\_\_\_ KCMA or ICC, and Certification #: \_\_\_\_\_

### Face Frames

Material: \_\_\_\_\_ Thickness x Width: \_\_\_\_\_ Finish: \_\_\_\_\_  
Are cabinets frameless? (non-LIHTC developments only) YES  NO

### End Panels, Tops and Bottoms

Material: \_\_\_\_\_ Thickness: \_\_\_\_\_ Finish: \_\_\_\_\_  
Are all cabinet assemblies fully glued? YES  NO  What connection is used? Dowel  Biscuit  Screw  Staple+dado

### Kitchen and Vanity Sink Bottoms

Material: \_\_\_\_\_ Thickness: \_\_\_\_\_ Finish: \_\_\_\_\_  
Are all cabinet assemblies fully glued? YES  NO  What connection is used? Dowel  Biscuit  Screw  Staple+dado

### Cabinet Backs

Material: \_\_\_\_\_ Thickness: \_\_\_\_\_ Finish: \_\_\_\_\_  
Do all cabinets have nailing strips? YES  NO  Thickness: \_\_\_\_\_  
Are backs dadoed/rabbeted + fully glued into end panels? YES  NO  What connection is used? Screw  Staple

### Shelves

Adjustable Shelf Material: \_\_\_\_\_ Thickness: \_\_\_\_\_ Finish: \_\_\_\_\_  
Fixed Shelf Material: \_\_\_\_\_ Thickness: \_\_\_\_\_ Finish: \_\_\_\_\_  
Are shelves edge banded if not solid wood? YES  NO

### Door and Drawer Fronts

Door/Door Frame Material: \_\_\_\_\_ Thickness: \_\_\_\_\_ Finish: \_\_\_\_\_  
If Door Inset Panel, Panel Material: \_\_\_\_\_ Thickness: \_\_\_\_\_ Finish: \_\_\_\_\_  
If MDF/HDF door, is plastic laminate on all six sides? YES  NO

### Drawer Boxes

Material: \_\_\_\_\_ Thickness: \_\_\_\_\_ Finish: \_\_\_\_\_  
What corner joint is used in the box construction? Dado  Rabbet  Dovetail  Other : \_\_\_\_\_

### Drawer Bottoms

Material: \_\_\_\_\_ Thickness: \_\_\_\_\_ Finish: \_\_\_\_\_  
Are bottoms dadoed into drawer box? YES  NO  Are bottoms glued/stapled into drawer box? Glued  Stapled  NA

### Drawer Guides

Are guides double suspension with steel rails? YES  NO

### Certifying Cabinet Supplier representative

Company Name: \_\_\_\_\_  
Representative Name: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Email: \_\_\_\_\_

### Certifying General Contractor representative

Company Name: \_\_\_\_\_  
Representative Name: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Email: \_\_\_\_\_

### Certifying Architect representative

Company Name: \_\_\_\_\_  
Representative Name: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Email: \_\_\_\_\_

Send Completed Signed form to: Email – [Cabinets@virginiahousing.com](mailto:Cabinets@virginiahousing.com)

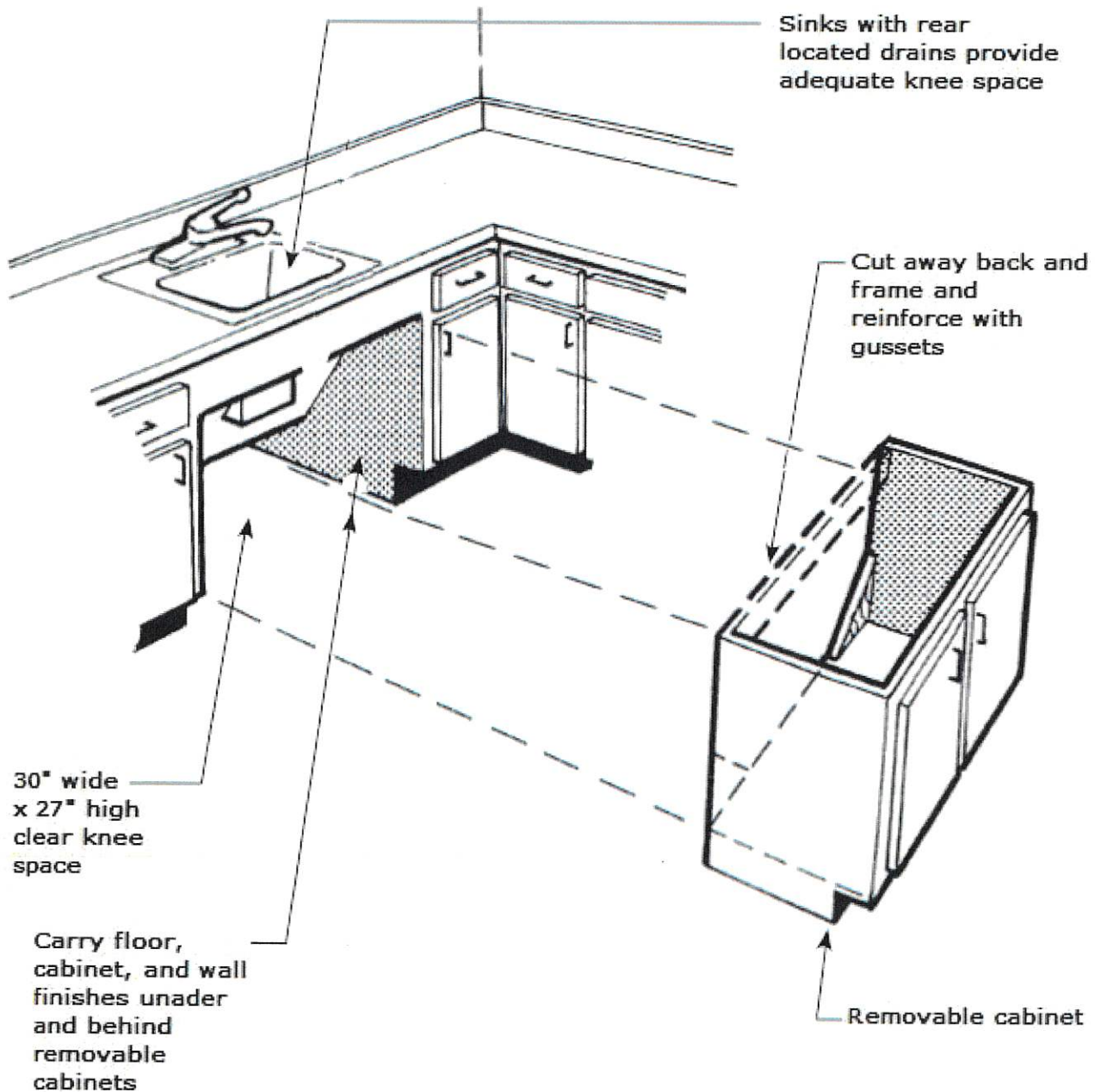
### Virginia Housing Use Only

Accepted Not Accepted Reviewer: \_\_\_\_\_ Date: \_\_\_\_\_

If Not Accepted, Explain: \_\_\_\_\_

## Preferred Removable Cabinet Detail

This detail is the preferred *Fair Housing Act Removable Base Cabinet Detail*. This detail is not a Virginia Housing requirement. All removable cabinet designs are acceptable as long as they meet the Virginia Housing Minimum Cabinet Requirements. This detail was borrowed from the *Fair Housing Act Design Manual*, Part Two, Chapter 7, Section 7.12



ATTACHMENT "B"

**PRICING SHEET**  
**Alterations to Pinecroft**  
**75 Wellesley Drive**  
**Newport News, VA 23602**

Company Name: \_\_\_\_\_

Total Bid Price: \$ \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

DATE: \_\_\_\_\_



ATTACHMENT "C"

**TERMS AND CONDITIONS**

1. **ADMINISTRATIVE APPEAL PROCEDURES:** NNRHA has established an administrative procedure for hearing protests of a decision to award, or an award, appeals from refusals to allow withdrawal of bids or proposals, appeals from disqualification's and determinations of non-responsibility, and appeals from decisions on disputes arising during the performance of the contract. Administrative appeals procedures can be obtained through the Division of Purchasing. If the dispute is regarding the contract, the Contractor shall proceed diligently with performance, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the Procurement Officer or the Contracting Officer.

A protest of a decision to award or an award shall be submitted within ten (10) days after the award or the announcement of the decision to award, whichever occurs first. An appeal from refusal to allow withdrawal of a solicitation shall be submitted within ten (10) days after receipt of the decision. An appeal from a determination of non-responsibility shall be submitted within ten (10) days after receipt of the decision. An appeal from a decision resulting from a contract dispute shall be submitted within sixty (60) days after final payment; however, written notice of the Contractor's intention to file such claim shall have been given at the time of the occurrence of the work upon which the claim is based.

Contractors are prohibited from placing a lien on NNRHA's property. This prohibition shall apply to all Subcontractors.

2. **ADVERTISEMENT:** It is understood and agreed that, in the event a contract is awarded for the services included in this solicitation, no indications of such services to NNRHA will be used in any way in product literature or advertising without written approval of NNRHA except for bibliographical and curriculum vitae purposes and when required in response to a request for solicitation by a prospective client.
3. **ANTI-DISCRIMINATION AND A DRUG FREE WORKPLACE:** By submitting their bids or proposals, bidders or offerors certify to NNRHA that they will conform to the provisions of the Federal Civil Rights Act of 1964, the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginians with Disabilities Act, The Americans with Disabilities Act and 2.2-4311 and 2.2-4312 of the Virginia Public Procurement Act. If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and programs funded with public funds shall be subject to audit by the public body.

In every contract over \$10,000 the following provisions apply. (1) During the performance of this contract, the Contractor agrees to: (a) Not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability or any other basis prohibited by state law relating to discrimination in

employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. (b) Provide a drug-free workplace for the Contractor's employees. (c) The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause. Also, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition. (d) In all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer and maintains a drug-free workplace. (e) Notices, advertisements, and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting these requirements. (2) The Contractor will include the provisions above in every subcontract or purchase order over \$10,000, so that the provision will be binding upon each Subcontractor or vendor.

For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a Contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

4. **ANTITRUST:** By entering into a contract, the Contractor conveys, sells, assigns, and transfers to NNRHA all rights, title and interest in and to all causes of action it may now have or hereafter acquire under the antitrust laws of the United States and the Commonwealth of Virginia relating to the particular goods or services purchased or acquired under said contract.
5. **APPLICABLE LAW AND COURTS:** This solicitation and any contract resulting from this solicitation shall be governed in all respects by the laws of the Commonwealth of Virginia and any litigation with respect thereto shall be brought in the courts of the City of Newport News, VA. The Contractor shall comply with all applicable federal, state, local laws and regulations. The Contractor shall procure any permits and licenses required for its business as the services to be provided by it hereunder.
6. **ASBESTOS:** Whenever and wherever during the course of performing any work under this contract, the Contractor discovers the presence of asbestos or suspect that asbestos is present; the Contractor shall stop the work immediately, secure the area, notify the building owner and await positive identification of the suspect material. During the downtime in such a case, the Contractor shall not disturb any surrounding surfaces but shall protect the area with suitable dust covers. In the event the Contractor is delayed due to the discovery of asbestos or suspected asbestos, then a mutually agreed extension of time to perform the work shall be allowed the Contractor but without additional compensation due to the time extension.
7. **ASSIGNMENT OF CONTRACT:** A contract shall not be assignable by the Contractor in whole or in part without the written consent of NNRHA.
8. **AUDIT:** The Contractor shall retain all books, records, and other documents relative to this contract for five (5) years after final payment, or until audited, whichever is sooner. The agency, its authorized agents, and/or state and federal auditors shall have full access to and the right to examine any of said materials during said period.

9. **AVAILABILITY OF FUNDS:** It is understood and agreed between the parties herein that NNRHA shall be bound hereunder only to the extent of the funds available or which may hereafter become available for the purpose of this agreement.
10. **AWARD OF CONTRACT:** Formal and informal bids and proposals will be awarded to the lowest responsible and responsive bidder(s) or most suitable offeror. The quality of the articles to be supplied, their conformity with the specifications, their suitability to the requirements of NNRHA, and the delivery terms will be taken into consideration in making an award. Length of time for delivery as well as price may be considered in awarding of the contract. NNRHA is not liable for any cost incurred by the Contractor prior to issuance of a contract.

NNRHA also reserves the right to make multiple awards, by line item, lot, award based on overall lowest pricing, cancel or reject any or all bids or proposals, in whole or in part, to waive informalities and to delete items prior to making the award, whenever it is deemed in the sole opinion of NNRHA to be in its best interest. Nothing herein shall bind NNRHA to purchase any services or specified quantity of an item/product. Be it further understood that NNRHA shall not be obligated to purchase or pay for any services or product listed unless and until officially ordered and received by NNRHA. NNRHA also reserves the right not to award a contract pursuant to this solicitation.

11. **BID/OFFER ACCEPTANCE PERIOD:** Any bid or offer in response to a solicitation shall be valid for ninety (90) days. At the end of the ninety (90) days the bid or offer may be withdrawn at the written request of the Bidder or Offeror. If the bid or offer is not withdrawn at that time it remains in effect until an award is made or the solicitation is canceled.
12. **CANCELLATION OF CONTRACT:** NNRHA reserves the right to cancel and terminate any resulting contract, in part or in whole, without penalty, upon thirty (30) days written notice to the Contractor. Any contract cancellation notice shall not relieve the Contractor of the obligation to deliver and/or perform on all outstanding orders issued prior to the effective date of cancellation.
13. **CHANGES TO THE CONTRACT:** The parties may agree in writing to modify the scope of the contract. An increase or decrease in the price of the contract resulting from such modification shall be agreed to by the parties as a part of their written agreement to modify the scope of the contract. However, the terms and conditions of the contract will not change.

NNRHA may order changes within the general scope of the contract at any time by written notice to the Contractor. Such changes, including any increase or decrease in the amount of the Contractor's compensation, which are mutually agreed upon by and between the NNRHA and the Contractor, shall be incorporated in writing with a modification to the contract.

Contractor shall not perform any work that would result in exceeding the dollar limitation of this contract and/or purchase order without first supplying a quotation and obtaining written approval from the Division of Procurement.

14. **CLEAN AIR AND WATER EPS, ENERGY EFFICIENCY (APPLICABLE TO CONTRACTS IN EXCESS OF \$100,000):** The Contractor agrees to comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 U.S.C. 1857(h), Section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, EPA regulations (40 CFR Part 15) and Energy Policy and Conservation Act (Pub. L. 94-163).

15. **CONFLICT OF INTEREST:** The Contractor warrants that he has fully complied with the State and Local Government Conflict of Interests Act (Section 2.1-639.1 et seq. of the Code of Virginia), The Virginia Governmental Frauds Act (Section 18.2-498.1 et seq.), Articles 2 and 3 of Chapter 10 (Crimes Against the Administration of Justice) of Title 18.2, and article 4 (Ethics in Public Contracting) of the Public Procurement Act (section 11-72 et seq.).

16. **CONTRACT DOCUMENTS:** The contract entered into by the parties shall consist of this solicitation, the signed bid or proposal submitted by the Contractor, the notice of award, purchase order, the general and special terms and conditions, and specifications with drawings, if any, including all addenda or modifications thereof, all which shall be referred to collectively as the Contract Documents.

17. **CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR) AS NNRHA'S AGENT:**

NNRHA will provide the Contractor the name of the designated representative(s) to administer this contract with the following responsibilities:

- A. Coordinating with the Contractor when services are needed and when they will begin.
- B. Day-to-day coordination of this service and assurance that services are delivered in accordance with the contract terms and conditions and purchase order.
- C. Promptly address problems or deviations from contract requirements or terms and conditions. If the problems or contract deviations continue, forward written vendor complaint, including recommended solutions, to the Procurement Officer so that adequate corrective action can be taken.
- D. Assurance that the contract dollar amount or terms and conditions are not exceeded, increased, decreased or modified in any way without prior authorization from the Procurement Officer. If a modification or revision is required, supply the Procurement Officer with an approved change order request.
- E. After completion, promptly sign and date documents indicating the work has been completed and accepted.
- F. Complete and submit periodic evaluations of Contractor performance to the Procurement Officer.

18. **CONTRACTOR PERSONNEL:** The Contractor represents that it will secure, at its own expense, all personnel necessary to perform the required services hereunder. Such personnel shall not be employees of NNRHA nor shall they have any contractual relationship with NNRHA. All commitments made by the Contractor in the bid or proposal with respect to (i) the Contractor's qualifications and its satisfaction of mandatory requirements in the IFB or RFP and (ii) the number and qualifications of its personnel to be assigned to this Contract, shall be incorporated herein by this reference.

All the required services will be performed by the Contractor or under its supervision, and all personnel employed by the Contractor shall be fully qualified and shall be authorized or permitted under State and Local law to perform such services. The Contractor shall not reassign any personnel specifically designated in the Bid or Proposal to perform services under this Contract without NNRHA's prior approval. The Contractor certifies that it will comply with NNRHA's request for the reassignment of any employee performing the required services hereunder when NNRHA determines, in its reasonable opinion that such employee is not suited to work on this Contract. Evidence of qualifications shall be made available to NNRHA upon request.

19. **CONTRACTOR REGISTRATION:** For construction contracts involving removal, repair or improvement of a building or other real property the following license is required.

**Class A Contractors License:** when the total value of a single contract or project is \$120,000.00 or more or is \$750,000.00 or more over a 12-month period. The qualified individual identified for this license must have at least 5 years of experience.

**Class B Contractors License:** when the total value of a single contract or project is \$10,000.00 or more, but less than \$120,000.00, or is \$150,000.00 or more, but less than \$750,000.00 over a 12-month period. The qualified individual identified for this license must have at least 3 years of experience.

**Class C Contractors License:** when the total value of a single contract or project is over \$1,000.00 but no more than \$10,000.00 or is no more than \$150,000.00 over a 12-month period. The qualified individual identified for this license must have at least 2 years of experience.

Specialty designations beyond general contracting might include Plumbing or HVAC and will require further licensure.

The Board shall require a master tradesmen license as a condition of licensure for electrical, plumbing, heating, ventilation and air conditioning contractors.

Indicate what type of Contractor's license you hold and your Specialty.

Licensed Class A Virginia Contractor No \_\_\_\_\_ Specialty \_\_\_\_\_

Licensed Class B Virginia Contractor No \_\_\_\_\_ Specialty \_\_\_\_\_

Licensed Class C Virginia Contractor No \_\_\_\_\_ Specialty \_\_\_\_\_

If the bidder or offeror shall fail to provide this information in the bid/proposal or on the envelope containing the bid/proposal and shall fail to promptly provide their Contractor license number in writing when requested to do so before or after the opening of bids/proposals, they shall be deemed to be in violation of 54.1-1115 of the Code of Virginia (1950), as amended, and the bid/proposal will not be considered.

If the bidder fails to obtain the required license prior to submission of their bid, the bid shall not be considered.

20. **COPYRIGHT/PATENTS:** The Contractor guarantees to defend and save NNRHA, its agents and employees, harmless from liability, loss, damage and expense including reasonable counsel fees, resulting from any actual or claimed trademark, copyright, composition, secret process, patented or unpatented invention infringement, or any litigation based thereon, with respect to any part of the goods or services covered by this order.

21. **DEBARMENT/ SUSPENDED STATUS:** By submitting their response, bidders/offerors certifies, to the best of it's knowledge that they are not currently debarred or suspended by NNRHA, the Commonwealth of Virginia or the Federal Government from submitting offers or proposals on contracts of the type of goods and/or services covered by this solicitation, nor are they an agent of any person or entity that is currently so debarred or suspended.
22. **DEFAULT:** In case of failure to deliver goods or services in accordance with the contract terms and conditions, NNRHA, after oral and written notice, may procure them from other sources and hold the Contractor responsible for any resulting additional purchase and administrative costs. This remedy shall be in addition to any other remedies, which NNRHA, state and federal laws have in place.
23. **EQUAL OPPORTUNITY FOR BUSINESS AND UNEMPLOYED AND UNDEREMPLOYED PERSONS (HUD ACT OF 1968, SECTION 3):**

In accordance with Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S. C. 1701u, the Contractor shall, to the maximum extent practicable:

- (A) Provide training and employment opportunities to the unemployed and underemployed residents of the unit of local government or the metropolitan area (or non-metropolitan county) in which the project is located; and
- (B) Award contracts for work in connection with the project to business concerns, which are located in or owned in substantial part by persons residing in the same metropolitan area or non-metropolitan County as the project.

The Contractor shall insert or cause to be inserted this same provision in each subcontract.

24. **ETHICS IN PUBLIC CONTRACTING:** By signing their response, bidders/offerors certify that their bid/offer is made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other bidder, supplier, manufacturer or subcontractor in connection with their bids, and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged. NNRHA may recover the value of anything conveyed in violation of this subsection. Any false statement hereunder constitutes a felony and can result in a fine and imprisonment as well as civil damages.

25. **FACSIMILE SOLICITATIONS/REVISIONS**

- A. **Unsealed Bids/Unsealed Proposals and their Revisions:** May be accepted when using small purchase procedures. Facsimile bids, proposals and revisions to these must be completely received in the Purchasing Division prior to the date and time specified for receipt. The original copy of the facsimile transmission may be requested, if requested, must be received within five (5) business days. The Procurement Officer will designate the timing device used to document the receipt of bids; time printed on the top of the facsimile copy will not govern the time of receipt.

B. Sealed Bids/Sealed Proposals/Revisions: Will be accepted from a third party or an agent of the bidder, provided that the bids are submitted in a sealed envelope prior to the date and time specified for receipt. NNRHA staff shall not be considered as a third party. The bidder/offeror is responsible for arranging the third-party involvement and for faxing the complete bid to the third party, not just a summary or the cover sheet. The original bid and addenda may be requested and, if requested, must be received within five (5) business days. The Procurement Officer will designate the timing device used to document the receipt of bids or proposals. Additionally, vendors may appear at the offices of 227 27th Street with proper company and personal identification to make revisions. All revisions must be initiated by the person making the change. Bid must be returned to the Purchasing Division prior to due date and time to be considered. NNRHA will not accept revisions written on the outside of the sealed envelope.

26. INDEMNIFICATION: The Contractor, its heirs, legal representatives, next of kin, successors and assigns agrees to indemnify, defend and hold harmless NNRHA, its members, Commissioners, officers, agents, and employees from any claims, damages and actions of any kind or nature, whether at law or in equity, arising from or caused by the use of any materials, goods, or equipment of any kind or nature furnished by the Contractor, any services of any kind or nature furnished by the Contractor, provided that such liability is not attributable to the sole negligence of NNRHA or to failure of NNRHA to use the materials goods, or equipment in the manner already and permanently described by the Contractor.

27. IDENTIFICATION OF BID/PROPOSAL/MODIFICATION: Submittal package will be sealed and identified as follows:

From: \_\_\_\_\_

Name of Bidder/Offeror

Due Date & Time

\_\_\_\_\_  
Bidder/Offeror Address

\_\_\_\_\_  
Solicitation No. & Solicitation Title

Attn: Procurement Officer

28. IMMIGRATION REFORM AND CONTROL ACT OF 1986: By submitting their bid/proposal, bidders/offerors certify that they do not and will not during the performance of this contract employ illegal alien workers or otherwise violate the provisions of the Federal Immigration Reform and Control Act of 1986.

29. INSURANCE: By signing and submitting a bid/proposal under this solicitation, the Bidder/Offeror certifies that if awarded the contract, they will have the following insurance coverage at the time the contract is awarded. The Contractor will have five (5) working days, upon notice of intent to award, to supply the Certificate of Insurance. The Bidder/Offeror further certifies that the Contractor and any Subcontractors will maintain this insurance coverage during the entire term of the contract and that all insurance coverage will be provided by insurance companies authorized to sell insurance in Virginia by the Virginia State Corporation Commission. The Contractor's insurance company will

supply a Certificate of Insurance listing the below required limits and the Certificate of Insurance shall name NNRHA as an additional insured.

A. Minimum Insurance Coverages and Limits Required for Most Contracts:

B. Worker's Compensation – The Contractor shall also obtain and maintain worker's compensation insurance as required by statutory requirements and benefits, and in such policy limits as mandated, by the State and shall require any Subcontractor engaged by the Contractor to satisfy such requirement as well. Coverage is compulsory for employers of three or more employees, to include the employer. Contractors who fail to notify NNRHA of increases in the number of employees that change their workers' compensation requirements under the Code of Virginia during the course of the contract shall be in noncompliance with the contract.

C. Automobile Liability (minimum) – \$1,000,000 combined single limit.

D. Commercial General Liability (minimum) – \$1,000,000 per occurrence, \$2,000,000 general aggregate, including \$100,000 for fire damage. Commercial General Liability is to include bodily injury and property damage, personal injury and advertising injury, products and completed operations coverage. NNRHA must be named as an additional insured and so endorsed on the policy. The insurance for the additional insured shall be as broad as and at the same limits as that of the insured. Insurance shall be primary and any insurance maintained by the additionally insured shall be excess and non-contributory until all the limits of insurance have been exhausted through the payment of claims. All rights of subrogation are waived for the policies listed.

E. The Contractor shall indemnify, hold harmless and defend NNRHA, its officers, agents, servants, and employees from and against any claims, demands, losses, liabilities, and damages, causes of actions and costs and expenses of whatsoever kind or nature arising from or related to:

- 1) the provision of services by or the failure to provide any services or the use of any services or materials furnished (or made available) by the Contractor or its agents, servants or employees.
- 2) any conduct or misconduct of the Contractor or its agents, servants or employees not included in subparagraph (1) hereof and for which, its agents, servants or employees are alleged to be liable.
- 3) the negligence or other actionable fault of any Subcontractors engaged by the Contractor; or
- 4) claims, suits, actions or proceedings of whatsoever nature that are brought by the Contractor's employees, candidates for employment and statutory employees, as determined under the State worker's compensation laws.

If insurance is due to expire or renew during any contract period, it is the responsibility of the Contractor (including Subcontractors, as applicable) to furnish and assure that NNRHA, Division of Purchasing, is in receipt of a current insurance certificate noting evidence of coverage. Expired insurance coverage during the course of any contract can be cause for

immediate termination of all work, removal from NNRHA properties and cancellation of all contracts. Newport News Redevelopment & Housing Authority, P.O. Box 797, Newport News, VA 23607, will be named as additional insured on the certification with respect to the services being procured.

If the Contractor fails to supply the Procurement Officer the required certificate, the intent to award will be cancelled. Please see additional insurance requirements on HUD Form 5370 pertaining to builders risk insurance.

30. **INTEREST OF MEMBERS OF CONGRESS:** No member of or delegate to the Congress of the United States of America shall be admitted to any share or part of this contract or to any benefit that may arise there from.

31. **INTEREST OF MEMBERS, OFFICERS, OR EMPLOYEES AND FORMER MEMBERS, OFFICERS, OR EMPLOYEES:** No member, officer, or employee of NNRHA, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which NNRHA was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

32. **LIMITATIONS ON PAYMENTS MADE TO INFLUENCE CERTAIN FEDERAL FINANCIAL TRANSACTIONS:**

A. The Contractor agrees to comply with Section 1352 of Title 31, United States Code which prohibits the use of Federal appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement, or the modification of any Federal contract, grant, loan, or cooperative agreement.

B. The Contractor further agrees to comply with the requirement of the Act to furnish a disclosure (OMB Standard Form LLL, Disclosure of Lobbying Activities) if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

C. Indian Tribes (except those chartered by States) and Indian organizations as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U. S. C. 450B) are exempt from the requirements of this clause.

33. **MANDATORY USE OF NNRHA FORMS AND TERMS AND CONDITIONS:** Failure to submit a bid/offer on the official NNRHA forms provided for that purpose may be a cause for rejection of the bid/offer. Modification of or additions to the General Terms and Conditions of the solicitation may be cause for rejection of the bid/offer; however, NNRHA reserves the right to decide on a case-by-case basis, in its sole discretion, whether to reject such a solicitation.

34. **MINORITY BUSINESS PARTICIPATION:** The Contractor shall use its best efforts to comply with the commitment it has made in the Bid/Offer relative to the participation of businesses primarily (at least 51%) owned by minorities, women or public housing residents or small businesses (collectively, 'Disadvantaged Business Enterprises') in the performance of this Contract. By executing this Contract, the Contractor accepts the right of NNRHA to appoint an employee to monitor the Contractor's compliance with the commitments and requirements of this paragraph. The Contractor agrees to promptly submit reports to NNRHA on request detailing the level of participation by Disadvantaged Business Enterprises in this Contract. NNRHA shall have the right to review all relevant documents of the Contractor relating to the participation of Disadvantaged Business Enterprises in this Contract on an ongoing basis. NNRHA reserves the right to evaluate the Contractor's performance with regard to the commitments and requirements of this paragraph on an annual basis.

The Contractor shall take the following steps to assure that, whenever possible, subcontracts are awarded to minority firms, women's business enterprises, and labor area firms:

- A. Placing qualified small and minority businesses and women's business enterprises on solicitation lists.
- B. Assuring that small and minority businesses and women business enterprises are solicited whenever they are potential sources.
- C. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises.
- D. Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises; and
- E. Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and Local governmental small business agencies.

When such business has been subcontracted to these firms and upon completion of the contract; the Contractor agrees to furnish the purchasing office the following information: Name of firm, phone number, total dollar amount subcontracted, and type of product/service provided.

35. **MULTIPLE CONTRACTORS ON SITE:** NNRHA reserves the right to let other contracts in connection with this project or any other project. Contractors are expected to allow opportunity for the introduction of materials and performance and the coordination of work with each other. If work by the other Contractor impacts your work according to plans and specifications, it is the Contractor's responsibility to notify NNRHA COTR or Procurement Officer immediately.
36. **NO WAIVER:** No failure or delay by a party to insist on the strict performance of any term of this Contract, or to exercise any right or remedy consequent on a breach thereof, shall constitute a waiver of any breach or any subsequent breach of such term. Neither this Contract nor any of its terms may be changed or modified, waived, or terminated (unless as otherwise provided hereunder) except by an instrument in writing signed by the party against whom the enforcement of the change, waiver or termination is sought. No waiver of any breach shall affect or alter this contract,

but each and every term of this Contract shall continue in full force and effect with respect to any other than existing or subsequent breach thereof. The remedies provided in this Contract are cumulative and not exclusive of the remedies provided by law or in equity.

37. **NOTICES:**

- A. Any notice, instruction, request or demand required to be given or made to the Contractor hereunder shall be deemed to be duly and properly given or made if delivered or mailed, postage pre-paid, to the Contractor.
- B. Any notice, request, information, or documents required to be given or delivered hereunder by the Contractor to NNRHA or to any of its representatives, unless stated otherwise in this Contract, shall be signed or approved in writing by the Contractor, and shall be sufficiently given or delivered if mailed, certified or registered, postage prepaid to:

Newport News Redevelopment & Housing Authority  
Division of Purchasing  
227 – 27<sup>th</sup> Street  
Newport News, VA 23607  
ATTN: Procurement Officer

Or to such representative or address as may be designated in writing to the Contractor.

- 38. **OBLIGATION OF BIDDER/OFFEROR:** By submitting a bid/offer, the bidder/offeror agrees that they have satisfied themselves, from their own investigation of the conditions to be met, and their obligation. The Contractor will not make any claim for, or have right to cancellation or relief from the contract because of any misunderstanding or lack of information.
- 39. **ORDERING:** Any supplies and services to be furnished under this contract may be ordered by issuance of delivery orders by the individuals or activities designated in the solicitation. Such orders may be issued from the date of award through the expiration or termination of this contract. All task orders are subject to the terms and conditions of this contract. In the event of conflict between a task order and this contract, the contract shall prevail.
- 40. **PAYMENT:** The prime contractor is to submit invoices for services rendered directly to P.O. Box 797, Newport News, VA 23607. All invoices shall refer to the contract and/or purchase order number; social security (for individual Contractors) of the federal employer identification number (for proprietorships, partnerships, and corporations). Any payment terms requiring payment in less than 30 days will be regarded as requiring payment 30 days after invoice or acceptance, whichever occurs last. However, this shall not affect discounts for payment in less than 30 days. All goods and services provided under this contract/purchase order, which will be paid for with public funds, shall be billed by the Contractor at the contract prices, to include, itemization of charges. Contract will be performance based and fees will not be paid until the service or supplies, as defined in the response to these contract documents have been provided and accepted in the manner specified.

The following shall be deemed to be the date of payment after receipt of invoice: the date of postmark in all cases where payment is made by mail, or the date of offset when offset proceedings have been instituted as authorized under the Virginia Debt Collection Act.

A. Unreasonable Charges

Upon determining that invoiced charges are not reasonable, the NNRHA shall promptly notify the Contractor, in writing, as to those charges which it considers unreasonable, and the basis for the determination. In such cases, Contractors should be put on notice that final payment in full is contingent on a determination of reasonableness with respect to all invoiced charges. Charges, which appear to be unreasonable, will be researched and challenged, and that portion of the invoice held in abeyance until a settlement can be reached. A Contractor may not institute legal action unless a settlement cannot be reached within thirty days of notification. The provisions of this section do not relieve NNRHA of its prompt payment obligations with respect to those charges, which are not in dispute (Code of Virginia § 2.2-4352).

B. Delays in Payment

NNRHA will make payment upon satisfactory completion, within thirty days. If work is not to the satisfaction of the COTR, the COTR will contact the Contractor to remedy the situation. Contractor will advise the COTR, in writing, of day and time task will be completed. If a new schedule is approved by COTR, and if the task is not completed within that time frame, NNRHA may proceed with default procedures. Reasons for not accepting Contractors work, and delaying payments, may include but are not limited to:

1. Submitting invoice without final inspection approval by COTR.
2. Incorrect Invoice, (i.e.) not billing according to the purchase order or contract.
3. Creating safety hazards.
4. Contractor failing to communicate completion of work.

41. **PERFORMANCE AND PAYMENT BONDS (if requested)**: The successful bidder/offeror shall deliver to the purchasing office executed Commonwealth of Virginia Standard Performance and Labor and Material Payment Bonds, each in the sum of the contract amount, with the NNRHA as obligee. The surety shall be a surety company or companies approved by the State Corporation Commission to transact business in the Commonwealth of Virginia and acceptable to HUD and the Authority. No payment shall be due and payable to the Contractor, even if the contract has been performed in whole or in part, until the bonds have been delivered to and approved by the purchasing office. Standard bond forms will be provided by the purchasing office prior to or at the time of award.

42. **PRIME CONTRACTOR'S RESPONSIBILITIES**: The Contractor shall be responsible for completely supervising and directing the work under this contract and all Subcontractors that may be utilized, using their best skill and attention.

Subcontractors who perform work under this contract shall be responsible to the prime Contractor. The Contractor agrees to being as fully responsible for the acts and omissions of Subcontractors and of persons employed by them as they are for the acts and omissions of their own employees. The Contractor shall be responsible for maintaining satisfactory standards of employee's competency, conduct, courtesy, appearance, honesty, and integrity and shall be responsible for taking such disciplinary action with respect to any employee, as may be necessary. Additionally, the prime Contractor shall:

- A. Ascertain that all services and work will be performed in a professional workman-like manner acceptable to NNRHA and consistent with accepted professional standards. If the Contractor or their staff is other than professional with residents or NNRHA staff, the Contractor may be found in default of this contract.
- B. Insert appropriate clauses in all subcontracts to bind Subcontractors to the terms and conditions of this contract insofar as they are applicable to the work of Subcontractors.
- C. Within seven (7) days after receipt of amounts paid to the Contractor for services rendered by the subcontract either:
  - 1. Pay the Subcontractor for the proportionate share of the total payment received from the agency attributable to the work performed by the Subcontractor under the contract; or
  - 2. Notify the agency and Subcontractor, in writing, of the intention to withhold all or a part of the Subcontractor's payment with the reason for nonpayment.
- D. Pay interest on all amounts owed to Subcontractor that remain unpaid after seven days following receipt of payment by the agency, except for amounts withheld as allowed in 'C-2' above. "Unless otherwise provided under the terms of this contract, interest shall accrue at the rate of one percent per month." A contract modification shall not be made for the purpose of providing reimbursement for the interest charge. A cost reimbursement claim shall not include any amounts for reimbursement for the interest charge. Your obligation to pay interest to a Subcontractor shall not be construed to be an obligation of NNRHA.
- E. Provide your social security number and if a proprietorship, partnership or corporation provide your federal employee identification number, space provided on cover sheet of this package.
- F. Include in each of its subcontracts a provision requiring all Subcontractors to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier Subcontractor.
- G. Not purchase any materials or supplies pertaining to this contract that is subject to any chattel mortgage or under conditional sales or other agreement by which an interest is retained by the seller. The Contractor warrants that there is clear title to all materials and supplies for all items invoiced for payment. This clause also pertains to all Subcontractors participating in this contract.
- H. Repair, to NNRHA satisfaction, any damage, including damage to finished surfaces, resulting from the performance of this contract.

43. **PROTECTION OF PERSON AND PROPERTY:**

- A. The Contractor expressly undertakes both directly and through its Subcontractors, to take every precaution at all times for the protection of persons and property, including NNRHA's employees and property. The Contractor shall make good any such damage injury or loss, except such as may be directly due to errors in the contract documents or caused by agents or employees of NNRHA. The Contractor shall adequately protect adjacent property as provided by law and the Contract documents, and shall provide and maintain all passageways, guard fences, lights and other facilities for protection required by public authority, local conditions, or any of the contract documents.

- B. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work and in accordance with all State and Federal regulations.
- C. In an emergency affecting the safety of the work, life of individuals or the adjoining property, the Contractor shall act immediately without special instruction or authorization from NNRHA. Should the Contractor, in order to prevent threatened loss or injury, be instructed or authorized to act by NNRHA, they shall so act, without appeal. Any additional compensation or extension of time claimed by the Contractor on account of any emergency work shall be determined as provided in this document or negotiated between both parties.
44. **PROTECTION OF TRADE SECRETS AND OTHER INFORMATION:** By submitting data required by this solicitation, the Contractor may (A) clearly mark any portions, which in their option, are trade secrets or commercial or financial information and (B) submit such marked material separately from other material required to be submitted and is in accordance with Code of Virginia 3.1-249.68.
45. **PUBLIC NOTICE OF AWARDS:** Award or decision to award, utilizing competitive sealed bidding or competitive negotiations will be posted on a public bulletin board located at 227 27<sup>th</sup> Street and displayed at [www.nnrha.com](http://www.nnrha.com). Sole source and emergency procurements, not utilizing competitive sealed bidding or competitive negotiations, will also be posted.
46. **QUALIFICATIONS OF BIDDERS/OFFERORS:** NNRHA may make such reasonable investigations as deemed proper and necessary to determine the ability of the bidders/offerors to perform the services, furnish the goods or services and the bidders/offerors shall furnish to NNRHA all such information and data for this purpose as may be requested. NNRHA reserves the right to inspect bidders/offerors physical facilities prior to award to satisfy questions regarding the bidders/offerors capabilities. NNRHA further reserves the right to reject any bid/offer if the evidence submitted by, or investigations of, such bidder/offeror fails to satisfy NNRHA that such bidder/offeror is properly qualified to carry out the obligations of the contract and to provide the services and/or goods contemplated therein.
47. **SAFETY STANDARDS:** All personnel shall, at all times, wear approved clothing, hard hats, safety vest, and any other equipment required to meet OSHA standards. They will obey all safety rules and regulations and will not create hazardous conditions within the operation. The Contractor must meet motor carrier safety regulations (Federal and State), as applicable. It is the Contractor's responsibility to ensure the OSHA regulations are met in all applicable areas for all exposures encountered during the term of the contract.
48. **SUSPENSION OF WORK:**
- A. The Procurement Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Procurement Officer determines appropriate for the convenience of the NNRHA.
- B. If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Procurement Officer in the administration of this contract, or (2) by the Procurement Officer's failure to act within the time specified (or within a reasonable time if not specified) in this contract an adjustment shall be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be

made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.

C. A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Procurement Officer in writing of the act or failure to act (but this requirement shall not apply as to a claim resulting from a suspension order); and, (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

49. **TAX EXEMPT:** NNRHA is exempt from the payment of any Virginia Sales Tax, State sales and use tax certificates of exemption. Form ST-12 will be issued upon request. When performance involves a service, the Contractor shall be responsible to pay a Virginia Sales Tax on materials consumed in performance of the service.

50. **TERMINATION FOR CONVENIENCE OF NNRHA:**

A. NNRHA may terminate this contract at any time without cause, in whole or in part, upon giving the Contractor notice of such termination. Upon such termination, the Contractors shall immediately cease work and remove from the project site all of its labor forces and such of its materials as NNRHA elects not to purchase or to assume in the manner hereinafter provided. Upon such termination, the Contractor shall take such steps as required by owner to assign to the owner the Contractor's interest in all subcontracts and purchase orders designated by owner. After all such steps have been taken to owner's satisfaction; the Contractor shall receive as full compensation for termination and assignment of the following:

1. All amounts then otherwise due under the terms of the contract.
2. Amount due for work performed subsequent to the latest request for payment through the date of termination.
3. Reasonable compensation for the actual cost of demobilization incurred by the Contractor as a direct result of such termination. The Contractor shall not be entitled to any compensation for lost profits or for any other type of contractual compensation or damage other than those provided by the preceding sentence. Upon payment for the foregoing, owner shall have no further obligations to the Contractor of any nature.
4. All claims associated with this termination must be submitted within one (1) year after the effective date of the termination.

B. In no event shall termination for the convenience of the owner terminate the obligations of the Contractor's surety on its payment and performance bonds.

51. **TERMINATION FOR DEFAULT:** NNRHA may terminate this contract at any time, for the Contractor's failure to perform their contractual obligations and may procure the articles or services from other sources and hold the defaulting contractor responsible for any resulting costs. NNRHA is not liable for Contractor's cost on undelivered work and may be entitled to the repayment of progress payments. All claims associated with this termination must be submitted within one (1) year after the effective date of the termination.
52. **TESTING AND INSPECTION:** NNRHA reserves the right to conduct any test/inspection it may deem advisable to assure goods and services conform to the specifications. Rejected supplies will be returned at the vendor's expense. The vendor, at no cost, shall replace materials and components that have been rejected by NNRHA.
53. **TRANSPORTATION AND PACKAGING:** By submitting their bids/offerors, all bidders/offerors certify and warrant that the price offered for FOB destination includes only the actual freight rate costs at the lowest and best rate and is based upon the actual weight of the goods to be shipped. Except as otherwise specified herein, standard commercial packaging, packing and shipping containers shall be used. All shipping containers shall be legibly marked or labeled on the outside with purchase order number, commodity description, and quantity.
54. **USE OF PREMISES AND REMOVAL OF DEBRIS:**
- A. The Contractor expressly undertakes, either directly or through its Subcontractor:
1. To perform this Contract in such a manner as not to interrupt or interfere with the operation of any existing activity on the premises or at the location of the work.
  2. To maintain its apparatus, materials, supplies, and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of its work or the work of NNRHA or any other Contractor.
  3. To place upon the work or any part thereof only such loads as are consistent with the safety of that portion of the work.
  4. To affect all cutting, filling or patching of its work required to make the same conform to the solicitations plans and specifications, and except with the consent of the Project Inspector, not to cut or otherwise alter the work of any other Contractor. The Contractor shall not damage or endanger any portion of the work by cutting, patching or otherwise altering any work, or excavation.
  5. To clean up frequently all refuse, rubbish, scrap materials and debris caused by its operation, to the end that at all times the site of the work shall present a neat, orderly and workmanlike appearance.
  6. The Contractor shall clean-up, move all refuse, rubbish surplus and scrap material and debris resulting from his operation at the end of each workday and after completion of all work. All material removed as part of clean up shall be completely removed from the properties.

7. NNRHA does not take responsibility for storing, securing or loss of the Contractor's apparatus, materials, supplies, equipment, or personal items.

**55. WITHDRAWAL OF BID DUE TO ERROR:**

- A. A bidder for a public construction contract, other than a contract for construction or maintenance of public highways, may withdraw his bid from consideration if the price bid was substantially lower than the other bids due solely to a mistake in the bid, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgement mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and material used in the preparation of the bid sought to be withdrawn.

If a bid contains both clerical and judgement mistakes, a bidder may withdraw his bid from consideration if the price bid would have been substantially lower than the other bids due solely to the clerical mistake, that was an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a bid that shall be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn.

- B. The bidder shall give notice in writing to Procurement Officer, Division of Purchasing, of their claim of right to withdraw their bid within two business days after the conclusion of the bid opening procedure and shall submit original work papers with such notice. The work papers, documents and materials may be considered as trade secrets or proprietary information subject to the conditions of subsection F of 2.2-4342. Section 2.2-4330 Code of Virginia.
- C. No bid shall be withdrawn under this section when the result would be the awarding of the contract on another bid of the same bidder or another bidder in which the ownership of the withdrawing bidder is more than five percent.
- D. If a bid is withdrawn under the authority of this section, the lowest remaining bid shall be deemed to be the low bid.
- E. No bidder who is permitted to withdraw a bid shall, for compensation, supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the contract is awarded or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn bid was submitted.
- F. If NNRHA denies the withdrawal of a bid under the provisions of this section, it shall notify the bidder in writing within 5 business days, stating the reason for its decision and award the contract to such bidder at the bid prices(s), provided such bidder is a responsive and responsible bidder. At the same time the notice is provided, NNRHA shall return all work papers and copies thereof that have been submitted by the bidder.

56. **WORK HOURS AND PROCEDURES:**

- A. Normal work hours for NNRHA are from 8:00a.m. to 5:00p.m., Monday through Friday, except holidays. All services shall be performed during normal work hours, unless prior approval from the COTR, or their designated personnel.
  
- B. Contractor(s) shall coordinate before commencing work the specific day(s) and the approximate times of day service will be conducted.
  
- C. Due to weather or any other delays, Contractor shall advise COTR of alternate date(s) of service and time immediately, prior to service.

ATTACHMENT "D"

**STATEMENT OF OFFERORS QUALIFICATIONS**

All questions must be answered and the data given must be clear and comprehensive. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information they desire.

- 1) Name of Offerors
  
- 2) Permanent Main Office Address, including City, State, Zip Code, Phone Number, Fax Number and Email Address.
  
- 3) When organized?
  
- 4) If incorporated, when incorporated?
  
- 5) How many years have you been engaged in business under your present firm or trade name?  
\_\_\_\_\_ years
  
- 6) Contracts on hand.  
(List these, showing gross amount of each contract and the appropriate anticipated dates of completion).
  
- 7) General character of work performed by your company.
  
- 8) Have you ever failed to complete any work award to you? If so, where and why?
  
- 9) Have you ever defaulted on a contract? If so, where and why?

10) A Section 3 Business is defined as;

- 1) A business owned by Section 3 residents;
- 2) A business that substantially employs Section 3 residents (30% or more); or
- 3) A business that can provide evidence of commitment to subcontract 25% of work to another Section 3 Business.

Are you considered a Section 3 Business?

\_\_\_\_\_ Yes                      \_\_\_\_\_ No

REFERENCES: Indicate below a listing of at least four (4) recent references that you have provided this type of service in the last five (5) years. Work performed for Newport News Redevelopment and Housing Authority is an acceptable reference. Include the date service was furnished and the name, address and phone number of the person the Authority has your permission to contact.

<u>Name of Company</u>	<u>Date of Service</u>	<u>Contact</u>	<u>Phone No.</u>
------------------------	------------------------	----------------	------------------

1)

2)

3)

4)

Contractor's License Number: \_\_\_\_\_ Class \_\_\_\_\_

Number of employees employed with your firm that will be assigned to this contract. \_\_\_\_\_

SUBCONTRACTORS: Attach a list of all known sub-contractors who will be working on this project. Failure to submit this required information may cause your bid to be deemed non-responsive.

ATTACHMENT "E"

MINORITY BUSINESS PARTICIPATION COMMITMENT FORM

It is the policy of Newport News Redevelopment and Housing Authority (NNRHA) to encourage minority participation in all contracts. To implement this policy, we encourage minority participation through subcontracting or other methods in contracting. You must complete this form, indicating the percentage of this contract that will be subcontracted to minority businesses. FAILURE TO COMPLETE THIS FORM MAY RESULT IN YOUR RESPONSE BEING DECLARED NON-RESPONSIVE THUS ELIMINATING YOUR FIRM FROM CONSIDERATION FOR THIS PROJECT.

For the purpose of this commitment, the term "minority business" means a business at least 50% of which is owned and controlled by minority group members or, in the case of a publicly owned business, at least 51% of the stock is minority owned and the business is controlled by minority group members. For the purpose of the preceding sentence "minority group members" are citizens of the United States who are African Americans, Hispanics, Asians, Pacific Islanders, and American Indians.

Please indicate the percentage of minority business participation in this project. This refers to the percentage of the total dollar value of the contract that will be subcontracted to minority firms:

\_\_\_\_\_ %.

If you need assistance with identifying minority firms in this area, please contact Hampton Roads Community Action Program (HRCAP), at (757) 247-6747 or the Virginia Department of Minority Business Enterprise at 111 East Main Street, Suite 300, Richmond, VA 23219 at (804) 786-6585.

The undersigned hereby certifies that they have read the terms of this commitment and is authorized to bind the prospective Bidder to the commitment herein set forth.

\_\_\_\_\_  
Contractor's Name

\_\_\_\_\_  
Name of Authorized Officer (printed)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of Authorized Officer (signed)

ATTACHMENT "F"

CERTIFICATE OF NON-SEGREGATED FACILITIES

The bidder certifies that he/she does not maintain or provide for its employees any segregated facilities at any establishment, and that he/she does not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The bidder certifies further that he/she will not maintain or provide for its employees any segregated facilities at any of its establishments and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The bidder agrees that a breach of this certification will be a violation of the Equal Opportunity clause in any contract resulting from acceptance of the bid. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. The bidder agrees that (except where he/she has obtained identical certifications from proposed subcontractors for specific time periods) he/she will obtain certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause and will retain such certifications in its files.

Date: \_\_\_\_\_, 20 \_\_\_\_\_

\_\_\_\_\_  
(Name of Bidder)

Treasury Number: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Official Address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ATTACHMENT "G"  
NON-COLLUSIVE AFFIDAVIT

State of \_\_\_\_\_

County of \_\_\_\_\_

Being first duly sworn, deposes and says that:

(1) He/she is \_\_\_\_\_ of  
(Owner, Partner, Officer, Representative or Agent)

\_\_\_\_\_, the Bidder that has submitted the attached bid;  
(Name of Company)

(2) He is fully informed respecting the preparation and contents of the attached bid and all pertinent circumstances respecting such bid;

(3) Such bid is genuine and is not a collusive sham;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived, or agreed, directly or indirectly with any other bidder, firm or person to submit a collusive or sham bid in connection with the contract for which the attached bid has been submitted or to refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought by unlawful agreement or collusion or communication or conference with any other bidder, firm or person to fix the price or prices in the bid price or the bid price of any other bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Newport News Redevelopment & Housing Authority or any person interested in the proposed contract; and

(5) The price or prices in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

\_\_\_\_\_  
(Name)

\_\_\_\_\_  
(Title)

Subscribed and Sworn before me

This \_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_

My Commission Expires \_\_\_\_\_

ATTACHMENT "H"

BID BOND FORM

KNOW ALL MEN BY THESE PRESENTS THAT WE ARE THE UNDERSIGNED,

\_\_\_\_\_, as PRINCIPAL

(Name of Principal)

and \_\_\_\_\_, as SURETY

(Name of Surety)

are held and firmly bound into the Newport News Redevelopment and Housing Authority, hereinafter called the "Authority" in the penal sum of \_\_\_\_\_ dollars lawful money of the United States for payment of which sum well and truly be made, we bind ourselves, our heirs, executors, administrators, successions and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted

the accompany bid, dated \_\_\_\_\_, 20\_\_\_\_ for \_\_\_\_\_.

NOW, THEREFORE, if the Principal shall not withdraw its bid within the period specified and in the manner specified in the bid documents and if the Principal shall enter into a written Contract within ten (10) days after the prescribed forms are presented to it for signature, and give bond with good and sufficient surety or sureties as may be required by the faithful performance and proper fulfillment of such Contract, then the above obligation shall be void and of no effect. However, in the event that the Principal fails to withdraw the bid in accordance with the bid documents and the applicable law, or if the Principal fails to enter into the Contract and file the required bonds within the specified time, Principal shall pay to the lesser of the difference between the Principal's bid and the next low bid or the face amount of this bond bid. If Principal fails to make the aforementioned payments in a timely fashion, then this bond shall remain in full force and virtue. This bid bond shall be in effect for at least ninety (90) days from the date that the bids are opened.

IN WITNESS WHEREOF, for the above bound parties have executed this instrument under their several seals this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, the name and corporate seal of each corporate party being hereto affixed, signed and sealed, pursuant to the authority of the governing bodies of the Principal and the Surety.

In the presence of:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Attest

\_\_\_\_\_  
\_\_\_\_\_

By: \_\_\_\_\_

Affix Corporate Seal

Attest

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Corporate Surety)

By: \_\_\_\_\_

Affix Corporate Seal

ATTACHMENT "I"

PAYMENT BOND

BOND # \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENT, that we (Corporation Partner) \_\_\_\_\_ and (Partner) \_\_\_\_\_ as Principal(s), and \_\_\_\_\_ as SURETY, are held and firmly bound unto the Newport News Redevelopment and Housing Authority (NNRHA) in the penal sum of \_\_\_\_\_ dollars, (\$ \_\_\_\_\_), lawful money of the United States of America for the payment of which sum well and truly to be made, we bond ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, which whereas the principal(s) entered into a certain CONTRACT with the NNRHA dated: \_\_\_\_\_ for the \_\_\_\_\_ (Insert project name and location)

NOW, THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreement of said CONTRACT during the original term of said CONTRACT and any extensions thereof that may be granted by the NNRHA with or without notice to the SURETY, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said CONTRACT, notice to SURETY being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several seals this \_\_\_\_\_ day of \_\_\_\_\_ (month), \_\_\_\_\_ (year), the name and corporate seal of each corporate party being hereto affixed and these present duly signed by it undersigned representative, pursuant to authority of its governing body.

PRINCIPAL: \_\_\_\_\_ PRINCIPAL: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ CITY: \_\_\_\_\_

TITLE: \_\_\_\_\_ TITLE: \_\_\_\_\_

ATTEST: \_\_\_\_\_ ATTEST: \_\_\_\_\_

CORPORATE SEAL: \_\_\_\_\_ CORPORATE SEAL: \_\_\_\_\_

**THE INFORMATION BELOW MUST BE FILLED IN BY THE CORPORATE SURETY**

SURETY: \_\_\_\_\_ *The rate of premium of this BOND is \$ \_\_\_\_\_ per Thousand for a total of \$ \_\_\_\_\_*

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ Power of Attorney Attached:  
YES \_\_\_\_\_ NO \_\_\_\_\_

TITLE: \_\_\_\_\_

ATTEST: \_\_\_\_\_

CORPORATE SEAL: \_\_\_\_\_

ATTACHMENT "T"  
PERFORMANCE BOND

BOND # \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENT, that we (Corporation Partner) \_\_\_\_\_ and (Partner) \_\_\_\_\_ as Principal(s), and \_\_\_\_\_ as SURETY, are held and firmly bound unto the Newport News Redevelopment and Housing Authority (NNRHA) in the penal sum of \_\_\_\_\_ dollars, (\$ \_\_\_\_\_), lawful money of the United States of America for the payment of which sum well and truly to be made, we bond ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, which whereas the principal(s) entered into a certain CONTRACT with the NNRHA dated: \_\_\_\_\_ for the \_\_\_\_\_ (Insert project name and location)

NOW, THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreement of said CONTRACT during the original term of said CONTRACT and any extensions thereof that may be granted by the NNRHA with or without notice to the SURETY, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said CONTRACT, notice to SURETY being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several seals this \_\_\_\_\_ day of \_\_\_\_\_ (month), \_\_\_\_\_ (year), the name and corporate seal of each corporate party being hereto affixed and these present duly signed by it undersigned representative, pursuant to authority of its governing body.

PRINCIPAL: \_\_\_\_\_

PRINCIPAL: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_

CITY: \_\_\_\_\_

TITLE: \_\_\_\_\_

TITLE: \_\_\_\_\_

ATTEST: \_\_\_\_\_

ATTEST: \_\_\_\_\_

CORPORATE SEAL:

CORPORATE SEAL:

**THE INFORMATION BELOW MUST BE FILLED IN BY THE CORPORATE SURETY**

SURETY: \_\_\_\_\_

The rate of premium of this BOND is \$ \_\_\_\_\_  
per Thousand for a total of \$ \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_

Power of Attorney Attached:

YES \_\_\_\_\_ NO \_\_\_\_\_

TITLE: \_\_\_\_\_

ATTEST: \_\_\_\_\_

CORPORATE SEAL:

ATTACHMENT "J"

**CONTRACTOR'S CERTIFICATE OF COMPLETION AND RELEASE**

The undersigned hereby certifies that this final payment from Newport News Redevelopment and Housing Authority to be just and true for work performed under the Contract/Purchase Order

# \_\_\_\_\_, and that such constitutes full and final payment, and upon receipt of this payment, which constitutes the balance due, the undersigned does hereby release Newport News Redevelopment and Housing Authority for all liabilities, obligations, payments, claims under the above contract. All claims by subcontractors, material men, and consultants for labor performed or materials, tools, and machinery provided have been paid or satisfactorily secured.

\_\_\_\_\_  
Name of Company

By: \_\_\_\_\_

Signature of an Officer if a Corporation

Signature of Owner if a Sole Proprietorship

Signature of Member or Manager if an LLC

Signature of Partner if a Partnership or LLP

\_\_\_\_\_  
Date of Signature

\_\_\_\_\_  
Title of Above Individual

"General Decision Number: VA20260140 01/02/2026

Superseded General Decision Number: VA20250140

State: Virginia

Construction Type: Residential

County: Newport News\* County in Virginia.

\*INDEPENDENT CITY

RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories).

Modification Number 0 Publication Date 01/02/2026

BRVA0001-002 05/01/2022

	Rates	Fringes
BRICKLAYER.....	\$ 22.44	10.23

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ELEV0052-004 01/01/2025

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 52.06	38.435+a+b

a. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving Day and Christmas Day.

b. VACATIONS: 6% men under 5 years based on regular hourly rate and 8% men over 5 years based on regular hourly rate for all hours worked.

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ENGI0147-012 06/01/2025

	Rates	Fringes
POWER EQUIPMENT OPERATOR Cranes 90 tons & over capacity; Tower & Climbing Cranes with Controls 100 ft. above ground.....	\$ 40.99	18.05
Cranes under 90 tons.....	\$ 39.99	18.05

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SUVA2012-018 08/08/2014

	Rates	Fringes
CARPENTER.....	\$ 13.39	0.00
CEMENT MASON/CONCRETE FINISHER...	\$ 15.04	0.00
DRYWALL FINISHER/TAPER.....	\$ 14.00	0.00
DRYWALL HANGER AND METAL STUD INSTALLER.....	\$ 13.79	0.00

ELECTRICIAN, Includes Low Voltage Wiring.....	\$ 15.83	0.00
FLOOR LAYER: Carpet.....	\$ 17.50	0.00
IRONWORKER, ORNAMENTAL.....	\$ 15.59	0.00
IRONWORKER, STRUCTURAL.....	\$ 21.55	1.39
LABORER: Common or General.....	\$ 9.69	0.00
LABORER: Landscape.....	\$ 11.72	0.00
LABORER: Mason Tender - Brick...	\$ 13.79	0.00
LABORER: Mason Tender - Cement/Concrete.....	\$ 13.00	0.00
LABORER: Pipelayer.....	\$ 14.04	2.66
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 17.30	2.83
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 15.26	0.80
OPERATOR: Bulldozer.....	\$ 15.17	2.27
OPERATOR: Loader.....	\$ 15.21	2.77
PAINTER (Brush and Roller).....	\$ 12.25	0.00
PLUMBER.....	\$ 16.34	0.00
ROOFER.....	\$ 13.09	0.00
SHEET METAL WORKER, Includes HVAC Duct and Unit Installation.....	\$ 16.60	0.00
SPRINKLER FITTER (Fire Sprinklers).....	\$ 18.09	3.15
TRUCK DRIVER: Dump Truck.....	\$ 16.30	0.00

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic

violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

#### Union Rate Identifiers

A four-letter identifier beginning with characters other than "SU", "UAVG", "SA", or "SC" denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

#### Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio.

The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

#### Survey Rate Identifiers

The "SU" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

#### State Adopted Rate Identifiers

The "SA" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

#### ----- WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to [davisbaconinfo@dol.gov](mailto:davisbaconinfo@dol.gov) or by mail to:

Branch of Wage Surveys  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210.

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END OF GENERAL DECISION

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## **SECTION 3 INFORMATION**

### **WHAT YOU NEED TO KNOW ABOUT SECTION 3**

#### **What is Section 3?**

Section 3 is a provision of the Housing and Urban Development Act of 1968, as amended by the Housing and Community Development Act of 1992 (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by certain HUD financial assistance shall, to the greatest extent feasible, and consistent with existing Federal, State, and local laws and regulations, be directed to low- and very low-income persons, particularly those who are recipients of government assistance for housing, and to business concerns which provide economic opportunities to low- and very low-income persons, identified as Section 3 workers or targeted Section 3 workers.

#### **What is a "Section 3 Worker"?**

A Section 3 worker is any worker who currently fits, or when hired within the past five years fit, at least one of the following categories, as documented:

1. The individual worker's income for the previous or annualized calendar year is below the income limit established by HUD; the income limit for 2025 is \$59,650.
2. The worker is employed by a Section 3 business concern.
3. The worker is a YouthBuild participant.

#### **What is a "Targeted Section 3 Worker"?**

A Section 3 targeted worker for Public Housing Financial Assistance projects are workers who:

1. Are employed by a Section 3 business concern; or
2. Currently fits or when hired fit at least one of the following categories, as documented within the past five years:
  - a. A resident of public housing or Section 8 assisted housing.
  - b. A resident of other public housing projects or Section 8 assisted housing managed by the PHA that is providing the assistance; or
  - c. A YouthBuild participant.

A Section 3 targeted worker for Housing and Community Development Financial Assistance projects are workers who:

1. Are employed by a Section 3 business concern.
2. Currently fits or when hired fit least one of the following categories, as documented within the past five years:
  - a. Living within the service area of the neighborhood of the project.
  - b. A YouthBuild participant.

### **What is a Section 3 Business Concern?**

A business concern meeting at least one of the following criteria, documented within the last six-month period:

1. It is at least 51% owned and controlled by low- or very low-income persons;
2. Over 75% of the labor hours performed for the business over the prior three-month period are performed by Section 3 workers; or
3. It is a business at least 51% owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing.

### **Additionally,**

The business must be legally formed according to state law and be licensed in Virginia. Additional documentation may be requested to demonstrate the business has the capacity to perform the contract successfully under the terms and conditions of the proposed contract.

### **What type of Economic Opportunities may be available under Section 3?**

1. Employment opportunities
2. Training opportunities
3. Business Opportunities

### **Who will provide the Economic Opportunities?**

Recipients of HUD financial assistance and their contractors and subcontractors are expected to develop a Section 3 plan to assure that economic opportunities to the greatest extent feasible are provided to low and very low-income persons and to qualified Sections 3 businesses.

### **What is a Section 3 Project?**

Section 3 projects are housing rehabilitation, housing construction, and other public construction projects assisted under HUD programs that provide housing and community development financial assistance when the total amount of assistance to the project exceeds a threshold of \$200,000. The threshold is \$100,000 where the assistance is from the Lead Hazard Control and Healthy Homes programs. The project is the site or sites together with any building[s] and improvements located on the site[s] that are under common ownership, management, and financing.

### **What are Labor Hours?**

The number of paid hours worked by persons on the project or by persons employed with funds that include public housing financial assistance.

### **What is a Low/Very Low-Income Person?**

A worker's income is below the income limit established by HUD. These limits are typically established at 80% and 50% of the area median individual income.

**What are Benchmarks? (Targets that must be met to be considered in compliance with Section 3)**

Twenty-five (25) percent or more of the total number of labor hours worked by all workers employed with public housing financial assistance in the PHA's or other recipient's fiscal year are Section 3 workers. Also, five (5) percent or more of the total number of labor hours worked by all workers employed with public housing financial assistance in the PHA's or other recipient's fiscal year are Targeted Section 3 workers. For Section 3 projects, the benchmarks are the same as for public housing financial assistance, but with regards to the project itself rather than the recipient's fiscal year.

**What is YouthBuild?**

YouthBuild is a community-based pre-apprenticeship program that provides job training and educational opportunities for at-risk youth ages 16-24 that have previously dropped out of high school.

**For additional information contact:**

Jande Freeman-Brewer  
227 27<sup>th</sup> Street  
P.O. Box 797  
Newport News, VA 23607  
Phone: 757-928-2632  
Fax: 757-928-7412  
jfbrewer@nnrha.org

### SECTION 3 REQUIREMENTS

- A. The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S. C. 170u (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by certain HUD financial assistance shall, to the greatest extent feasible, and consistent with existing Federal, State, and local laws and regulations, be directed to low- and very income persons, particularly those who are recipients of government assistance for housing and to business concerns which provide economic opportunities to low- and very low-income persons.
- B. The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 75, which implements Section 3. As evidenced by this contract, the Parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 75 regulations.
- C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number of job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the persons taking applications for each of the positions; and the anticipated date the work shall begin.
- D. The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 75, and agrees to take appropriate action, as provided in an applicable provision of the subcontract in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 75.
- E. The contractor will certify that any vacant employment positions, training positions, and any subcontracting opportunities, that are required (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 75 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR Part 75.
- F. Noncompliance with HUD's regulations in 24 CFR Part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contractors.



## Project Labor Hours

**Project Name:** \_\_\_\_\_

Location: \_\_\_\_\_ Contractor: \_\_\_\_\_

Date: \_\_\_\_\_ Period Covered: \_\_\_\_\_

Completed by: \_\_\_\_\_ Job Title: \_\_\_\_\_

- 1) Professional 2) Technician 3) Office/Clerical 4) Construction by trade 5) Laborer

**(PLEASE COMPLETE THIS FORM INCLUDING EVERY EMPLOYEE & SUBCONTRACTOR EMPLOYEE WORKING ON THE PROJECT)**

<b>Employee Name</b>	<b>Section 3 Worker: Yes or No</b>	<b>Targeted Section 3 Worker: Yes or No</b>	<b>Job Classification:</b>	<b>Total monthly hours worked:</b>

**SECTION 3 BUSINESS SELF – CERTIFICATION FORM**

(In compliance with Section 3 of the HUD Act of 1968)

This purpose of this form is to comply with Section 3 of the HUD Act of 1968 business certification requirements. To count as a Section 3 Business your company must meet one of the listed categories below. Each category will require additional documentation to support the election. You must provide that supporting documentation with this form to be properly and completely confirmed as a Section 3 business. If this form is submitted without the required supplemental data, your certification will not be processed.

*Please make a selection below; additional documentation will be required.*

<b>Section 3 Business Category</b>	<b>Additional Required Data</b>	<b>Mark an "X" on one Election</b>
Business is at least 51 percent owned and controlled by low-or very low –income persons.	Proof of ownership showing all owners and their percentages and a completed Section 3 Individual Self-Certification form for all low-and very low-income owners.	
Over 75 percent of the labor hours performed for the business over the prior three-month period was performed by Section 3 workers.	Provide the last 90 days full payrolls for the entire company, make a list of the names from the payrolls of the Sections 3 workers, and provide a completed Section 3 Individual Self-Certification form for all low-and very low-income workers listed.	
Business is at least 51 percent owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing	Proof of ownership showing all owners and their percentages and a Section 3 Individual Self-Certification form for all public housing and/or Section 8 residents.	

**Are you a Section 3 Business? (Circle one) YES NO**

Company Name:	Title:
Print Name:	Date Signed:
Address:	Email:
Telephone Number:	Fax Number:

Type of Business: *(circle One)*    Corporation    Partnership    Sole Proprietorship    Other

**Please list all owners of the business and their percentage of ownership:**

_____	_____
_____	_____
_____	_____
_____	_____

**Contractor's License:**    Class A: \_\_\_\_    Class B: \_\_\_\_    Class C: \_\_\_\_

**Certifications:**    SWaM: \_\_\_\_    DBE: \_\_\_\_    Other: \_\_\_\_

I hereby certify to the US Department of Housing and Urban Development (HUD) that all of the information on this form is true and correct. I attest under penalty of perjury that my business meets that elected definition and understand proof of this information may be requested. I understand, if found to be inaccurate, I may be disqualified as a Section 3 business.

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*Signature of Business Owner or Authorized Representative*

*Date*

### SECTION 3 INDIVIDUAL LOW-INCOME PERSON SELF-CERTIFICATION FORM

(In compliance with Section 3 of the HUD Act of 1968)

The purpose of this form is to comply with Section 3 of the HUD Act of 1968 self-certification income requirements. To count as a Section 3 individual, any legal resident of the United States annual income must not exceed the HUD income limits for the year before they were hired, or, the individual's current year annualized for the year you are being confirmed as low-income.

Printed Name: \_\_\_\_\_

Street Address: (No P.O. Box)      Apt #      City      State      Zip

Phone #: \_\_\_\_\_      Email: \_\_\_\_\_

To qualify as a Section 3 person, you must meet one of the categories below.

<p><b>Check only one line below that describes your situation:</b></p> <p><input type="checkbox"/> I am a Public Housing Resident or Section 8 assists me with my rent.</p> <p><input type="checkbox"/> I was a Public Housing Resident or Section 8 assisted me with my rent. If so what year and where did you reside: _____</p> <p><input type="checkbox"/> I receive no HUD support, but I am low-income because my individual income does not exceed \$59,650 and I live in the Hampton Roads Metropolitan area.</p> <p><input type="checkbox"/> Are you currently or have you ever been a YouthBuild participant; if so when and where: _____</p> <p>For additional comments:</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

I hereby certify to the US Department of Housing and Urban Development (HUD) that all of the information on this form is true and correct. I attest under penalty of perjury that my total income does not exceed the income that is shown above, and that proof of this information may be requested. I understand if found inaccurate, I may be disqualified as an applicant and/or a certified Section 3 individual. Finally, I authorize including my name on a list of Section 3 residents seeking employment and to include my contact information so that contractors may contact me directly for any employment opportunities.

Signature: \_\_\_\_\_      Date: \_\_\_\_\_

**SECTION 3 COMPLIANCE FORM**

\_\_\_\_\_  
**Contractor**

\_\_\_\_\_  
**Address**

\_\_\_\_\_  
**City, State, Zip Code**

**Reference Project:** \_\_\_\_\_

**Subject: Statement of Compliance with Section 3 Clause**

**In accordance with the provisions stated herein, I will to the "greatest extent feasible" provide training, employment and contract opportunities to qualified low-income residents and business concerns which provide economic opportunities to low-income persons in the area in which this project is located (Hampton Roads Metropolitan Area). This clause and reporting requirements will be incorporated into any lower tier contracts.**

**We will comply and seek out low-income persons for any open positions. Notices shall be posted in conspicuous places available to residents, employees and applicants for any open positions.**

\_\_\_\_\_  
**Signature and Title**

\_\_\_\_\_  
**Print Name**

\_\_\_\_\_  
**Date Signed**

**Note, when submitting your response to the solicitation, provide a summary/documentation of your Section 3 outreach efforts and the outcomes.**

**Examples of Recruiting Efforts**  
**(HUD Recipients & Contractors)**

\*Advertising the contracting opportunities through trade association papers, and newsletter, and through the local media, such as community television networks, newspapers of general circulation, and radio advertising. Distributing flyers via mass mailings, including emails, in common areas of the housing developments.

\*Establishing or sponsoring programs designed to assist residents of public housing/section 8 in the creation and development of resident-owned businesses.

\*Supporting businesses which provide economic opportunities to low income persons by linking them to the support services available through the Small Business Administration (SBA), the Department of Commerce and comparable agencies at the State and local levels.

\*Encouraging financial institutions, in carrying out their responsibilities under the Community Reinvestment Act, to provide no or low interest loans for providing working capital and other financial business needs.

\*Actively supporting joint ventures with Section 3 business concerns.

\*Actively supporting the development or maintenance of business incubators which assist Section 3 business concerns.

\*Skill based will be maintained of residents of public housing and Section 8-assisted housing.

\*Relationships will be developed with local area employers in an effort to solicit job vacancies to determine skills needed in their workplaces, thereby providing training to residents developing skills that will transfer into the external labor market.

<p><b>Note, when submitting your response to the solicitation, provide a summary/documentation of your Section 3 outreach efforts and the outcomes.</b></p>
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# ATTACHMENT “M”

## HUD FORMS

**U.S. Department of Housing and  
Urban Development**  
Office of Public and Indian Housing

**Instructions to Bidders for Contracts  
Public and Indian Housing Programs**

# Instructions to Bidders for Contracts

## Public and Indian Housing Programs

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### 1. Bid Preparation and Submission

(a) Bidders are expected to examine the specifications, drawings, all instructions, and, if applicable, the construction site (see also the contract clause entitled **Site Investigation and Conditions Affecting the Work** of the *General Conditions of the Contract for Construction*). Failure to do so will be at the bidders' risk.

(b) All bids must be submitted on the forms provided by the Public Housing Agency/Indian Housing Authority (PHA/IHA). Bidders shall furnish all the information required by the solicitation. Bids must be signed and the bidder's name typed or printed on the bid sheet and each continuation sheet which requires the entry of information by the bidder. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent shall be accompanied by evidence of that agent's authority. (Bidders should retain a copy of their bid for their records.)

(c) Bidders must submit as part of their bid a completed form HUD-5369-A, "Representations, Certifications, and Other Statements of Bidders."

(d) All bid documents shall be sealed in an envelope which shall be clearly marked with the words "Bid Documents," the Invitation for Bids (IFB) number, any project or other identifying number, the bidder's name, and the date and time for receipt of bids.

(e) If this solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "No Bid" in the space provided for any item on which no price is submitted.

(f) Unless expressly authorized elsewhere in this solicitation, alternate bids will not be considered.

(g) Unless expressly authorized elsewhere in this solicitation, bids submitted by telegraph or facsimile (fax) machines will not be considered.

(h) If the proposed contract is for a Mutual Help project (as described in 24 CFR Part 905, Subpart E) that involves Mutual Help contributions of work, material, or equipment, supplemental information regarding the bid advertisement is provided as an attachment to this solicitation.

### 2. Explanations and Interpretations to Prospective Bidders

(a) Any prospective bidder desiring an explanation or interpretation of the solicitation, specifications, drawings, etc., must request it at least 7 days before the scheduled time for bid opening. Requests may be oral or written. Oral requests must be confirmed in writing. The only oral clarifications that will be provided will be those clearly related to solicitation procedures, i.e., not substantive technical information. No other oral explanation or interpretation will be provided. Any information given a prospective bidder concerning this solicitation will be furnished promptly to all other prospective bidders as a written amendment to the solicitation, if that information is necessary in submitting bids, or if the lack of it would be prejudicial to other prospective bidders.

(b) Any information obtained by, or provided to, a bidder other than by formal amendment to the solicitation shall not constitute a change to the solicitation.

### 3. Amendments to Invitations for Bids

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date on the bid form, or (3) by letter, telegram, or facsimile, if those methods are authorized in the solicitation. The PHA/IHA must receive acknowledgement by the time and at the place specified for receipt of bids. Bids which fail to acknowledge the bidder's receipt of any amendment will result in the rejection of the bid if the amendment(s) contained information which substantively changed the PHA's/IHA's requirements.

(c) Amendments will be on file in the offices of the PHA/IHA and the Architect at least 7 days before bid opening.

### 4. Responsibility of Prospective Contractor

(a) The PHA/IHA will award contracts only to responsible prospective contractors who have the ability to perform successfully under the terms and conditions of the proposed contract. In determining the responsibility of a bidder, the PHA/IHA will consider such matters as the bidder's:

- (1) Integrity;
- (2) Compliance with public policy;
- (3) Record of past performance; and
- (4) Financial and technical resources (including construction and technical equipment).

(b) Before a bid is considered for award, the bidder may be requested by the PHA/IHA to submit a statement or other documentation regarding any of the items in paragraph (a) above. Failure by the bidder to provide such additional information shall render the bidder nonresponsible and ineligible for award.

## 5. Late Submissions, Modifications, and Withdrawal of Bids

(a) Any bid received at the place designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it:

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th);

(2) Was sent by mail, or if authorized by the solicitation, was sent by telegram or via facsimile, and it is determined by the PHA/IHA that the late receipt was due solely to mishandling by the PHA/IHA after receipt at the PHA/IHA; or

(3) Was sent by U.S. Postal Service Express Mail Next Day Service - Post Office to Addressee, not later than 5:00 p.m. at the place of mailing two working days prior to the date specified for receipt of proposals. The term "working days" excludes weekends and observed holidays.

(b) Any modification or withdrawal of a bid is subject to the same conditions as in paragraph (a) of this provision.

(c) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date and the bid, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, bidders should request the postal clerk to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(d) The only acceptable evidence to establish the time of receipt at the PHA/IHA is the time/date stamp of PHA/IHA on the proposal wrapper or other documentary evidence of receipt maintained by the PHA/IHA.

(e) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent by Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the "Express Mail Next Day Service-Post Office to Addressee" label and the postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. "Postmark" has the same meaning as defined in paragraph (c) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, bidders should request the postal clerk to place a legible hand cancellation bull's eye postmark on both the receipt and Failure by a bidder to acknowledge receipt of the envelope or wrapper.

(f) Notwithstanding paragraph (a) of this provision, a late modification of an otherwise successful bid that makes its terms more favorable to the PHA/IHA will be considered at any time it is received and may be accepted.

(g) Bids may be withdrawn by written notice, or if authorized by this solicitation, by telegram (including mailgram) or facsimile machine transmission received at any time before the exact time set for opening of bids; provided that written confirmation of telegraphic or facsimile withdrawals over the signature of the bidder is mailed and postmarked prior to the specified bid opening time. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for opening of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

## 6. Bid Opening

All bids received by the date and time of receipt specified in the solicitation will be publicly opened and read. The time and place of opening will be as specified in the solicitation. Bidders and other interested persons may be present.

## 7. Service of Protest

(a) Definitions. As used in this provision:

"Interested party" means an actual or prospective bidder whose direct economic interest would be affected by the award of the contract.

"Protest" means a written objection by an interested party to this solicitation or to a proposed or actual award of a contract pursuant to this solicitation.

(b) Protests shall be served on the Contracting Officer by obtaining written and dated acknowledgement from —

NNRHA Procurement Manager

[Contracting Officer designate the official or location where a protest may be served on the Contracting Officer]

(c) All protests shall be resolved in accordance with the PHA's/IHA's protest policy and procedures, copies of which are maintained at the PHA/IHA.

## 8. Contract Award

(a) The PHA/IHA will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the PHA/IHA considering only price and any price-related factors specified in the solicitation.

(b) If the apparent low bid received in response to this solicitation exceeds the PHA's/IHA's available funding for the proposed contract work, the PHA/IHA may either accept separately priced items (see 8(e) below) or use the following procedure to determine contract award. The PHA/IHA shall apply in turn to each bid (proceeding in order from the apparent low bid to the high bid) each of the separately priced bid deductible items, if any, in their priority order set forth in this solicitation. If upon the application of the first deductible item to all initial bids, a new low bid is within the PHA's/IHA's available funding, then award shall be made to that bidder. If no bid is within the available funding amount, then the PHA/IHA shall apply the second deductible item. The PHA/IHA shall continue this process until an evaluated low bid, if any, is within the PHA's/IHA's available funding. If upon the application of all deductibles, no bid is within the PHA's/IHA's available funding, or if the solicitation does not request separately priced deductibles, the PHA/IHA shall follow its written policy and procedures in making any award under this solicitation.

(c) In the case of tie low bids, award shall be made in accordance with the PHA's/IHA's written policy and procedures.

(d) The PHA/IHA may reject any and all bids, accept other than the lowest bid (e.g., the apparent low bid is unreasonably low), and waive informalities or minor irregularities in bids received, in accordance with the PHA's/IHA's written policy and procedures.

(e) Unless precluded elsewhere in the solicitation, the PHA/IHA may accept any item or combination of items bid.

(f) The PHA/IHA may reject any bid as nonresponsive if it is materially unbalanced as to the prices for the various items of work to be performed. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated for other work.

(g) A written award shall be furnished to the successful bidder within the period for acceptance specified in the bid and shall result in a binding contract without further action by either party.

**9. Bid Guarantee** (applicable to construction and equipment contracts exceeding \$25,000)

All bids must be accompanied by a negotiable bid guarantee which shall not be less than five percent (5%) of the amount of the bid. The bid guarantee may be a certified check, bank draft, U.S. Government Bonds at par value, or a bid bond secured by a surety company acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. In the case where the work under the contract will be performed on an Indian reservation area, the bid guarantee may also be an irrevocable Letter of Credit (see provision 10, Assurance of Completion, below). Certified checks and bank drafts must be made payable to the order of the PHA/IHA. The bid guarantee shall insure the execution of the contract and the furnishing of a method of assurance of completion by the successful bidder as required by the solicitation. Failure to submit a bid guarantee with the bid shall result in the rejection of the bid. Bid guarantees submitted by unsuccessful bidders will be returned as soon as practicable after bid opening.

**10. Assurance of Completion**

(a) Unless otherwise provided in State law, the successful bidder shall furnish an assurance of completion prior to the execution of any contract under this solicitation. This assurance may be [Contracting Officer check applicable items] —

[ ] (1) a performance and payment bond in a penal sum of 100 percent of the contract price; or, as may be required or permitted by State law;

[ ] (2) separate performance and payment bonds, each for 50 percent or more of the contract price;

[ ] (3) a 20 percent cash escrow;

[ ] (4) a 25 percent irrevocable letter of credit; or,

[ ] (5) an irrevocable letter of credit for 10 percent of the total contract price with a monitoring and disbursements agreement with the IHA (applicable only to contracts awarded by an IHA under the Indian Housing Program).

(b) Bonds must be obtained from guarantee or surety companies acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. Individual sureties will not be considered. U.S. Treasury Circular Number 570, published annually in the Federal Register, lists companies approved to act as sureties on bonds securing Government contracts, the maximum underwriting limits on each contract bonded, and the States in which the company is licensed to do business. Use of companies listed in this circular is mandatory. Copies of the circular may be downloaded on the U.S. Department of Treasury website <http://www.fms.treas.gov/c570/index.html>, or ordered for a minimum fee by contacting the Government Printing Office at (202) 512-2168.

(c) Each bond shall clearly state the rate of premium and the total amount of premium charged. The current power of attorney for the person who signs for the surety company must be attached to the bond. The effective date of the power of attorney shall not precede the date of the bond. The effective date of the bond shall be on or after the execution date of the contract.

(d) Failure by the successful bidder to obtain the required assurance of completion within the time specified, or within such extended period as the PHA/IHA may grant based upon reasons determined adequate by the PHA/IHA, shall render the bidder ineligible for award. The PHA/IHA may then either award the contract to the next lowest responsible bidder or solicit new bids. The PHA/IHA may retain the ineligible bidder's bid guarantee.

**11. Preconstruction Conference** (applicable to construction contracts)

After award of a contract under this solicitation and prior to the start of work, the successful bidder will be required to attend a preconstruction conference with representatives of the PHA/IHA and its architect/engineer, and other interested parties convened by the PHA/IHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract (e.g., Equal Employment Opportunity, Labor Standards). The PHA/IHA will provide the successful bidder with the date, time, and place of the conference.

**12. Indian Preference Requirements** (applicable only if this solicitation is for a contract to be performed on a project for an Indian Housing Authority)

(a) HUD has determined that the contract awarded under this solicitation is subject to the requirements of section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e(b)). Section 7(b) requires that any contract or subcontract entered into for the benefit of Indians shall require that, to the greatest extent feasible

(1) Preferences and opportunities for training and employment (other than core crew positions; see paragraph (h) below) in connection with the administration of such contracts or subcontracts be given to qualified "Indians." The Act defines "Indians" to mean persons who are members of an Indian tribe and defines "Indian tribe" to mean any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians; and,

(2) Preference in the award of contracts or subcontracts in connection with the administration of contracts be given to Indian organizations and to Indian-owned economic enterprises, as defined in section 3 of the Indian Financing Act of 1974 (25 U.S.C. 1452). That Act defines "economic enterprise" to mean any Indian-owned commercial, industrial, or business activity established or organized for the purpose of profit, except that the Indian ownership must constitute not less than 51 percent of the enterprise; "Indian organization" to mean the governing body of any Indian tribe or entity established or recognized by such governing body; "Indian" to mean any person who is a member of any tribe, band, group, pueblo, or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs and any "Native" as defined in the Alaska Native Claims Settlement Act; and Indian "tribe" to mean any Indian tribe, band, group, pueblo, or community including Native villages and Native groups (including

corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

(b) (1) The successful Contractor under this solicitation shall comply with the requirements of this provision in awarding all subcontracts under the contract and in providing training and employment opportunities.

(2) A finding by the IHA that the contractor, either (i) awarded a subcontract without using the procedure required by the IHA, (ii) falsely represented that subcontracts would be awarded to Indian enterprises or organizations; or, (iii) failed to comply with the contractor's employment and training preference bid statement shall be grounds for termination of the contract or for the assessment of penalties or other remedies.

(c) If specified elsewhere in this solicitation, the IHA may restrict the solicitation to qualified Indian-owned enterprises and Indian organizations. If two or more (or a greater number as specified elsewhere in the solicitation) qualified Indian-owned enterprises or organizations submit responsive bids, award shall be made to the qualified enterprise or organization with the lowest responsive bid. If fewer than the minimum required number of qualified Indian-owned enterprises or organizations submit responsive bids, the IHA shall reject all bids and readvertise the solicitation in accordance with paragraph (d) below.

(d) If the IHA prefers not to restrict the solicitation as described in paragraph (c) above, or if after having restricted a solicitation an insufficient number of qualified Indian enterprises or organizations submit bids, the IHA may advertise for bids from non-Indian as well as Indian-owned enterprises and Indian organizations. Award shall be made to the qualified Indian enterprise or organization with the lowest responsive bid if that bid is -

(1) Within the maximum HUD-approved budget amount established for the specific project or activity for which bids are being solicited; and

(2) No more than the percentage specified in 24 CFR 905.175(c) higher than the total bid price of the lowest responsive bid from any qualified bidder. If no responsive bid by a qualified Indian-owned economic enterprise or organization is within the stated range of the total bid price of the lowest responsive bid from any qualified enterprise, award shall be made to the bidder with the lowest bid.

(e) Bidders seeking to qualify for preference in contracting or subcontracting shall submit proof of Indian ownership with their bids. Proof of Indian ownership shall include but not be limited to:

(1) Certification by a tribe or other evidence that the bidder is an Indian. The IHA shall accept the certification of a tribe that an individual is a member.

(2) Evidence such as stock ownership, structure, management, control, financing and salary or profit sharing arrangements of the enterprise.

(f) (1) All bidders must submit with their bids a statement describing how they will provide Indian preference in the award of subcontracts. The specific requirements of that statement and the factors to be used by the IHA in determining the statement's adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement shall be rejected as nonresponsive. The IHA may require that comparable statements be provided by subcontractors to the successful Contractor, and may require the Contractor to reject any bid or proposal by a subcontractor that fails to include the statement.

(2) Bidders and prospective subcontractors shall submit a certification (supported by credible evidence) to the IHA in any instance where the bidder or subcontractor believes it is infeasible to provide Indian preference in subcontracting. The acceptance or rejection by the IHA of the certification shall be final. Rejection shall disqualify the bid from further consideration.

(g) All bidders must submit with their bids a statement detailing their employment and training opportunities and their plans to provide preference to Indians in implementing the contract; and the number or percentage of Indians anticipated to be employed and trained. Comparable statements from all proposed subcontractors must be submitted. The criteria to be used by the IHA in determining the statement(s)'s adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement(s), or that includes a statement that does not meet minimum standards required by the IHA shall be rejected as nonresponsive.

(h) Core crew employees. A core crew employee is an individual who is a bona fide employee of the contractor at the time the bid is submitted; or an individual who was not employed by the bidder at the time the bid was submitted, but who is regularly employed by the bidder in a supervisory or other key skilled position when work is available. Bidders shall submit with their bids a list of all core crew employees.

(i) Preference in contracting, subcontracting, employment, and training shall apply not only on-site, on the reservation, or within the IHA's jurisdiction, but also to contracts with firms that operate outside these areas (e.g., employment in modular or manufactured housing construction facilities).

(j) Bidders should contact the IHA to determine if any additional local preference requirements are applicable to this solicitation.

(k) The IHA [ ] does [ ] does not [Contracting Officer check applicable box] maintain lists of Indian-owned economic enterprises and Indian organizations by specialty (e.g., plumbing, electrical, foundations), which are available to bidders to assist them in meeting their responsibility to provide preference in connection with the administration of contracts and subcontracts.

**U.S. Department of Housing  
and Urban Development**  
Office of Public and Indian Housing

**Representations, Certifications,  
and Other Statements of Bidders**  
**Public and Indian Housing Programs**

# Representations, Certifications, and Other Statements of Bidders

## Public and Indian Housing Programs

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### 1. Certificate of Independent Price Determination

(a) The bidder certifies that--

(1) The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to (i) those prices, (ii) the intention to submit a bid, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a competitive proposal solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit a bid for the purpose of restricting competition.

(b) Each signature on the bid is considered to be a certification by the signatory that the signatory--

(1) Is the person in the bidder's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

[insert full name of person(s) in the bidder's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the bidder's organization];

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the bidder deletes or modifies subparagraph (a)2 above, the bidder must furnish with its bid a signed statement setting forth in detail the circumstances of the disclosure.

[ ] [Contracting Officer check if following paragraph is applicable]

(d) Non-collusive affidavit. (applicable to contracts for construction and equipment exceeding \$50,000)

(1) Each bidder shall execute, in the form provided by the PHA/IHA, an affidavit to the effect that he/she has not colluded with any other person, firm or corporation in regard to any bid submitted in response to this solicitation. If the successful bidder did not submit the affidavit with his/her bid, he/she must submit it within three (3) working days of bid opening. Failure to submit the affidavit by that date may render the bid nonresponsive. No contract award will be made without a properly executed affidavit.

(2) A fully executed "Non-collusive Affidavit" [ ] is, [ ] is not included with the bid.

### 2. Contingent Fee Representation and Agreement

(a) Definitions. As used in this provision:

"Bona fide employee" means a person, employed by a bidder and subject to the bidder's supervision and control as to time, place, and manner of performance, who neither exerts, nor proposes to exert improper influence to solicit or obtain contracts nor holds out as being able to obtain any contract(s) through improper influence.

"Improper influence" means any influence that induces or tends to induce a PHA/IHA employee or officer to give consideration or to act regarding a PHA/IHA contract on any basis other than the merits of the matter.

(b) The bidder represents and certifies as part of its bid that, except for full-time bona fide employees working solely for the bidder, the bidder:

(1) [ ] has, [ ] has not employed or retained any person or company to solicit or obtain this contract; and

(2) [ ] has, [ ] has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(c) If the answer to either (a)(1) or (a)(2) above is affirmative, the bidder shall make an immediate and full written disclosure to the PHA/IHA Contracting Officer.

(d) Any misrepresentation by the bidder shall give the PHA/IHA the right to (1) terminate the contract; (2) at its discretion, deduct from contract payments the amount of any commission, percentage, brokerage, or other contingent fee; or (3) take other remedy pursuant to the contract.

### 3. Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions (applicable to contracts exceeding \$100,000)

(a) The definitions and prohibitions contained in Section 1352 of title 31, United States Code, are hereby incorporated by reference in paragraph (b) of this certification.

(b) The bidder, by signing its bid, hereby certifies to the best of his or her knowledge and belief as of December 23, 1989 that:

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of a contract resulting from this solicitation;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the bidder shall complete and submit, with its bid, OMB standard form LLL, "Disclosure of Lobbying Activities;" and

(3) He or she will include the language of this certification in all subcontracts at any tier and require that all recipients of subcontract awards in excess of \$100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than \$10,000, and not more than \$100,000, for each such failure.

(d) Indian tribes (except those chartered by States) and Indian organizations as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) are exempt from the requirements of this provision.

#### 4. Organizational Conflicts of Interest Certification

The bidder certifies that to the best of its knowledge and belief and except as otherwise disclosed, he or she does not have any organizational conflict of interest which is defined as a situation in which the nature of work to be performed under this proposed contract and the bidder's organizational, financial, contractual, or other interests may, without some restriction on future activities:

(a) Result in an unfair competitive advantage to the bidder; or,  
(b) Impair the bidder's objectivity in performing the contract work.  
[ ] In the absence of any actual or apparent conflict, I hereby certify that to the best of my knowledge and belief, no actual or apparent conflict of interest exists with regard to my possible performance of this procurement.

#### 5. Bidder's Certification of Eligibility

(a) By the submission of this bid, the bidder certifies that to the best of its knowledge and belief, neither it, nor any person or firm which has an interest in the bidder's firm, nor any of the bidder's subcontractors, is ineligible to:

(1) Be awarded contracts by any agency of the United States Government, HUD, or the State in which this contract is to be performed; or,

(2) Participate in HUD programs pursuant to 24 CFR Part 24.

(b) The certification in paragraph (a) above is a material representation of fact upon which reliance was placed when making award. If it is later determined that the bidder knowingly rendered an erroneous certification, the contract may be terminated for default, and the bidder may be debarred or suspended from participation in HUD programs and other Federal contract programs.

#### 6. Minimum Bid Acceptance Period

(a) "Acceptance period," as used in this provision, means the number of calendar days available to the PHA/IHA for awarding a contract from the date specified in this solicitation for receipt of bids.

(b) This provision supersedes any language pertaining to the acceptance period that may appear elsewhere in this solicitation.

(c) The PHA/IHA requires a minimum acceptance period of [Contracting Officer insert time period] calendar days.

(d) In the space provided immediately below, bidders may specify a longer acceptance period than the PHA's/IHA's minimum requirement. The bidder allows the following acceptance period: calendar days.

(e) A bid allowing less than the PHA's/IHA's minimum acceptance period will be rejected.

(f) The bidder agrees to execute all that it has undertaken to do, in compliance with its bid, if that bid is accepted in writing within (1) the acceptance period stated in paragraph (c) above or (2) any longer acceptance period stated in paragraph (d) above.

#### 7. Small, Minority, Women-Owned Business Concern Representation

The bidder represents and certifies as part of its bid/ offer that it --

(a) [ ] is, [ ] is not a small business concern. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding, and qualified as a small business under the criteria and size standards in 13 CFR 121.

(b) [ ] is, [ ] is not a women-owned business enterprise. "Women-owned business enterprise," as used in this provision, means a business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

(c) [ ] is, [ ] is not a minority business enterprise. "Minority business enterprise," as used in this provision, means a business which is at least 51 percent owned or controlled by one or more minority group members or, in the case of a publicly owned business, at least 51 percent of its voting stock is owned by one or more minority group members, and whose management and daily operations are controlled by one or more such individuals. For the purpose of this definition, minority group members are:

(Check the block applicable to you)

[ ] Black Americans	[ ] Asian Pacific Americans
[ ] Hispanic Americans	[ ] Asian Indian Americans
[ ] Native Americans	[ ] Hasidic Jewish Americans

#### 8. Indian-Owned Economic Enterprise and Indian Organization Representation (applicable only if this solicitation is for a contract to be performed on a project for an Indian Housing Authority)

The bidder represents and certifies that it:

(a) [ ] is, [ ] is not an Indian-owned economic enterprise. "Economic enterprise," as used in this provision, means any commercial, industrial, or business activity established or organized for the purpose of profit, which is at least 51 percent Indian owned. "Indian," as used in this provision, means any person who is a member of any tribe, band, group, pueblo, or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs and any "Native" as defined in the Alaska Native Claims Settlement Act.

(b) [ ] is, [ ] is not an Indian organization. "Indian organization," as used in this provision, means the governing body of any Indian tribe or entity established or recognized by such governing body. Indian "tribe" means any Indian tribe, band, group, pueblo, or

community including Native villages and Native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

**9. Certification of Eligibility Under the Davis-Bacon Act** (applicable to construction contracts exceeding \$2,000)

(a) By the submission of this bid, the bidder certifies that neither it nor any person or firm who has an interest in the bidder's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of the contract resulting from this solicitation shall be subcontracted to any person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

**10. Certification of Nonsegregated Facilities** (applicable to contracts exceeding \$10,000)

(a) The bidder's attention is called to the clause entitled **Equal Employment Opportunity** of the General Conditions of the Contract for Construction.

(b) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(c) By the submission of this bid, the bidder certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The bidder agrees that a breach of this certification is a violation of the Equal Employment Opportunity clause in the contract.

(d) The bidder further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) prior to entering into subcontracts which exceed \$10,000 and are not exempt from the requirements of the Equal Employment Opportunity clause, it will:

- (1) Obtain identical certifications from the proposed subcontractors;
- (2) Retain the certifications in its files; and
- (3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

**Notice to Prospective Subcontractors of Requirement for Certifications of Nonsegregated Facilities**

A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Employment Opportunity clause of the prime contract. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

**Note:** The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

**11. Clean Air and Water Certification** (applicable to contracts exceeding \$100,000)

The bidder certifies that:

(a) Any facility to be used in the performance of this contract [ ] is, [ ] is not listed on the Environmental Protection Agency List of Violating Facilities:

(b) The bidder will immediately notify the PHA/IHA Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the Environmental Protection Agency, indicating that any facility that the bidder proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and,

(c) The bidder will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

**12. Previous Participation Certificate** (applicable to construction and equipment contracts exceeding \$50,000)

(a) The bidder shall complete and submit with his/her bid the Form HUD-2530, "Previous Participation Certificate." If the successful bidder does not submit the certificate with his/her bid, he/she must submit it within three (3) working days of bid opening. Failure to submit the certificate by that date may render the bid nonresponsive. No contract award will be made without a properly executed certificate.

(b) A fully executed "Previous Participation Certificate" [ ] is, [ ] is not included with the bid.

**13. Bidder's Signature**

The bidder hereby certifies that the information contained in these certifications and representations is accurate, complete, and current.

\_\_\_\_\_  
(Signature and Date)

\_\_\_\_\_  
(Typed or Printed Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Company Address)

# General Conditions for Construction Contracts - Public Housing Programs

U.S. Department of Housing and Urban  
Development  
Office of Public and Indian Housing  
OMB Approval No. 2577-0157 (exp. 1/31/2027)

**Applicability. This form is applicable to any  
construction/development contract greater than \$250,000.**

Public reporting burden for this collection of information is estimated to average 1.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Comments regarding the accuracy of this burden estimate and any suggestions for reducing this burden can be sent to the Reports Management Officer, Office of Policy Development and Research, REE, Department of Housing and Urban Development, 451 7th St SW, Room 4176, Washington, DC 20410-5000. When providing comments, please refer to OMB Approval No. 2577-0157. This form includes those clauses required by OMB's common rule on grantee procurement, implemented at HUD in 2 CFR 200, and those requirements set forth in Section 3 of the Housing and Urban Development Act of 1968 and its amendment by the Housing and Community Development Act of 1992, implemented by HUD at 24 CFR Part 75. The form is required for construction contracts awarded by Public Housing Agencies (PHAs). The form is used by Housing Authorities in solicitations to provide necessary contract clauses. If the form were not used, PHAs would be unable to enforce their contracts. Responses to the collection of information are required to obtain a benefit or to retain a benefit. The information requested does not lend itself to confidentiality. HUD may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB number.

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## 1. Definitions

- (a) "Architect" means the person or other entity engaged by the PHA to perform architectural, engineering, design, and other services related to the work as provided for in the contract. When a PHA uses an engineer to act in this capacity, the terms "architect" and "engineer" shall be synonymous. The Architect shall serve as a technical representative of the Contracting Officer. The Architect's authority is as set forth elsewhere in this contract.
- (b) "Contract" means the contract entered into between the PHA and the Contractor. It includes the forms of Bid, the Bid Bond, the Performance and Payment Bond or Bonds or other assurance of completion, the Certifications, Representations, and Other Statements of Bidders (form HUD-5370), these General Conditions of the Contract for Construction (form HUD-5370), the applicable wage rate determinations from the U.S. Department of Labor, any special conditions included elsewhere in the contract, the specifications, and drawings. It includes all formal changes to any of those documents by addendum, change order, or other modification.
- (c) "Contracting Officer" means the person delegated the authority by the PHA to enter into, administer, and/or terminate this contract and designated as such in writing to the Contractor. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer also designated in writing. The Contracting Officer shall be deemed the authorized agent of the PHA in all dealings with the Contractor.
- (d) "Contractor" means the person or other entity entering into the contract with the PHA to perform all of the work required under the contract.
- (e) "Drawings" means the drawings enumerated in the schedule of drawings contained in the Specifications and as described in the contract clause entitled Specifications and Drawings for Construction herein.
- (f) "HUD" means the United States of America acting through the Department of Housing and Urban Development including the Secretary, or any other person designated to act on its behalf. HUD has agreed, subject to the provisions of an Annual Contributions Terms and Conditions (ACC), to provide financial assistance to the PHA, which includes assistance in financing the work to be performed under this contract. As defined elsewhere in these General Conditions or the contract documents, the determination of HUD may be required to authorize changes in the work or for release of funds to the PHA for payment to the Contractor. Notwithstanding HUD's role, nothing in this contract shall be construed to create any contractual relationship between the Contractor and HUD.
- (g) "Project" means the entire project, whether construction or rehabilitation, the work for which is provided for in whole or in part under this contract.
- (h) "PHA" means the Public Housing Agency organized under applicable state laws which is a party to this contract.
- (i) "Specifications" means the written description of the technical requirements for construction and includes the criteria and tests for determining whether the requirements are met.
- (l) "Work" means materials, workmanship, and manufacture and fabrication of components.
- (a) The Contractor shall furnish all necessary labor, materials, tools, equipment, and transportation necessary for performance of the work. The Contractor shall also furnish all necessary water, heat, light, and power not made available to the Contractor by the PHA pursuant to the clause entitled Availability and Use of Utility Services herein.
- (b) The Contractor shall perform on the site, and with its own organization, work equivalent to at least [ ] (12 percent unless otherwise indicated) of the total amount of work to be performed under the order. This percentage may be reduced by a supplemental agreement to this order if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the PHA.
- (c) At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.
- (d) The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall hold and save the PHA, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.
- (e) The Contractor shall lay out the work from base lines and bench marks indicated on the drawings and be responsible for all lines, levels, and measurements of all work executed under the contract. The Contractor shall verify the figures before laying out the work and will be held responsible for any error resulting from its failure to do so.
- (f) The Contractor shall confine all operations (including storage of materials) on PHA premises to areas authorized or approved by the Contracting Officer.
- (g) The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. After completing the work and before final inspection, the Contractor shall (1) remove from the premises all scaffolding, equipment, tools, and materials (including rejected materials) that are not the property of the PHA and all rubbish caused by its work; (2) leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer; (3) perform all specified tests; and, (4) deliver the installation in complete and operating condition.
- (h) The Contractor's responsibility will terminate when all work has been completed, the final inspection made, and the work accepted by the Contracting Officer. The Contractor will then be released from further obligation except as required by the warranties specified elsewhere in the contract.

## 3. Architect's Duties, Responsibilities, and Authority

- (a) The Architect for this contract, and any successor, shall be designated in writing by the Contracting Officer.

## 2. Contractor's Responsibility for Work

- (b) The Architect shall serve as the Contracting Officer's technical representative with respect to architectural, **Schedule** engineering, and design matters related to the work performed under the contract. The Architect may provide direction on contract performance. Such direction shall be within the scope of the contract and may not be of a nature which: (1) institutes additional work outside the scope of the contract; (2) constitutes a change as defined in the Changes clause herein; (3) causes an increase or decrease in the cost of the contract; (4) alters the Construction Progress Schedule; or (5) changes any of the other express terms or conditions of the contract.
- (c) The Architect's duties and responsibilities may include but shall not be limited to:
- (1) Making periodic visits to the work site, and on the basis of his/her on-site inspections, issuing written reports to the PHA which shall include all observed deficiencies. The Architect shall file a copy of the report with the Contractor's designated representative at the site;
  - (2) Making modifications in drawings and technical specifications and assisting the Contracting Officer in the preparation of change orders and other contract modifications for issuance by the Contracting Officer;
  - (3) Reviewing and making recommendations with respect to - (i) the Contractor's construction progress schedules; (ii) the Contractor's shop and detailed drawings; (iii) the machinery, mechanical and other equipment and materials or other articles proposed for use by the Contractor; and, (iv) the Contractor's price breakdown and progress payment estimates; and,
  - (4) Assisting in inspections, signing Certificates of Completion, and making recommendations with respect to acceptance of work completed under the contract.

#### 4. Other Contracts

The PHA may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with PHA employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by PHA employees

#### **Construction Requirements**

#### 5. Pre-construction Conference and Notice to Proceed of the work, and that it has investigated and satisfied itself

- (a) Within ten calendar days of contract execution, and prior to the commencement of work, the Contractor shall attend a preconstruction conference with representatives of the PHA, its Architect, and other interested parties convened by the PHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract. The PHA will provide the Contractor with the date, time, and place of the conference.
- (b) The contractor shall begin work upon receipt of a written Notice to Proceed from the Contracting Officer or designee. The Contractor shall not begin work prior to receiving such notice.

#### 6. Construction Progress

- (a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring labor, materials, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments or take other remedies under the contract until the Contractor submits the required schedule.
- (b) The Contractor shall enter the actual progress on the chart as required by the Contracting Officer, and immediately deliver three copies of the annotated schedule to the Contracting Officer. If the Contracting Officer determines, upon the basis of inspection conducted pursuant to the clause entitled Inspection and Acceptance of Construction, herein that the Contractor is not meeting the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the PHA. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.
- (c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the Default clause of this contract.

#### 7. Site Investigation and Conditions Affecting the Work

- (a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location as to the general and local conditions which can affect the work or its cost, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is

reasonably ascertainable from an inspection of the site, including all exploratory work done by the PHA, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the PHA.

- (b) The PHA assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the PHA. Nor does the PHA assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

### 8. Differing Site Conditions

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site(s), of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. Work shall not proceed at the affected site, except at the

Contractor's risk, until the Contracting Officer has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, the Contractor shall file a claim in writing to the PHA within ten days after receipt of such instructions and, in any event, before proceeding with the work. An equitable adjustment in the contract price, the delivery schedule, or both shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

### 9. Specifications and Drawings for Construction

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be

promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by", or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown" "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place" that is "furnished and installed".

(d) "Shop drawings" means drawings, submitted to the PHA by the Contractor, subcontractor, or any lower tier subcontractor, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials of equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract. The PHA may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with other contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the PHA's reasons therefore. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Architect approves any such variation and the Contracting Officer concurs, the Contracting Officer shall issue an appropriate modification to the contract, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) It shall be the responsibility of the Contractor to make timely requests of the PHA for such large scale and full size drawings, color schemes, and other additional information, not already in his possession, which shall be

required in the planning and production of the work. Such requests may be submitted as the need arises, but each such request shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.

- (h) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the PHA and one set will be returned to the Contractor. As required by the Contracting Officer, the Contractor, upon completing the work under this contract, shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the work is completed and accepted.
- (i) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all shop drawings prepared by subcontractors are submitted to the Contracting Officer.

#### 10. As-Built Drawings

- (a) "As-built drawings," as used in this clause, means drawings submitted by the Contractor or subcontractor at any tier to show the construction of a particular structure or work as actually completed under the contract. "As-built drawings" shall be synonymous with "Record drawings."
- (b) As required by the Contracting Officer, the Contractor shall provide the Contracting Officer accurate information to be used in the preparation of permanent as-built drawings. For this purpose, the Contractor shall record on one set of contract drawings all changes from the installations originally indicated, and record final locations of underground lines by depth from finish grade and by accurate horizontal offset distances to permanent surface improvements such as buildings, curbs, or edges of walks.
- (c) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all as-built drawings prepared by subcontractors are submitted to the Contracting Officer.

#### 11. Material and Workmanship

- (a) All equipment, material, and articles furnished under this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the contract to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of, and as approved by the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.
- (b) Approval of equipment and materials.
- (1) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the

machinery and mechanical and other equipment.

When required by this contract or by the Contracting Officer, the Contractor shall also obtain the

Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

- (2) When required by the specifications or the Contracting Officer, the Contractor shall submit appropriately marked samples (and certificates related to them) for approval at the Contractor's expense, with all shipping charges prepaid. The Contractor shall label, or otherwise properly mark on the container, the material or product represented, its place of origin, the name of the producer, the Contractor's name, and the identification of the construction project for which the material or product is intended to be used.
- (3) Certificates shall be submitted in triplicate, describing each sample submitted for approval and certifying that the material, equipment or accessory complies with contract requirements. The certificates shall include the name and brand of the product, name of manufacturer, and the location where produced.
- (4) Approval of a sample shall not constitute a waiver of the PHA right to demand full compliance with contract requirements. Materials, equipment and accessories may be rejected for cause even though samples have been approved.
- (5) Wherever materials are required to comply with recognized standards or specifications, such specifications shall be accepted as establishing the technical qualities and testing methods, but shall not govern the number of tests required to be made nor modify other contract requirements. The Contracting Officer may require laboratory test reports on items submitted for approval or may approve materials on the basis of data submitted in certificates with samples. Check tests will be made on materials delivered for use only as frequently as the Contracting Officer determines necessary to insure compliance of materials with the specifications. The Contractor will assume all costs of retesting materials which fail to meet contract requirements and/or testing materials offered in substitution for those found deficient.
- (6) After approval, samples will be kept in the Project office until completion of work. They may be built into the work after a substantial quantity of the materials they represent has been built in and accepted.
- (c) Requirements concerning lead-based paint. The Contractor shall comply with the requirements concerning lead-based paint contained in the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846) as implemented by 24 CFR Part 35.

#### 12. Permits and Codes

- (a) The Contractor shall give all notices and comply with all applicable laws, ordinances, codes, rules and regulations. Notwithstanding the requirement of the Contractor to comply with the drawings and specifications in the contract, all work installed shall comply with all applicable codes and regulations as amended by any

waivers. Before installing the work, the Contractor shall examine the drawings and the specifications for compliance with applicable codes and regulations bearing on the work and shall immediately report any discrepancy it may discover to the Contracting Officer.

Where the requirements of the drawings and specifications fail to comply with the applicable code or regulation, the Contracting Officer shall modify the contract by change order pursuant to the clause entitled Changes herein to conform to the code or regulation.

- (b) The Contractor shall secure and pay for all permits, fees, and licenses necessary for the proper execution and completion of the work. Where the PHA can arrange for the issuance of all or part of these permits, fees and licenses, without cost to the Contractor, the contract amount shall be reduced accordingly.

### 13. Health, Safety, and Accident Prevention

(a) In performing this contract, the Contractor shall:

- (1) Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health and/or safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation;
- (2) Protect the lives, health, and safety of other persons;
- (3) Prevent damage to property, materials, supplies, and equipment; and,
- (4) Avoid work interruptions.

(b) For these purposes, the Contractor shall:

- (1) Comply with regulations and standards issued by the Secretary of Labor at 29 CFR Part 1926. Failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96), 40 U.S.C. 3701 et seq.; and
- (2) Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.
- (c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 CFR Part 1904.
- (d) The Contracting Officer shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.
- (e) The Contractor shall be responsible for its subcontractors' compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as the PHA, the Secretary of Housing and Urban Development, or the Secretary of Labor shall direct as a means of enforcing such provisions.

### 14. Temporary Heating

The Contractor shall provide and pay for temporary heating, covering, and enclosures necessary to properly protect all work and materials against damage by dampness and cold, to dry out the work, and to facilitate the completion of the work. Any permanent heating equipment used shall be turned over to the PHA in the condition and at the time required by the specifications.

### 15. Availability and Use of Utility Services

- (a) The PHA shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the PHA or, where the utility is produced by the PHA, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.
- (b) The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the PHA, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

### 16. Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements

- (a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed under this contract, and which do not unreasonably interfere with the work required under this contract.
- (b) The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during performance of this contract, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.
- (c) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Prior to disturbing the ground at the construction site, the Contractor shall ensure that all underground utility lines are clearly marked.
- (d) The Contractor shall shore up, brace, underpin, secure, and protect as necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be affected by the excavations or other operations connected with the construction of the project.
- (e) Any equipment temporarily removed as a result of work under this contract shall be protected, cleaned, and replaced in the same condition as at the time of award of this contract.

- (f) New work which connects to existing work shall correspond in all respects with that to which it connects and/or be similar to existing work unless otherwise required by the specifications.
- (g) No structural members shall be altered or in any way weakened without the written authorization of the Contracting Officer, unless such work is clearly specified in the plans or specifications.
- (h) If the removal of the existing work exposes discolored or unfinished surfaces, or work out of alignment, such surfaces shall be refinished, or the material replaced as necessary to make the continuous work uniform and harmonious. This, however, shall not be construed to require the refinishing or reconstruction of dissimilar finishes previously exposed, or finished surfaces in good condition, but in different planes or on different levels **Construction** when brought together by the removal of intervening work, unless such refinishing or reconstruction is specified in the plans or specifications.
- (i) The Contractor shall give all required notices to any adjoining or adjacent property owner or other party before the commencement of any work.
- (j) The Contractor shall indemnify and save harmless the PHA from any damages on account of settlement or the loss of lateral support of adjoining property, any damages from changes in topography affecting drainage, and from all loss or expense and all damages for which the PHA may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.
- (k) The Contractor shall repair any damage to vegetation, structures, equipment, utilities, or improvements, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

#### 17. Temporary Buildings and Transportation of Materials

- (a) Temporary buildings (e.g., storage sheds, shops, offices, sanitary facilities) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the PHA. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.
- (b) The Contractor shall, as directed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any federal, state, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

#### 18. Clean Air and Water

The contractor shall comply with the Clean Air Act, as amended, 42 USC 7401 et seq., the Federal Water Pollution Control Water Act, as amended, 33 U.S.C. 1251 et seq., and standards issued pursuant thereto in the facilities in which this contract is to be performed.

#### 19. Energy Efficiency

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub.L. 94-163) for the State in which the work under the contract is performed.

#### 20. Inspection and Acceptance of

- (a) Definitions. As used in this clause -
- (1) "Acceptance" means the act of an authorized representative of the PHA by which the PHA approves and assumes ownership of the work performed under this contract. Acceptance may be partial or complete.
- (2) "Inspection" means examining and testing the work performed under the contract (including, when appropriate, raw materials, equipment, components, and intermediate assemblies) to determine whether it conforms to contract requirements.
- (3) "Testing" means that element of inspection that determines the properties or elements, including functional operation of materials, equipment, or their components, by the application of established scientific principles and procedures.
- (b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. All work is subject to PHA inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.
- (c) PHA inspections and tests are for the sole benefit of the PHA and do not: (1) relieve the Contractor of responsibility for providing adequate quality control measures; (2) relieve the Contractor of responsibility for loss or damage of the material before acceptance; (3) constitute or imply acceptance; or, (4) affect the continuing rights of the PHA after acceptance of the completed work under paragraph (j) below.
- (d) The presence or absence of the PHA inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Contracting Officer's written authorization. All instructions and approvals with respect to the work shall be given to the Contractor by the Contracting Officer.
- (e) The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The PHA may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The PHA shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

- (f) The PHA may conduct routine inspections of the construction site on a daily basis.
- (g) The Contractor shall, without charge, replace or correct work found by the PHA not to conform to contract requirements, unless the PHA decides that it is in its interest to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.
- (h) If the Contractor does not promptly replace or correct rejected work, the PHA may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed.
- (i) If any work requiring inspection is covered up without approval of the PHA, it must, if requested by the Contracting Officer, be uncovered at the expense of the Contractor. If at any time before final acceptance of the entire work, the **Construction** PHA considers it necessary or advisable, to examine work already completed by removing or tearing it out, the Contractor, shall on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray all the expenses of the examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the Contracting Officer shall make an equitable adjustment to cover the cost of the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.
- (j) The Contractor shall notify the Contracting Officer, in writing, as to the date when in its opinion all or a designated portion of the work will be substantially completed and ready for inspection. If the Architect determines that the state of preparedness is as represented, the PHA will promptly arrange for the inspection. Unless otherwise specified in the contract, the PHA shall accept, as soon as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines and designates can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the PHA's right under any warranty or guarantee.

## 21. Use and Possession Prior to Completion

- (a) The PHA shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the PHA intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The PHA's possession or use shall not be deemed an acceptance of any work under the contract.
- (b) While the PHA has such possession or use, the Contractor shall be relieved of the responsibility for (1) the loss of or damage to the work resulting from the PHA's possession or use, notwithstanding the terms of the clause entitled Permits and Codes herein; (2) all maintenance costs on the areas occupied; and, (3) furnishing heat, light, power, and water used in the areas

occupied without proper remuneration therefore. If prior possession or use by the PHA delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

## 22. Warranty of Title

The Contractor warrants good title to all materials, supplies, and equipment incorporated in the work and agrees to deliver the premises together with all improvements thereon free from any claims, liens or charges, and agrees further that neither it nor any other person, firm or corporation shall have any right to a lien upon the premises or anything appurtenant thereto.

## 23. Warranty of

- (a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (j) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of \_\_\_\_\_ (one year unless otherwise indicated) from the date of final acceptance of the work. If the PHA takes possession of any part of the work before final acceptance, this warranty shall continue for a period of (one year unless otherwise indicated) from the date that the PHA takes possession.
- (b) The Contractor shall remedy, at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to PHA-owned or controlled real or personal property when the damage is the result of—  
 (1) The Contractor's failure to conform to contract requirements; or  
 (2) Any defects of equipment, material, workmanship or design furnished by the Contractor.
- (c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for (one year unless otherwise indicated) from the date of repair or replacement.
- (d) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect or damage.
- (e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the PHA shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the Contractor's expense.
- (f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:  
 (1) Obtain all warranties that would be given in normal commercial practice;  
 (2) Require all warranties to be executed in writing, for the benefit of the PHA; and,  
 (3) Enforce all warranties for the benefit of the PHA.
- (g) In the event the Contractor's warranty under paragraph (a) of this clause has expired, the PHA may bring suit at its own expense to enforce a subcontractor's, manufacturer's or supplier's warranty.

- (h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defect of material or design furnished by the PHA nor for the repair of any damage that results from any defect in PHA furnished material or design.
- (i) Notwithstanding any provisions herein to the contrary, the establishment of the time periods in paragraphs (a) and (c) above relate only to the specific obligation of the Contractor to correct the work, and have no relationship to the time within which its obligation to comply with the contract may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligation other than specifically to correct the work.
- (j) This warranty shall not limit the PHA's rights under the Inspection and Acceptance of Construction clause of this contract with respect to latent defects, gross mistakes or fraud.

**24. Prohibition Against Liens**

The Contractor is prohibited from placing a lien on the PHA's property. This prohibition shall apply to all subcontractors at any tier and all materials suppliers.

**Administrative Requirements**

**25. Contract Period**

this contract within \_\_\_\_\_ calendar days of the effective date of the contract, or within the time schedule established in the notice to proceed issued by the Contracting Officer.

**26. Order of Provisions**

accordance with the terms and conditions of the In the event of a conflict between these General Conditions and the Specifications, the General Conditions shall prevail. In the event of a conflict between the contract and any applicable state or local law or regulation, the state or local law or regulation shall prevail; provided that such state or local law or regulation does not conflict with, or is less restrictive than applicable federal law, regulation, or Executive Order. In the event of such a conflict, applicable federal law, regulation, and Executive Order shall prevail.

**27. Payments**

- retain ten (10) percent of the amount of progress
- (a) The PHA shall pay the Contractor the price as provided in this contract.
  - (b) The PHA shall make progress payments approximately every 30 days as the work proceeds, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer. The PHA may, subject to written determination and approval of the Contracting Officer, make more frequent payments to contractors which are qualified small businesses.
  - (c) Before the first progress payment under this contract, the Contractor shall furnish, in such detail as requested by the Contracting Officer, a breakdown of the total contract price showing the amount included therein for each principal category of the work, which shall substantiate the payment amount requested in order to provide a

basis for determining progress payments. The breakdown shall be approved by the Contracting Officer and must be acceptable to HUD. If the contract covers more than one project, the Contractor shall furnish a separate breakdown for each. The values and quantities employed in making up this breakdown are for determining the amount of progress payments and shall not be construed as a basis for additions to or deductions from the contract price. The Contractor shall prorate its overhead and profit over the construction period of the contract.

- (d) The Contractor shall submit, on forms provided by the PHA, periodic estimates showing the value of the work performed during each period based upon the approved submitted not later than 30 days in advance of the date set for payment and are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Architect prior to payment. If the contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each.
- (e) Along with each request for progress payments and the required estimates, the Contractor shall furnish the following certification, or payment shall not be made: I hereby certify, to the best of my knowledge and belief, that:

- (1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
- (2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements; and,
- (3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in subcontract.

**Name:**

**Title:**

**Date:**

- (f) Except as otherwise provided in State law, the PHA shall payments until completion and acceptance of all work under the contract; except, that if upon completion of 50 percent of the work, the Contracting Officer, after consulting with the Architect, determines that the Contractor's performance and progress are satisfactory, the PHA may make the remaining payments in full for the work subsequently completed. If the Contracting Officer subsequently determines that the Contractor's performance and progress are unsatisfactory, the PHA shall reinstate the ten (10) percent (or other percentage as provided in State law) retainage until such time as the Contracting Officer determines that performance and progress are satisfactory.
- (g) The Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration when computing progress payments.

Material delivered to the Contractor at locations other than the site may also be taken into consideration if the Contractor furnishes satisfactory evidence that (1) it has acquired title to such material; (2) the material is properly stored in a bonded warehouse, storage yard, or similar suitable place as may be approved by the Contracting Officer; (3) the material is insured to cover its full value; and (4) the material will be used to perform this contract. Before any progress payment which includes delivered material is made, the Contractor shall furnish such documentation as the Contracting Officer may require to assure the protection of the PHA's interest in such materials. The Contractor shall remain responsible for such stored material notwithstanding the transfer of title to the PHA.

- (h) All material and work covered by progress payments made shall, at the time of payment become the sole property of the PHA, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or, (2) waiving the right of the PHA to require the fulfillment of all of the terms of the contract. In the event the work of the Contractor has been damaged by other contractors or persons other than employees of the PHA in the course of their employment, the Contractor shall restore such damaged work without cost to the PHA and to seek redress for its damage only from those who directly caused it.
- (i) The PHA shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all work; and (2) presentation of release of all claims against the PHA arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned.
- (j) Prior to making any payment, the Contracting Officer may require the Contractor to furnish receipts or other evidence of payment from all persons performing work and supplying material to the Contractor, if the Contracting Officer determines such evidence is necessary to substantiate claimed costs.
- (k) The PHA shall not; (1) determine or adjust any claims for payment or disputes arising there under between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of the PHA to withhold moneys from the Contractor shall in no wise impair the obligations of any surety or sureties under any bonds furnished under this contract.

## 28. Contract Modifications

- (a) Only the Contracting Officer has authority to modify any term or condition of this contract. Any contract modification shall be authorized in writing.
- (b) The Contracting Officer may modify the contract unilaterally (1) pursuant to a specific authorization stated in a contract clause (e.g., Changes); or (2) for administrative matters which do not change the rights or

responsibilities of the parties (e.g., change in the PHA address). All other contract modifications shall be in the form of supplemental agreements signed by the Contractor and the Contracting Officer.

- (c) When a proposed modification requires the approval of HUD prior to its issuance (e.g., a change order that exceeds the PHA's approved threshold), such modification shall not be effective until the required approval is received by the PHA.

## 29. Changes

- (a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract including changes:
  - (1) In the specifications (including drawings and designs);
  - (2) In the method or manner of performance of the work;
  - (3) PHA-furnished facilities, equipment, materials, services, or site; or,
  - (4) Directing the acceleration in the performance of the work.
- (b) Any other written order or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances and source of the order and (2) that the Contractor regards the order as a change order.
- (c) Except as provided in this clause, no order, statement or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.
- (d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for a adjustment based on defective specifications, no proposal for any change under paragraph (b) above shall be allowed for any costs incurred more than 20 days (5 days for oral orders) before the Contractor gives written notice as required. In the case of defective specifications for which the PHA is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.
- (e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause, or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting a written statement describing the general nature and the amount of the proposal. If the facts justify it, the Contracting Officer may extend the period for submission. The proposal may be included in the notice required under paragraph (b) above. No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.
- (f) The Contractor's written proposal for equitable adjustment shall be submitted in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract in at least the following details:

- (1) Direct Costs. Materials (list individual items, the quantity and unit cost of each, and the aggregate cost); Transportation and delivery costs associated with materials; Labor breakdowns by hours or unit costs (identified with specific work to be performed); Construction equipment exclusively necessary for the change; Costs of preparation and/ or revision to shop drawings resulting from the change; Worker's Compensation and Public Liability Insurance; Employment taxes under FICA and FUTA; and, Bond Costs when size of change warrants revision.
- (2) Indirect Costs. Indirect costs may include overhead, general and administrative expenses, and fringe benefits not normally treated as direct costs.
- (3) Profit. The amount of profit shall be negotiated and may vary according to the nature, extent, and complexity of the work required by the change. The allowability of the direct and indirect costs shall be determined in accordance with the Contract Cost Principles and Procedures for Commercial Firms in Part 31 of the Federal Acquisition Regulation (48 CFR 1-31), as implemented by HUD Handbook 2210.18, in effect on the date of this contract. The Contractor shall not be allowed a profit on the profit received by any subcontractor. Equitable adjustments for deleted work shall include a credit for profit and may include a credit for indirect costs. On proposals covering both increases and decreases in the amount of the contract, the application of indirect costs and profit shall be on the net-change in direct costs for the Contractor or subcontractor performing the work.
- (g) The Contractor shall include in the proposal its request for time extension (if any), and shall include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the contract in its entirety.
- (h) The Contracting Officer shall act on proposals within 30 days after their receipt, or notify the Contractor of the date when such action will be taken.
- (i) Failure to reach an agreement on any proposal shall be a dispute under the clause entitled Disputes herein. Nothing in this clause, however, shall excuse the Contractor from proceeding with the contract as changed.
- (j) Except in an emergency endangering life or property, no change shall be made by the Contractor without a prior order from the Contracting Officer.

### 30. Suspension of Work

- (a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the PHA.
- (b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified (or within a reasonable time if not specified) in this contract an adjustment shall be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have

been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.

- (c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order); and, (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

### 31. Disputes

- (a) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to the contract. A claim arising under the contract, unlike a claim relating to the contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim. The submission may be converted to a claim by complying with the requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.
- (b) Except for disputes arising under the clauses entitled Labor Standards - Davis Bacon and Related Acts, herein, all disputes arising under or relating to this contract, including any claims for damages for the alleged breach thereof which are not disposed of by agreement, shall be resolved under this clause.
- (c) All claims by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision. A claim by the PHA against the Contractor shall be subject to a written decision by the Contracting Officer.
- (d) The Contracting Officer shall, within 60 (unless otherwise indicated) days after receipt of the request, decide the claim or notify the Contractor of the date by which the decision will be made.
- (e) The Contracting Officer's decision shall be final unless the Contractor (1) appeals in writing to a higher level in the PHA in accordance with the PHA's policy and procedures, (2) refers the appeal to an independent mediator or arbitrator, or (3) files suit in a court of competent jurisdiction. Such appeal must be made within (30 unless otherwise indicated) days after receipt of the Contracting Officer's decision.
- (f) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

### 32. Default

- (a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with the diligence that will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within this time, the Contracting Officer may, by written notice to the Contractor, terminate the right to

proceed with the work (or separable part of the work) that has been delayed. In this event, the PHA may take over the work and complete it, by contract or otherwise, and may take possession of and use any materials, equipment, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the PHA resulting from the **Convenience** Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the PHA in completing the work.

- (b) The Contractor's right to proceed shall not be terminated or the Contractor charged with damages under this clause if—
- (1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God, or of the public enemy, (ii) acts of the PHA or other governmental entity in either its sovereign or contractual capacity, (iii) acts of another contractor in the performance of a contract with the PHA, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and
- (2) The Contractor, within days (10 days unless otherwise indicated) from the beginning of such delay (unless extended by the Contracting Officer) notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, time for completing the work shall be extended by written modification to the contract. The findings of the Contracting Officer shall be reduced to a written decision which shall be subject to the provisions of the Disputes clause of this contract.
- (c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been for convenience of the PHA.

### 33. Liquidated Damages

- (a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, as specified in the clause entitled Default of this contract, the Contractor shall pay to the PHA as liquidated damages, the sum of \$ \_\_\_\_\_ [Contracting Officer insert amount] for each day of delay. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed. To the extent that the Contractor's delay or nonperformance is excused under another clause in this contract, liquidated damages shall not be due the PHA. The Contractor remains liable for damages caused other than by delay.
- (b) If the PHA terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final

completion of the work together with any increased costs occasioned the PHA in completing the work.

- (c) If the PHA does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

### 34. Termination for

- (a) The Contracting Officer may terminate this contract in whole, or in part, whenever the Contracting Officer determines that such termination is in the best interest of the PHA. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which the performance of the work under the contract is terminated, and the date upon which such termination becomes effective.
- (b) If the performance of the work is terminated, either in whole or in part, the PHA shall be liable to the Contractor for reasonable and proper costs resulting from such termination upon the receipt by the PHA of a properly presented claim setting out in detail: (1) the total cost of the work performed to date of termination less the total amount of contract payments made to the Contractor; (2) the cost (including reasonable profit) of settling and paying claims under subcontracts and material orders for work performed and materials and supplies delivered to the site, payment for which has not been made by the PHA to the Contractor or by the Contractor to the subcontractor or supplier; (3) the cost of preserving and protecting the work already performed until the PHA or assignee takes possession thereof or assumes responsibility therefore; (4) the actual or estimated cost of legal and accounting services reasonably necessary to prepare and present the termination claim to the PHA; and (5) an amount constituting a reasonable profit on the value of the work performed by the Contractor.
- (c) The Contracting Officer will act on the Contractor's claim within days (60 days unless otherwise indicated) of receipt of the Contractor's claim.
- (d) Any disputes with regard to this clause are expressly made subject to the provisions of the Disputes clause of this contract.

### 35. Assignment of Contract

The Contractor shall not assign or transfer any interest in this contract; except that claims for monies due or to become due from the PHA under the contract may be assigned to a bank, trust company, or other financial institution. Such assignments of claims shall only be made with the written concurrence of the Contracting Officer. If the Contractor is a partnership, this contract shall inure to the benefit of the surviving or remaining member(s) of such partnership as approved by the Contracting Officer.

### 36. Insurance

- (a) Before commencing work, the Contractor and each subcontractor shall furnish the PHA with certificates of insurance showing the following insurance is in force and will insure all operations under the Contract:
- (1) Workers' Compensation, in accordance with state or Territorial Workers' Compensation laws.
- (2) Commercial General Liability with a combined single limit for bodily injury and property damage of not less than \$ \_\_\_\_\_ [Contracting Officer insert amount]

per occurrence to protect the Contractor and each subcontractor against claims for bodily injury or death and damage to the property of others. This shall cover the use of all equipment, hoists, and vehicles on the site(s) not covered by Automobile Liability under (3) below. If the Contractor has a "claims made" policy, then the following additional requirements apply: the policy must provide a "retroactive date" which must be on or before the execution date of the Contract; and the extended reporting period may not be less than five years following the completion date of the Contract.

- (3) Automobile Liability on owned and non-owned motor vehicles used on the site(s) or in connection therewith for a combined single limit for bodily injury and property damage of not less than \$ \_\_\_\_\_

[Contracting Officer insert amount] per occurrence.

- (b) Before commencing work, the Contractor shall furnish the PHA with a certificate of insurance evidencing that Builder's Risk (fire and extended coverage) Insurance on all work in place and/or materials stored at the building site(s), including foundations and building equipment, is in force. The Builder's Risk Insurance shall be for the benefit of the Contractor and the PHA as their interests may appear and each shall be named in the policy or policies as an insured. The Contractor in installing equipment supplied by the PHA shall carry insurance on such equipment from the time the Contractor takes possession thereof until the Contract work is accepted by the PHA. The Builder's Risk Insurance need not be carried on excavations, piers, footings, or foundations until such time as work on the superstructure is started. It need not be carried on landscape work. Policies shall furnish coverage at all times for the full cash value of all completed construction, as well as materials in place and/or stored at the site(s), whether or not partial payment has been made by the PHA. The Contractor may terminate this insurance on buildings as of the date taken over for occupancy by the PHA. The Contractor is not required to carry Builder's Risk Insurance for modernization work which does not involve structural alterations or additions and where the PHA's existing fire and extended coverage policy can be endorsed to include such work.
- (c) All insurance shall be carried with companies which are financially responsible and admitted to do business in the State in which the project is located. If any such insurance is due to expire during the construction period, the Contractor (including subcontractors, as applicable) shall not permit the coverage to lapse and shall furnish evidence of coverage to the Contracting Officer. All certificates of insurance, as evidence of coverage, shall provide that no coverage may be canceled or non-renewed by the insurance company until at least 30 days prior written notice has been given to the Contracting Officer.

### 37. Subcontracts

- (a) Definitions. As used in this contract -
- (1) "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a subcontractor to furnish supplies, materials, equipment, and services for the performance of the prime contract or a subcontract.

(2) "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another subcontractor.

- (b) The Contractor shall not enter into any subcontract with any subcontractor who has been temporarily denied participation in a HUD program or who has been suspended or debarred from participating in contracting programs by any agency of the United States Government or of the state in which the work under this contract is to be performed.
- (c) The Contractor shall be as fully responsible for the acts or omissions of its subcontractors, and of persons either directly or indirectly employed by them as for the acts or omissions of persons directly employed by the Contractor.
- (d) The Contractor shall insert appropriate clauses in all subcontracts to bind subcontractors to the terms and conditions of this contract insofar as they are applicable to the work of subcontractors.
- (e) Nothing contained in this contract shall create any contractual relationship between any subcontractor and the PHA or between the subcontractor and HUD.

### 38. Subcontracting with Small and Minority Firms, Women's Business Enterprise, and Labor Surplus Area Firms

The Contractor shall take the following steps to ensure that, whenever possible, subcontracts are awarded to small business firms, minority firms, women's business enterprises, and labor surplus area firms:

- (a) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- (b) Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;
- (c) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;
- (d) Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises; and
- (e) Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and local governmental small business agencies.

### 39. Equal Employment Opportunity

During the performance of this contract, the Contractor/Seller agrees as follows:

- (a) The Contractor/Seller shall not discriminate against any employee or applicant for employment because of race color, religion, sex, sexual orientation, gender identity, disability, or national origin.
- (b) The Contractor/Seller shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, disability, or national origin. Such action shall include, but not be limited to, (1) employment, (2) upgrading demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or other forms of compensation, and (8) selection for training, including apprenticeship

(c) The Contractor/Seller agrees to post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

(d) The Contractor/Seller shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor/Seller, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(e) The Contractor/Seller shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(f) The Contractor/Seller shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(g) The Contractor/Seller shall furnish all information and reports required by Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto. The Contractor/Seller shall permit

access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(h) In the event of a that the Contractor/Seller is in noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated or suspended in whole or in part and the contractor/seller may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(i) The contractor/seller will include the provisions of paragraphs (a) through (h) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each sub[contractor/seller] or vendor. The [contractor/seller] will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the [contractor/seller] becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the [contractor/seller] may request the United States to enter into such litigation to protect the interests of the United States.

(j) Compliance with the requirements of this clause shall be to the maximum extent consistent with, but not in derogation of, compliance with section 7(b) of the Indian Self-Determination and Education Assistance Act and the Indian Preference clause of this contract.

#### 40. Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968.

(a) The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

(b) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 75, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 75 regulations.

(c) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 prioritization requirements and shall state the minimum percentages of labor hour requirements established in the Benchmark Notice (FR-6085-N-04).

(d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 75, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 75.

(e) Noncompliance with HUD's regulations in 24 CFR Part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

(f) Contracts, subcontracts, grants, or subgrants subject to Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5307(b)) or subject to tribal preference requirements as authorized under 101(k) of the Native American Housing Assistance and Self-Determination Act (25 U.S.C. 4111(k)) must provide preferences in employment, training, and business opportunities to Indians and Indian organizations, and are therefore not subject to the requirements of 24 CFR Part 75.

#### 41. Interest of Members of Congress

No member of or delegate to the Congress of the United States of America shall be admitted to any share or part of this contract or to any benefit that may arise therefrom.

#### 42. Interest of Members, Officers, or Employees and Former Members, Officers, or Employees

No member, officer, or employee of the PHA, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which the PHA was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

#### 43. Limitations on Payments made to Influence Certain Federal Financial Transactions

- (a) The Contractor agrees to comply with Section 1352 of Title 31, United States Code which prohibits the use of **Acts** Federal appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.
- (b) The Contractor further agrees to comply with the requirement of the Act to furnish a disclosure (OMB Standard Form LLL, Disclosure of Lobbying Activities) if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

#### 44. Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringement of any patent rights and shall save the PHA harmless from loss on account thereof; except that the PHA shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified and the Contractor has no reason to believe that the specified design, process, or product is an infringement. If, however, the Contractor has reason to believe that any design, process or product specified is an infringement of a patent, the Contractor shall promptly notify the Contracting Officer. Failure to give such notice shall make the Contractor responsible for resultant loss.

#### 45. Examination and Retention of Contractor's Records

- (a) The PHA, HUD, or Comptroller General of the United States, or any of their duly authorized representatives shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.
- (b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding \$10,000.
- (c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the Disputes clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the PHA, HUD, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

#### 46. Labor Standards - Davis-Bacon and Related

If the total amount of this contract exceeds \$2,000, the Federal labor standards set forth in the clause below shall apply to the development or construction work to be performed under the contract.

- (a) Minimum Wages.
- (1) All laborers and mechanics employed under this contract in the development or construction of the project(s) involved will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the regular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall

be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

- (2) (i) Any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met: (A) The work to be performed by the classification requested is not performed by a classification in the wage determination; and (B) The classification is utilized in the area by the construction industry; and (C) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (ii) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employee Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.
- (iii) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.
- (iv) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (a)(2)(ii) or (iii) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in classification.
- (3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the

amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

- (b) Withholding of funds. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working in the construction or development of the project, all or part of the wages required by the contract, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due.
- (c) Payrolls and basic records.
- (1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working in the construction or development of the project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(2) (i) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under subparagraph (c)(1) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1214-0149.)

(ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (A) That the payroll for the payroll period contains the information required to be maintained under paragraph (c) (1) of this clause and that such information is correct and complete;
  - (B) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3; and
  - (C) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirements for submission of the "Statement of Compliance" required by subparagraph (c)(2)(ii) of this clause.
- (iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(3) The Contractor or subcontractor shall make the records required under subparagraph (c)(1) available for inspection, copying, or transcription by authorized representatives of HUD or its designee, the Contracting Officer, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to

make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

- (d) (1) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship and Training, Employer and Labor Services (OATELS), or with a State Apprenticeship Agency recognized by OATELS, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by OATELS or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event OATELS, or a State Apprenticeship Agency recognized by OATELS, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (2) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under

the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (3) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
- (e) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.
- (f) Contract termination; debarment. A breach of this contract clause may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.
- (g) Compliance with Davis-Bacon and related Act requirements. All rulings and interpretations of the Davis-Bacon and related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (h) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this clause shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the PHA, HUD, the U.S. Department of Labor, or the employees or their representatives.
- (i) Certification of eligibility.
  - (1) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

- (2) No part of this contract shall be subcontracted to any person or firm ineligible for award of a United States Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

- (3) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

- (j) Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

- (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics, including watchmen and guards, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

- (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in subparagraph (j)(1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic (including watchmen and guards) employed in violation of the provisions set forth in subparagraph (j)(1) of this clause, in the sum of \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in subparagraph (j)(1) of this clause. DOL posts current fines at: <https://www.dol.gov/whd/govcontracts/cwhssa.htm#cmp>

- (3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in subparagraph (j)(2) of this clause.

- (k) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts all the provisions contained in this clause, and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all these provisions.

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47. Non-Federal Prevailing Wage Rates

(a) Any prevailing wage rate (including basic hourly rate and any fringe benefits), determined under State or tribal law to be prevailing, with respect to any employee in any trade or position employed under the contract, is inapplicable to the contract and shall not be enforced against the Contractor or any subcontractor, with respect to employees engaged under the contract whenever such non-Federal prevailing wage rate exceeds:

- (1) The applicable wage rate determined by the Secretary of Labor pursuant to the Davis-Bacon Act (40 U.S.C. 3141 et seq.) to be prevailing in the locality with respect to such trade;
- (b) An applicable apprentice wage rate based thereon specified in an apprenticeship program registered with the U.S. Department of Labor (DOL) or a DOL-recognized State Apprenticeship Agency; or
- (c) An applicable trainee wage rate based thereon specified in a DOL-certified trainee program.

48. Procurement of Recovered Materials.

(a) In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The Contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time; (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.

( ) Paragraph (a) of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of \$10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was with a Federal agency or a State agency or agency of a political subdivision of a State; and (ii) purchased a total of in excess of \$10,000 of the item both under and outside that contract.

# Schedule of Amounts for Contract Payments

U.S. Department of Housing and Urban Development  
Office of Public and Indian Housing

OMB Approval No. 2577-0157  
(Exp. 1/31/2027)

No progress payments shall be made to the contractor unless a schedule of amounts for contract payments in accordance with the construction contract is received.

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently valid OMB control number. Comments regarding the accuracy of this burden estimate and any suggestions for reducing this burden can be sent to the Reports Management Officer, Office of Policy Development and Research, REE, Department of Housing and Urban Development, 451 7th St SW, Room 4176, Washington, DC 20410-5000. When providing comments, please refer to OMB Approval No. 2577-0157. Construction practices and HUD administrative requirements establish the need that HAs maintain certain records or submit certain documents in conjunction with the oversight of the award of construction contracts for the construction of new low-income housing developments or modernization of existing developments. These forms are used by HAs to provide information on the construction progress schedule and schedule of amounts for contract payments. Responses to the collection of information are required to obtain a benefit or to retain a benefit. The information requested does not lend itself to confidentiality.

Project Name and Location	Project Number
---------------------------	----------------

Name, Address, and Zip Code of Contractor
-------------------------------------------

Nature of Contract	Contract Number
--------------------	-----------------

Approved for Contractor by	Title	Date (mm/dd/yyyy)
----------------------------	-------	-------------------

Approved for Architect by	Title	Date (mm/dd/yyyy)
---------------------------	-------	-------------------

Approved for Owner by	Title	Date (mm/dd/yyyy)
-----------------------	-------	-------------------

Item No. (1)	Description of Item (2)	Quantity (3)	Unit of Measure (4)	Unit Price in Place (5)	Amount of Sub-Item (6)	Amount of Principal Item (7)
			<b>D</b>			

<b>Total Amount of Contract or Carried Forward</b>	\$
----------------------------------------------------	----

To the best of my knowledge, all the information stated herein, as well as any information provided in the accompaniment herewith, is true and accurate. **Warning:** HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802)

Signature of authorized representative	Date signed (mm/dd/yyyy)
----------------------------------------	--------------------------

## Instructions for Preparation of form HUD-51000

1. A separate breakdown is required for each project and prime contract instructions for preparation are given below.
  - a. **Heading.** Enter all identifying information required for both forms.
  - b. **Columns 1 and 2.** In column 1, enter the item numbers starting with No. 1, and in column 2 enter each principal division of work incorporated in the contract work.
    - (1) **Master List.** The Master list contains the basic items into which any construction contract may be subdivided for the purpose of preparing the Construction Progress Schedule and the Periodical Estimates for Partial Payments. Only those items shall be selected which apply to the particular contract. To ensure uniformity, no change shall be made in the item numbers. Generally, about 25 to 40 major items appear in a contract.
    - (2) **Items Subdivided.** In the Contractor's breakdown, against which all periodical estimates will be checked prior to payment, each major item must be subdivided into sub-items pertinent to the project involved and in agreement with the Contractor's intended basis for requesting monthly payments.
  - c. **Column 3.** Enter the total quantity for each sub-item of each principal division of work listed in the breakdown.
  - d. **Column 4.** Enter the appropriate unit of measure for each sub-item of work opposite the quantities described in column 3, such as "sq. ft.," "cu. yd.," "tons," "lb.," "lumber per M/BM," "brickwork per M," etc., applicable to the particular sub-item. Items shown on "lump sum" or equivalent basis will be paid for only on completion of the whole item and not on a percentage of completion basis.
  - e. **Column 5.** Enter the unit price, in place, of each sub-item of work.
  - f. **Column 6.** Enter the amount of each sub-item obtained by multiplying the quantities in column 3 by the corresponding unit prices in column 5.
  - g. **Column 7.** Enter the amount of principal item only, obtained by adding the amounts of all sub-items of each principal division of work listed in column 6. Continue with the breakdown on form HUD-51000.
  - h. The "Schedule of Amounts for Contract Payments" shall be signed and dated in the space provided at the bottom of each sheet of the form by the individual who prepared the breakdown for the Contractor.
2. The minimum number of copies required for each submission for approval is an original and two copies. When approved, one fully approved copy will be returned to the Contractor.

### Master List of Items

Item No.	Division of Work	Item No.	Division of Work	Item No.	Division of Work
1	Bond	20	Rough Carpentry		<b>Site Improvements</b>
2	General Conditions	21	Metal Bucks	44	Retaining Walls
3	Demolition & Clearing	22	Caulking	45	Storm Sewers
		23	Weatherstripping	46	Sanitary Sewers
	<b>Structures</b>	24	Lath & Plastering-Drywall	47	Water Distribution System
4	General Excavation	25	Stucco	48	Gas Distribution System
5	Footing Excavation	26	Finish Carpentry	49	Electrical Distribution System
6	Backfill	27	Finish Hardware	50	Street & Yard Lighting
7	Foundation Piles & Caissons	28	Glass & Glazing	51	Fire & Police Alarm System
8	Concrete Foundations	29	Metal Doors	52	Fire Protection System
9	Concrete Superstructures	30	Metal Base & Trim	53	Street Work
10	Reinforcing Steel	31	Toilet Partitions	54	Yard Work
11	Waterproofing & Dampproofing	32	Floors	55	(Other)
12	Spandrel Waterproofing	33	Painting & Decorating	56	(Other)
13	Structural Steel	34	Screens		<b>Equipment</b>
14	Masonry	35	Plumbing	57	Shades & Drapery Rods
15	Stonework	36	Heating	58	Ranges
16	Miscellaneous & Ornamental Metal	37	Ventilating System	59	Refrigerators
17	Metal Windows	38	Electrical	60	Kitchen Cabinets & Work Tables
18	Roofing	39	Elevators	61	Laundry Equipment
19	Sheet Metal	40	Elevator Enclosures—Metal	62	(Other)
		41	Incinerators—Masonry & Parts		<b>Punch List 12</b>
		42	(Other)	63	Lawns & Planting
		43	(Other)	64	

1 General Conditions should be 3% to 5% of contract amount.

2 Punch List should be approximately 1/2 of 1% or \$30 per dwelling unit, whichever is greater.

# Periodic Estimate for Partial Payment

U.S. Department of Housing  
and Urban Development  
Office of Public and Indian Housing

OMB Approval No. 2577-015  
7 (exp. 1/31/2027)

Submit original and one copy to the Public Housing Agency.  
Complete instructions are on the back of this form.

Public reporting burden for this collection of information is estimated to average 3.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently valid OMB control number. Comments regarding the accuracy of this burden estimate and any suggestions for reducing this burden can be sent to the Reports Management Officer, Office of Policy Development and Research, REE, Department of Housing and Urban Development, 451 7th St SW, Room 4176, Washington, DC 20410-5000. When providing comments, please refer to OMB Approval No. 2577-0157. This information is collected under the authority of Section 5(c) of the U.S Housing Act of 1937 and HUD regulations. HAs are responsible for contract administration to ensure that the work for project development is done in accordance with State laws and HUD requirements. The contractor/subcontractor reports provide details and summaries on payments, change orders, and schedule of materials stored for the project. The information will be used to ensure that the total development costs, identified in the ACC, are kept as low as possible and consistent with HUD construction requirements. Responses to the collection are necessary to obtain a benefit. The information requested does not lend itself to confidentiality.

Name of Public Housing Agency	Periodic Estimate Number	Period From (mm/dd/yyyy) To (mm/dd/yyyy)
Location of Project		Project Number

Name of Contractor	Contract Number
--------------------	-----------------

Item Number (1)	Description of Item (2)	Completed to Date (3)
		\$

Value of Contract Work Completed to Date (Transfer this total to line 5 on back of this sheet)	\$
------------------------------------------------------------------------------------------------	----

**Instructions**

**Headings.** Enter all identifying data required. Periodic estimates must be numbered in sequence beginning with the number 1.

**Columns 1 and 2.** The "Item Number" and "Description of Item" must correspond to the number and descriptive title assigned to each principal division of work in the "Schedule of Amounts for Contract Payments", form HUD-51000.

**Column 3.** Enter the accumulated value of each principal division of work completed as of the closing date of the periodic estimate. Enter the total in the space provided.

**Certifications.** The certification of the contractor includes the analysis of amounts used to determine the net balance due. In the first paragraph, enter the name of the Public Housing Agency, the contractor, and the date of the contract. Enter the calculations used in arriving at the "Balance Due This Payment" on lines 1 through 16.

Enter the contractor's name and signature in the certification following line 16.

The latter portion of this certification relating to payment of legal rates of wages, is required by the contract before any payment may be made. However, if the contractor does not choose to certify on behalf of his/her subcontractors to wage payments made by them, he/she may modify the language to cover only himself /herself and attach a list of all subcontractors who employed labor on the site during the period covered by the Periodic Estimate, together with the individual certifications of each.

**Certification of the Contractor or Duly Authorized Representative**

According to the best of my knowledge and belief, I certify that all items and amounts shown on the other side of this form are correct; that all work has been performed and material supplied in full accordance with the items and conditions of the contract between the (name of owner) \_\_\_\_\_ and (contractor) \_\_\_\_\_

dated (mm/dd/yyyy) \_\_\_\_\_, and duly authorized deviations, substitutions, alterations, and additions; that the following is a true and correct statement of the Contract Account up to and including the last day of the period covered by this estimate, and that no part of the "Balance Due This Payment" has been received.

1. Original Contract Amount \$ \_\_\_\_\_

**Approved Change Orders:**

2. Additions (Total from Col. 3, form HUD-51002) \$ \_\_\_\_\_

3. Deductions (Total from Col. 5, form HUD-51002) \$ \_\_\_\_\_ (net) \$ \_\_\_\_\_

4. Current Adjusted Contract Amount (line 1 plus or minus net) \$ \_\_\_\_\_

**Computation of Balance Due this Payment**

5. Value of Original Contract work completed to date (from other side of this form) \$ \_\_\_\_\_

**Completed Under Approved Change Orders**

6. Additions (from Col. 4, form HUD-51002) \$ \_\_\_\_\_

7. Deductions (from Col.5, form HUD-51002) \$ \_\_\_\_\_ (net) \$ \_\_\_\_\_

8. Total Value of Work in Place (line 5 plus or minus net line 7) \$ \_\_\_\_\_

9. Less: Retainage, \_\_\_\_\_ % \$ \_\_\_\_\_

10. Net amount earned to date (line 8 less line 9) \$ \_\_\_\_\_

11. Less: Previously earned (line 10, last Periodic Estimate) \$ \_\_\_\_\_

12. Net amount due, work in place (line 10 less line 11) \$ \_\_\_\_\_

**Value of Materials Properly Stored**

13. At close of this period (from form HUD-51004) \$ \_\_\_\_\_

14. Less: Allowed last period \$ \_\_\_\_\_

15. Increase (decrease) from amount allowed last period \$ \_\_\_\_\_

16. Balance Due This Payment \$ \_\_\_\_\_

I further certify that all just and lawful bills against the undersigned and his/her subcontractors for labor, material, and equipment employed in the performance of this contract have been paid in full in accordance with the terms and conditions of this contract, and that the undersigned and his/her subcontractors have complied with, or that there is an honest dispute with respect to, the labor provisions of this contract.

Name of Contractor	Signature of Authorized Representative	Title	Date (mm/dd/yyyy)
_____	_____	_____	_____

**Certificate of Authorized Project Representative and of Contracting Officer**

Each of us certifies that he/she has checked and verified this Periodic Estimate No. \_\_\_\_\_; that to the best of his/her knowledge and belief it is a true statement of the value of work performed and material supplied by the contractor; that all work and material included in this estimate has been inspected by him/her or by his/her authorized assistants; and that such work has been performed or supplied in full accordance with the drawings and specifications, all applicable accessibility requirements (including Section 504 and Title II of the Americans with Disabilities Act; and the Fair Housing Act and Title III of the Americans with Disabilities Act, if applicable), the terms and conditions of the contract, and duly authorized deviations, substitutions, alterations, and additions, all of which have been duly approved.

We, therefore, approve as the "Balance Due this Payment" the amount of \$ \_\_\_\_\_

Authorized Project Representative	Date (mm/dd/yyyy)	Contracting Officer	Date (mm/dd/yyyy)
_____	_____	_____	_____

I certify the information on this form and in any accompanying documentation is true and accurate. I acknowledge making, presenting, or submitting a false, fictitious, or fraudulent statement, representation, or certification may result in criminal, civil, and/or administrative sanctions, including fines, penalties, and confinement for up to 5 years, (18 U.S.C. §§ 287, 1001 and 31 U.S.C. §3729)

# Schedule of Change Orders

U.S. Department of Housing and Urban Development  
Office of Public and Indian Housing

OMB Approval No. 2577-0157  
(exp. 1/31/2027)

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently valid OMB control number. Comments regarding the accuracy of this burden estimate and any suggestions for reducing this burden can be sent to the Reports Management Officer, Office of Policy Development and Research, REE, Department of Housing and Urban Development, 451 7th St SW, Room 4176, Washington, DC 20410-5000. When providing comments, please refer to OMB Approval No. 2577-0157. This information is collected under the authority of Section 6(c) of the U.S. Housing Act of 1937 and HUD regulations. HAS are responsible for contract administration to ensure that the work for project development is done in accordance with State laws and HUD requirements. The contractor/subcontractor reports provide details and summaries on payments, change orders, and schedule of materials stored for the project. The information will be used to ensure that the total development costs, identified in the ACC, are kept as low as possible and consistent with HUD construction requirements. Responses to the collection are necessary to obtain a benefit. The information requested does not lend itself to confidentiality.

**Instructions:** Contractors use this form for reporting the details of approved Change Orders. Attach an original (or a copy) to each copy of the Periodic Estimate for Partial Payment (form HUD-51001) submission, and send to the Public Housing Agency. Complete all entries. Only Change Orders which bear the signatures required by the contract are to be recorded.

Name of Public Housing Agency	Supporting Periodic Estimate for Partial Payment Number	Period From (mm/dd/yyyy)	to (mm/dd/yyyy)
Location of Project			Project Number
Name of Contractor			Contract Number

Approved Change Orders		Additions		Deductions
Change Order Number (1)	Dated (mm/dd/yyyy) (2)	Total Amount of Change Order (3)	Value of Work Completed to Date (4)	Total Amount of Change Order (5)
		\$	\$	\$
<b>Totals</b>		\$	\$	\$

Authorized Project Representative	Date (mm/dd/yyyy)
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I certify that the information provided on this form and in any accompanying documentation is true and accurate. I acknowledge that making, presenting, or submitting a false, fictitious, or fraudulent statement, representation, or certification may result in criminal, civil, and/or administrative sanctions, including fines, civil penalties, and confinement for up to 5 years, (18 U.S.C. §§ 287, 1001 and 31 U.S.C. §3729)



# Summary of Materials Stored

U.S. Department of Housing  
and Urban Development  
Office of Public and Indian Housing

OMB Approval No. 2577-0157  
(exp. 1/31/2027)

Public reporting burden for this collection of information is estimated to average 2.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. HUD may not conduct or sponsor, and an applicant is not required to respond to a collection of information unless it displays a currently valid OMB control number. Comments regarding the accuracy of this burden estimate and any suggestions for reducing this burden can be sent to the Reports Management Officer, Office of Policy Development and Research, REE, Department of Housing and Urban Development, 451 7th St SW, Room 4176, Washington, DC 20410-5000. When providing comments, please refer to OMB Approval No. 2577-0157. This information is collected under the authority of Section 6(c) of the U.S. Housing Act of 1937 and HUD regulations. HAs are responsible for contract administration to ensure that the work for project development is done in accordance with State laws and HUD requirements. The contractor/subcontractor reports provide details and summaries on payments, change orders, and schedule of materials stored for the project. The information will be used to ensure that the total development costs, identified in the ACC, are kept as low as possible and consistent with HUD construction requirements. Responses to the collection are necessary to obtain a benefit. The information requested does not lend itself to confidentiality.

**Instructions:** This form is for the Contractor to summarize the value of materials stored at the site (as shown on the schedule, form HUD-51003). Use a separate line for the contractor and each of his/her subcontractors. Prepare an original and one copy, attach form HUD-51003, and send to the Public Housing Agency with the Periodic Estimate for Partial Payment, form HUD-51001. **Payment Value.** No more than 90 percent of the estimated value of the stored materials will be allowed, and only the net amount will be carried to line 13 on the back of the Periodic Estimate for Partial Payment, form HUD-51001. **Signatures.** This form must be signed by those employees of the contractor and of the Public Housing Agency who prepare and check the Schedule of Materials Stored, form HUD-51003.

Name of Public Housing Agency	Supporting Periodic Estimate for Partial Payment Number	Period From (mm/dd/yyyy)	To (mm/dd/yyyy)
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Location of Project	Project Number
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Name of General Contractor	Contract Number
----------------------------	-----------------

Name of General Contractor or Subcontractor	Amounts
General Contractor	\$

Subcontractors	\$
----------------	----

	Total	\$
	Less 10%	\$
	Net	\$

Prepared by	Date (mm/dd/yyyy)	Checked by	Date (mm/dd/yyyy)
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I certify that I or my authorized representatives have examined and checked in detail the invoices representing the cost of materials set forth in appended "Schedule of Materials Stored", form HUD-51003, dated (mm/dd/yyyy) \_\_\_\_\_ submitted by \_\_\_\_\_ consisting of \_\_\_\_\_ sheets with an indicated cost of \$ \_\_\_\_\_, and find that the net unit prices set forth in the schedule are the same or less than the invoices examined, and that such materials were suitably stored at the site of the development as of (date)(mm/dd/yyyy) \_\_\_\_\_.

Name of Owner	By (Authorized Representative)	Title	Date (mm/dd/yyyy)
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**Warning:** HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802)

## DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352

Approved by OMB

0348-0046

(See reverse for public burden disclosure.)

<b>1. Type of Federal Action:</b> <input type="checkbox"/> a. contract <input type="checkbox"/> b. grant <input type="checkbox"/> c. cooperative agreement <input type="checkbox"/> d. loan <input type="checkbox"/> e. loan guarantee <input type="checkbox"/> f. loan insurance	<b>2. Status of Federal Action:</b> <input type="checkbox"/> a. bid/offer/application <input type="checkbox"/> b. initial award <input type="checkbox"/> c. post-award	<b>3. Report Type:</b> <input type="checkbox"/> a. initial filing <input type="checkbox"/> b. material change <b>For Material Change Only:</b> year _____ quarter _____ date of last report _____
<b>4. Name and Address of Reporting Entity:</b> <input type="checkbox"/> Prime <input type="checkbox"/> Subawardee Tier _____, if known:  Congressional District, if known: 4c	<b>5. If Reporting Entity in No. 4 is a Subawardee, Enter Name and Address of Prime:</b>  Congressional District, if known:	
<b>6. Federal Department/Agency:</b>	<b>7. Federal Program Name/Description:</b>  CFDA Number, if applicable: _____	
<b>8. Federal Action Number, if known:</b>	<b>9. Award Amount, if known:</b> \$ _____	
<b>10. a. Name and Address of Lobbying Registrant</b> (if individual, last name, first name, MI):	<b>b. Individuals Performing Services</b> (including address if different from No. 10a) (last name, first name, MI):	
<b>11.</b> Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.	Signature: _____ Print Name: _____ Title: _____ Telephone No.: _____ Date: _____	
<b>Federal Use Only:</b>		Authorized for Local Reproduction Standard Form LLL (Rev. 7-97)

## INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee," then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, State and zip code of the lobbying registrant under the Lobbying Disclosure Act of 1995 engaged by the reporting entity identified in item 4 to influence the covered Federal action.  
  
(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).
11. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is OMB No. 0348-0046. Public reporting burden for this collection of information is estimated to average 10 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, DC 20503.