Renovations to:

Warwick Public Library
First Floor Restrooms
600 Sandy Lane
Warwick, RI

Prepared for:

Warwick Public Library
600 Sandy Lane
Providence, RI 02889

Construction Documents
February 24, 2020

Architect:

Ed Wojcik Architect, Ltd.
One Richmond Square
Providence, RI 02906
P: 401-861-7139

Mechanical Engineer:

Wilkinson Associates
615 Jefferson Boulevard
Warwick, RI 02886
P: 401-737-6382

BOARD of TRUSTEES, Warwick Public Library, Warwick RI
BIDS REQUESTED FOR

Bid #2020L-03 Restroom Renovation

Specifications are available in the Administrative Office, Warwick Public Library, 600 Sandy Lane, Warwick, RI, Monday through Friday, 9:00 AM until 4:00 PM on or after Monday, February 24, 2020 and on the City of Warwick's website, https://www.warwickri.gov/bids/all

Sealed bids will be received in the Administrative Office, Warwick Public Library, 600 Sandy Lane, Warwick, RI 02889 until **3:00 pm on Wednesday. March 18.** The bids will be opened publicly commencing at **3:00 PM** on the same day in the Administrative Office, Warwick Public Library. The Library Board of Trustees will consider the bids at the Board meeting on Wednesday, March 25 at 4:30 p.m. at the Central Library.

A walkthrough will take place on Monday, March 2 at noon. Contractors are encouraged to attend.

The contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap for any position for which the employee or applicant is qualified and that in the event of noncompliance the Library may declare the contractor in breach and take any necessary legal recourse including termination or cancellation of the contract.

A bidder filing a bid thereby certifies that no officer, agent, or employee of the Library or City has a pecuniary interest in the bid or has participated in contract negotiations on the part of the Library, that the bid is made in good faith without fraud or collusion, or connection of any kind with any other bidder for the same call for bids, and that the bidder is competing solely in his own behalf without connection with, or obligation to, any undisclosed person or firm.

All bids should be submitted with one (1) original and one (1) copy in a sealed envelope. The exterior of the envelope shall be plainly marked to include: Your Company Name and "Bid #2020L-03 Restroom Renovation". Bids received prior to the time of the opening will be securely kept, unopened. No responsibility will be attached to an officer or person for the premature opening of a bid not properly addressed and identified. No bids shall be accepted via fax or email.

All questions pertaining to these specifications should be referred to Christopher LaRoux, Director, Warwick Public Library, 600 Sandy Lane, Warwick RI 02889, 401-739-5440 ext. 9760.

Any deviation from the specifications must be noted in writing and attached as part of the bid. The Bidder shall indicate the item or part with the deviation and indicate how the bid will deviate from the specifications.

Negligence on the part of the bidder in preparing the bid confers no rights for the withdrawal of the bid after it is opened.

The successful bidder must provide the Warwick Public Library with an ***original*** certificate of insurance for General Liability in a minimum **amount of $1 million** naming the ***City of Warwick as the additional insured*** and so stated on the certificate with the bid name and bid number.

The successful bidder must furnish a Labor & Materials Bond in the amount of 100 percent of the total proposal price.

The successful bidder will provide said insurance within ten (10) calendar days after notification of award or the City reserves the right to rescind said award.

The contractor must carry sufficient liability insurance and agree to indemnify the Library against all claims of any nature, which might arise as a result of his operations or conduct of work.

The successful bidder must comply with all Rhode Island Laws, applicable to public works projects, including, but not limited to provisions of Chapter 13 of Title 37 of the Rhode Island General Laws, pertaining to prevailing wage rates, and all other applicable local, state and federal laws. Prevailing Wages will apply to this bid. Current rates may be viewed at http://www.dlt.state.ri.us/pw/

The IRS Form W-9 must be completed and submitted with the bid if the bidder falls under IRS requirements to file this form.

Prices to be held firm from April 1, 2020 through completion of the project. The project should be completed by June 30.

The Library is exempt from the payment of Rhode Island Sales Tax under the 1956 General Laws of the State of Rhode Island, 44-18-30, Paragraph I, as amended.

The award shall be made on the basis of the lowest evaluated or responsive bid price. **The Board of Trustees of the Warwick Public Library is not obligated to accept the lowest bid and reserves the right to reject any and all bids or amend the scope of the project.**

The Library reserves the right to terminate the contract or any part of the contract in the best interests of the Library, upon 30-day notice to the contractor. The Library shall incur no liability for materials or services not yet ordered if it terminates in the best interests of the Library. If the Library terminates in the interests of the Library after an order for materials or services has been placed, the contractor shall be entitled to compensation upon submission of invoices and proper proof of claim, in that proportion which its services and products were satisfactorily rendered or provided, as well as expenses necessarily incurred in the performance of work up to time of termination.

All invoices submitted for payment must include the date(s) of service and or the contract period that is being billed.

All costs directly or indirectly related to the preparation of a response to this solicitation, or any presentation or communication to supplement and/or clarify any response to this solicitation, which may be required or requested by the Library, shall be the sole responsibility of and shall be borne by the respondent.

If the respondent is awarded a contract in accordance with this solicitation and the respondent's bid or response, and if the respondent fails or refuses to satisfy fully all of its obligations thereunder, the Warwick Public Library shall be entitled to recover from the respondent any losses, damages or costs incurred by the Library as a result of such failure or refusal.

The Library reserves the right to rescind award for non-compliance to bid specifications.

The successful bidder must adhere to all City, State and Federal Laws, where applicable.

WARWICK PUBLIC LIBRARY

CONTRACT SERVICES FOR RESTROOM RENOVATIONS

SECTION 00 0110

TABLE OF CONTENTS

END OF SECTION

SECTION 00 5000

CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.

1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT

1.03 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in Contract Documents.

B. Post-Award Certificates and Other Forms:
   1. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).

C. Clarification and Modification Forms:
   1. Change Order Form: AIA G701.

D. Closeout Forms:
   1. Certificate of Substantial Completion Form: AIA G704.

1.04 REFERENCE STANDARDS

A. AIA G701 - Change Order; 2017.

B. AIA G702 - Application and Certificate for Payment; 1992.

C. AIA G703 - Continuation Sheet; 1992.

D. AIA G704 - Certificate of Substantial Completion; 2017.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Renovations to Warwick Public Library Restrooms

B. Owner's Name: Warwick Public Library.

C. Architect's Name: Ed Wojcik Architect, Ltd..

D. The Project consists of the alteration of Men's and Women's restrooms on first floor, and onstrucion of new companion restroom.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5200 - Agreement Form.

1.03 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 4100.

B. Scope of alterations work is indicated on drawings.

C. Plumbing: Alter existing and add new construction.

D. Electrical Power and Lighting: Replace existing system with new construction.

E. Fire Suppression Sprinklers: Alter existing system and add new construction, keeping existing in operation.

F. Fire Alarm: Alter existing system and add new construction, keeping existing in operation.

1.04 WORK BY OWNER

A. Owner will supply and install the following:
   1. Toilet tissue dispensers.
   2. Sanitary napkin disposals.

1.05 OWNER OCCUPANCY

A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.

B. Owner intends to occupy the Project upon Substantial Completion.

C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

D. Schedule the Work to accommodate Owner occupancy.

1.06 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.
   1. Locate and conduct construction activities in ways that will limit disturbance to site.

B. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Use of site and premises by the public.

C. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Existing building spaces may not be used for storage.

E. Utility Outages and Shutdown:
   1. Limit disruption of utility services to hours the building is unoccupied.

2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
3. Prevent accidental disruption of utility services to other facilities.

1.07 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner.

END OF SECTION

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Change procedures.

D. Correlation of Contractor submittals based on changes.

E. Procedures for preparation and submittal of application for final payment.

1.02 SCHEDULE OF VALUES

A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

E. Revise schedule to list approved Change Orders, with each Application For Payment.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.

C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

D. Forms filled out by hand will not be accepted.

E. Execute certification by signature of authorized officer.

F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

G. Submit one electronic and three hard-copies of each Application for Payment.

H. Include the following with the application:
   1. Transmittal letter as specified for submittals in Section 01 3000.
   2. Partial release of liens from major subcontractors and vendors.

I. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.04 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.

B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.

C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within ____ days.

D. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
   1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
   2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
   3. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.
   4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

E. Substantiation of Costs: Provide full information required for evaluation.
   1. On request, provide the following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.

F. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

G. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

H. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

I. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 01 7000.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2200
UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. List of unit prices, for use in preparing Bids.

B. Measurement and payment criteria applicable to Work performed under a unit price payment method.

C. Defect assessment and non-payment for rejected work.

1.02 RELATED REQUIREMENTS

A. Document 00 4322 - Unit Prices Form: List of Unit Prices as supplement to Bid Form

1.03 COSTS INCLUDED

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

1.04 UNIT QUANTITIES SPECIFIED

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

1.05 PAYMENT

A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.

B. Payment will not be made for any of the following:
   1. Products determined as unacceptable before or after placement.
   2. Products remaining on hand after completion of the Work.
   3. Loading, hauling, and disposing of rejected Products.

1.06 DEFECT ASSESSMENT

A. Replace Work, or portions of the Work, not complying with specified requirements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.
B. Electronic document submittal service.
C. Preconstruction meeting.
D. Site mobilization meeting.
E. Progress meetings.
F. Construction progress schedule.
G. Submittals for review, information, and project closeout.
H. Number of copies of submittals.
I. Requests for Interpretation (RFI) procedures.
J. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 01 6000 - Product Requirements: General product requirements.
B. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

1.04 PROJECT COORDINATOR

A. Project Coordinator: Construction Manager.
B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for _____ access, traffic, and parking facilities.
C. During construction, coordinate use of site and facilities through the Project Coordinator.
D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 1000 - Summary.
F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
G. Make the following types of submittals to Architect through the Project Coordinator:
    1. Requests for Interpretation.
    2. Requests for substitution.
    3. Shop drawings, product data, and samples.
    4. Applications for payment and change order requests.
    5. Progress schedules.
    6. Coordination drawings.
    7. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
   1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
   2. Contractor and Architect are required to use this service.
   3. It is Contractor's responsibility to submit documents in allowable format.
   4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
   5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
   6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
   7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

3.02 PRECONSTRUCTION MEETING

A. Owner will schedule a meeting after Notice of Award.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties to Contract and Architect.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 SITE MOBILIZATION MEETING

A. Owner will schedule meeting at the Project site prior to Contractor occupancy.

B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's superintendent.

C. Agenda:

1. Use of premises by Owner and Contractor.
2. Owner's requirements.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Security and housekeeping procedures.
6. Schedules.
7. Application for payment procedures.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements for start-up of equipment.
11. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum monthly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required:
1. Contractor.
2. Owner.
3. Architect.
4. Contractor's superintendent.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of RFIs log and status of responses.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Maintenance of quality and work standards.
11. Effect of proposed changes on progress schedule and coordination.
12. Other business relating to work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.05 CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

3.06 REQUESTS FOR INTERPRETATION (RFI)

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

1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
2. A resolution to an issue which has arisen due to field conditions and affects design intent.

B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.

C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
   1. Prepare a separate RFI for each specific item.
      a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
      b. Do not forward requests which solely require internal coordination between subcontractors.
   2. Prepare using an electronic version of the form appended to this section.
   3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.

D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
   1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
   2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
      a. Approval of submittals (use procedures specified elsewhere in this section).
      b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
      c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
      d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
   3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
   4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response.

E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
   1. Official Project name and number, and any additional required identifiers established in Contract Documents.
   2. Discrete and consecutive RFI number, and descriptive subject/title.
   3. Issue date, and requested reply date.
   4. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
   5. Annotations: Field dimensions and/or description of conditions which have engendered the request.
   6. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.

F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
   1. Indicate current status of every RFI. Update log promptly and on a regular basis.
   2. Note dates of when each request is made, and when a response is received.
   3. Highlight items requiring priority or expedited response.
   4. Highlight items for which a timely response has not been received to date.

H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.

I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
   1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
   2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
   3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
   4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.07 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format.

3.08 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.09 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.10 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.11 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.12 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Use a single transmittal for related items.
   2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
   3. Transmit using approved form.
      a. Use Contractor's form, subject to prior approval by Architect.
   4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
   5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
   6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
      a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
   7. Schedule submittals to expedite the Project, and coordinate submission of related items.
      a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
      b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
   8. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
   9. Provide space for Contractor and Architect review stamps.
   10. When revised for resubmission, identify all changes made since previous submission.
   11. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
   12. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.

B. Product Data Procedures:
   1. Submit only information required by individual specification sections.
   2. Collect required information into a single submittal.
   3. Submit concurrently with related shop drawing submittal.
   4. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.

2. Do not reproduce Contract Documents to create shop drawings.
3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:
1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.13 SUBMITTAL REVIEW

A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.

B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.

C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.

D. Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
a. "Reviewed", or language with same legal meaning.
b. "Reviewed as noted - resubmission not required", or language with same legal meaning.
1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
c. "Reviewed as noted - Resubmit for Record", or language with same legal meaning.
2. Not Authorizing fabrication, delivery, and installation:
a. "Revise and Resubmit".
1) Resubmit revised item, with review notations acknowledged and incorporated.
b. "Rejected".
1) Submit item complying with requirements of Contract Documents.

E. Architect's and consultants' actions on items submitted for information:
1. Items for which no action was taken:
a. "Received" - to notify the Contractor that the submittal has been received for record only.
2. Items for which action was taken:
a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. References and standards.

C. Control of installation.

D. Tolerances.

E. Defect Assessment.

1.02 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.03 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4100

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY OF REFERENCE STANDARDS

A. Regulatory requirements applicable to this project are the following:

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.

D. State of Rhode Island amendments to some or all of the following.

E. City of Warwick amendments to some or all of the following.

F. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

G. NFPA 1 - Fire Code; 2018.

H. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. ICC (IPC) - International Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Controls: Barriers, enclosures, and fencing.

B. Security requirements.

C. Waste removal facilities and services.

1.02 RELATED REQUIREMENTS

A. Section 01 5100 - Temporary Utilities.

1.03 TEMPORARY UTILITIES - SEE SECTION 01 5100

A. Owner will provide the following:
   1. Electrical power and metering, consisting of connection to existing facilities.
   2. Water supply, consisting of connection to existing facilities.

1.04 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.06 SECURITY - SEE SECTION 01 3553

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

1.07 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations.

1.02 RELATED REQUIREMENTS

A. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.

B. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

C. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.

B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Use of products having any of the following characteristics is not permitted:
   1. Made using or containing CFC's or HCFC's.
   2. Containing lead, cadmium, or asbestos.

C. Where other criteria are met, Contractor shall give preference to products that:
   1. If used on interior, have lower emissions, as defined in Section 01 6116.
   2. If wet-applied, have lower VOC content, as defined in Section 01 6116.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. See Section 01 2500 - Substitution Procedures.

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 6116

VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for Indoor-Emissions-Restricted products.

B. Requirements for VOC-Content-Restricted products.

C. Requirement for installer certification that they did not use any non-compliant products.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures.

1.03 DEFINITIONS

A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.
   3. Flooring.
   4. Products making up wall and ceiling assemblies.
   5. Thermal and acoustical insulation.

B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.

C. Interior of Building: Anywhere inside the exterior weather barrier.

D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
   1. Concrete.
   2. Clay brick.
   3. Metals that are plated, anodized, or powder-coated.
   4. Glass.
   5. Ceramics.
   6. Solid wood flooring that is unfinished and untreated.

1.04 REFERENCE STANDARDS

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

B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2018).

C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; 2017, v1.2.

D. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.

E. CHPS (HPPD) - High Performance Products Database; Current Edition at www.chps.net/.

F. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.

G. SCAQMD 1113 - Architectural Coatings; 1977 (Amended 2016).

H. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

I. SCS (CPD) - SCS Certified Products; Current Edition.

J. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

C. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of installer's products, or 2) that such products used comply with these requirements.

1.06 QUALITY ASSURANCE

A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
   1. Wet-Applied Products: State amount applied in mass per surface area.
   2. Paints and Coatings: Test tinted products, not just tinting bases.
   3. Evidence of Compliance: Acceptable types of evidence are the following;
      a. Current UL (GGG) certification.
      b. Current SCS (CPD) Floorscore certification.
      c. Current SCS (CPD) Indoor Advantage Gold certification.
      d. Current listing in CHPS (HPPD) as a low-emitting product.
      e. Current CRI (GLP) certification.
      f. Test report showing compliance and stating exposure scenario used.
   4. Product data submittal showing VOC content is NOT acceptable evidence.
   5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.

B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. Indoor-Emissions-Restricted Products: Comply with Indoor Emissions Standard and Test Method, except for:
   1. Inherently Non-Emitting Materials.

C. VOC-Content-Restricted Products: VOC content not greater than required by the following:
   1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
   2. Joint Sealants: SCAQMD 1168 Rule.
   3. Paints and Coatings: Each color; most stringent of the following:
      a. 40 CFR 59, Subpart D.
      b. SCAQMD 1113 Rule.
      c. CARB (SCM).

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, _____.

C. Cutting and patching.

D. Surveying for laying out the work.

E. Cleaning and protection.

F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

G. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.

B. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.

C. Section 07 8400 - Firestopping.

1.03 QUALIFICATIONS

A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.04 PROJECT CONDITIONS

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
   1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
   1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
   2. Indoors: Limit conduct of especially noisy interior work to 7 am to 9 am.

1.05 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

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

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; and _____.
2. Grid or axis for structures.
3. Building foundation, column locations, ground floor elevations, and _____.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
1. Verify that construction and utility arrangements are as indicated.
2. Report discrepancies to Architect before disturbing existing installation.
3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.

C. Remove existing work as indicated and as required to accomplish new work.
1. Remove items indicated on drawings.
2. Relocate items indicated on drawings.
3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, and Electrical): Remove, relocate, and extend existing systems to accommodate new construction.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    b. Provide temporary connections as required to maintain existing systems in service.
4. Verify that abandoned services serve only abandoned facilities.
5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.

F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

H. Refinish existing surfaces as indicated:
   1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
   2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

I. Clean existing systems and equipment.

J. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

K. Do not begin new construction in alterations areas before demolition is complete.

L. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-complying work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

J. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.

3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 ADJUSTING

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

3.10 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean filters of operating equipment.

F. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.11 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in

accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.12 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Owner may decide to pay for additional recycling, salvage, and/or reuse based on Landfill Alternatives Proposal specified below.

E. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood.
   5. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.

F. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

G. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.

H. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

I. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

C. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

D. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Landfill Alternatives Proposal: Within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner, submit a projection of trash/waste that will require disposal and alternatives to landfilling, with net costs.
   1. Submit to Architect for Owner's review and approval.
   2. If Owner wishes to implement any cost alternatives, the Contract Price will be adjusted as specified elsewhere.
   3. Include an analysis of trash/waste to be generated and landfill options as specified for Waste Management Plan described below.
   4. Describe as many alternatives to landfilling as possible:
      a. List each material proposed to be salvaged, reused, or recycled.
      b. List the proposed local market for each material.
      c. State the estimated net cost resulting from each alternative, after subtracting revenue from sale of recycled or salvaged materials and landfill tipping fees saved due to diversion of materials from the landfill.
   5. Provide alternatives to landfilling for at least the following materials:
      a. Concrete.

C. Once Owner has determined which of the landfill alternatives addressed in the Proposal above are acceptable, prepare and submit Waste Management Plan; submit within 10 calendar days after notification by Architect.

PART 3 EXECUTION

2.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.

C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.

D. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

2.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Prebid meeting.
   2. Preconstruction meeting.
   3. Regular job-site meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Individual Product Sections: Specific requirements for operation and maintenance data.

C. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Addenda.
   3. Change Orders and other modifications to the Contract.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Record Drawings: Legibly mark each item to record actual construction including:
   1. Field changes of dimension and detail.
   2. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

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

3.04 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

J. Arrangement of Contents: Organize each volume in parts as follows:
   1. Project Directory.
   2. Table of Contents, of all volumes, and of this volume.
   3. Operation and Maintenance Data: Arranged by system, then by product category.
      a. Source data.
      b. Operation and maintenance data.
      c. Field quality control data.
      d. Photocopies of warranties and bonds.

3.05 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch (216 by 279 mm) three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 02 4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Building demolition excluding removal of hazardous materials and toxic substances.

B. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 1000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

C. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

D. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

E. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

PART 3 EXECUTION

2.01 SCOPE

A. Remove other items indicated, for salvage, relocation, and recycling.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Do not close or obstruct roadways or sidewalks without permit.
   6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

E. Perform demolition in a manner that maximizes salvage and recycling of materials.
   1. Dismantle existing construction and separate materials.
   2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

2.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, and Electrical): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

2.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Rough opening framing for doors, windows, and roof openings.

B. Preservative treated wood materials.

C. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2015.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

C. AWPA U1 - Use Category System: User Specification for Treated Wood; 2018.

D. PS 20 - American Softwood Lumber Standard; 2015.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.04 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

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

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm)):
   1. Grade: No. 2.

D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
   2. Drywall Screws: Bugle head, hardened steel, power driven type, length to achieve full penetration of sheathing substrate.

2.04 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
   1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.03 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. Provide the following specific non-structural framing and blocking:
   1. Grab bars.
   2. Towel and bath accessories.
   3. Wall-mounted door stops.

3.04 TOLERANCES

A. Framing Members: 1/4 inch (6 mm) from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

3.05 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 7419 - Construction Waste Management and Disposal.

1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Batt insulation in interior wall construction.

1.02 REFERENCE STANDARDS

A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.

2.02 BATT INSULATION MATERIALS

A. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
   1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   2. Manufacturers:
      a. Johns Manville; MinWool Sound Attenuation Fire Batts: www.jm.com/#sle.
      b. Thermafiber, Inc; SAFB: www.thermafiber.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install in interior wall spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

END OF SECTION

SECTION 07 8400
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

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

1.02 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2019.

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).

C. ITS (DIR) - Directory of Listed Products; current edition.

D. FM (AG) - FM Approval Guide; current edition.

E. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

F. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.

G. UL (DIR) - Online Certifications Directory; Current Edition.

H. UL (FRD) - Fire Resistance Directory; Current Edition.

1.03 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.

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

1.04 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Firestopping Materials: Any materials meeting requirements.

B. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.

C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
   1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.03 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

A. Penetrations By:
   1. Uninsulated Metallic Pipe, Conduit, and Tubing:

a. 1 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
   a. 1 Hour Construction: UL System W-L-2128; Hilti FS-ONE MAX Intumescent Firestop Sealant.
3. Electrical Cables Not In Conduit:
   a. 1 Hour Construction: UL System W-L-3065; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
4. Insulated Pipes:
   a. 1 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.

2.04 FIRESTOPPING SYSTEMS

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

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authorities having jurisdiction.

3.04 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Joint backings and accessories.

1.02 REFERENCE STANDARDS

A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

B. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

C. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section and with at least five years of documented experience.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
   1. Dow Chemical Company; _____: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
   2. Pecora Corporation; _____: www.pecora.com/#sle.
   3. Sherwin-Williams Company; _____: www.sherwin-williams.com/#sle.
   4. Sika Corporation; _____: www.usa-sika.com/#sle.
   5. Tremco Commercial Sealants & Waterproofing; ____: www.tremcosealants.com/#sle.
   6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. Other joints indicated below.
   2. Do not seal the following types of joints.

a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
c. Joints where installation of sealant is specified in another section.
d. Joints between suspended panel ceilings/grid and walls.

B. Type ___ - Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
1. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.

C. Interior Wet Areas: Bathrooms and restrooms; fixtures in wet areas include plumbing fixtures, countertops, and other similar items.

2.03 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

2.04 NONSAG JOINT SEALANTS

A. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
1. Color: White.

2.05 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
1. Open Cell: 40 to 50 percent larger in diameter than joint width.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install bond breaker backing tape where backer rod cannot be used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION

SECTION 08 1213
HOLLOW METAL FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire-rated hollow metal frames for non-hollow metal doors.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware: Hardware, silencers, and weatherstripping.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.

C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.

F. 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; 2018a.

G. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.

H. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

I. ITS (DIR) - Directory of Listed Products; current edition.

J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

L. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2007.

M. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

N. UL (DIR) - Online Certifications Directory; Current Edition.

O. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Manufacturer's Qualification Statement.

E. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with applicable requirements and in compliance with standards and/or custom guidelines as indicated.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Frames with Integral Casings:
   1. Ceco Door, an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
   2. Curries, an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
   3. Republic Doors, an Allegion brand; ____: www.republicdoor.com/#sle.
   4. Steelcraft, an Allegion brand; ____: www.allegion.com/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Refer to Door and Frame Schedule on the drawings for frame sizes, fire ratings, sound ratings, finishing, door hardware to be installed, and other variations, if any.

B. Door Frame Type: Provide hollow metal door frames with integral casings.

C. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.

D. Accessibility: Comply with ICC A117.1 and ADA Standards.

E. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior frame that is also indicated as being sound-rated must comply with the requirements specified for exterior frames and for sound-rated frames; where two requirements conflict, comply with the most stringent.

F. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115, NAAMM HMMA 830, NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

2.03 HOLLOW METAL DOOR FRAMES WITH INTEGRAL CASINGS

A. Fire-Rated Door Frames: Full profile/continuously welded type.
   1. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C or NFPA 252 ("positive pressure fire tests").
   2. Provide units listed and labeled by ITS (DIR) or UL (DIR).
      a. Attach fire rating label to each fire rated unit.
   3. Frame Finish: Factory primed and field finished.

2.04 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.05 ACCESSORIES

A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

A. Install frames in accordance with manufacturer's instructions and related requirements of specified frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Install door hardware as specified in Section 08 7100.

3.03 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 1416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire-rated.

1.02 RELATED REQUIREMENTS

A. Section 08 1213 - Hollow Metal Frames.

B. Section 08 7100 - Door Hardware.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2018).

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2018).

C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

D. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Samples: Submit two samples of door veneer, 6 by 6 inch (152 by 152 mm) in size illustrating wood grain, stain color, and sheen.

E. Warranty, executed in Owner's name.

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.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Eggers Industries; ____: www.eggersindustries.com/#sle.
   2. Graham Wood Doors; _____: www.grahamdoors.com/#sle.
   3. Marshfield DoorSystems, Inc; ____: www.marshfielddoors.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS

A. Doors: Refer to drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
   3. Wood veneer facing with factory transparent finish.

2.03 DOOR AND PANEL CORES

A. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: Species to match existing, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, center balance match of spliced veneer leaves assembled on door or panel face.
   1. Vertical Edges: Any option allowed by quality standard for grade.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

E. Provide edge clearances in accordance with the quality standard specified.

2.06 FACTORY FINISHING - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Stain: As selected by Architect.
      c. Sheen: Satin.

B. Factory finish doors in accordance with approved sample.

C. Seal door top edge with color sealer to match door facing.

2.07 ACCESSORIES

A. Hollow Metal Door Frames: As specified in Section 08 1213.

B. Door Hardware: As specified in Section 08 7100.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.
B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
C. Use machine tools to cut or drill for hardware.
D. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.
B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.
B. Adjust closers for full closure.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood doors.

B. Hardware for fire-rated doors.

1.02 RELATED REQUIREMENTS

A. Section 08 1213 - Hollow Metal Frames.

B. Section 08 1416 - Flush Wood Doors.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. BHMA A156.1 - American National Standard for Butts and Hinges; 2016.

C. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.

D. BHMA A156.6 - American National Standard for Architectural Door Trim; 2015.

E. BHMA A156.7 - American National Standard for Template Hinge Dimensions; 2016.

F. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; 2017.

G. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2018.

H. BHMA A156.18 - American National Standard for Materials and Finishes; 2016.

I. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; 1993; also in WDHS-1/WDHS-5 Series, 1996.

J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

K. ITS (DIR) - Directory of Listed Products; current edition.

L. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.

M. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.

N. UL (DIR) - Online Certifications Directory; Current Edition.

O. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Keying Requirements Meeting:
   1. Owner will schedule meeting at project site prior to Contractor occupancy.
   2. Attendance Required:
      a. Contractor.
      b. Owner.
   3. Agenda:
      a. Establish keying requirements.
      b. Verify locksets and locking hardware are functionally correct for project requirements.
      c. Verify that keying and programming complies with project requirements.
      d. Establish keying submittal schedule and update requirements.
   4. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
   5. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
   6. Deliver established keying requirements to manufacturers.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

C. Keying Schedule:
   1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.

1.06 QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.
   1. Closers: Five years, minimum.
   2. Locksets and Cylinders: Three years, minimum.
   3. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.
   2. Accessibility: ADA Standards and ICC A117.1.
   3. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
   4. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for application indicated.

2.02 HINGES

A. Manufacturers:
   1. McKinney; an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
   2. Hager Companies; _____: www.hagerco.com/#sle.
   3. Stanley, dormakaba Group; _____: www.stanleyhardwarefordoors.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Hinges: Comply with BHMA A156.1, Grade 1.
   1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
      a. Provide hinge width required to clear surrounding trim.
   2. Provide hinges on every swinging door.
   3. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   4. Provide ball-bearing hinges at each door with closer.

5. Provide following quantity of butt hinges for each door:
   a. Doors From 60 inches (1.5 m) High up to 90 inches (2.3 m) High: Three hinges.

2.03 LOCK CYLINDERS

A. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
   1. Provide cylinders from same manufacturer as locking device.
   2. Provide cams and/or tailpieces as required for locking devices.

2.04 MORTISE LOCKS

A. Manufacturers:
   1. Corbin Russwin, Sargent, or Yale; an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
   2. Schlage, an Allegion brand; _____: www.allegion.com/us/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Mortise Locks: Comply with BHMA A156.13, Grade 1, Security, 1000 Series.
   1. Latchbolt Throw: 3/4 inch (19 mm), minimum.
   2. Deadbolt Throw: 1 inch (25.4 mm), minimum.
   3. Backset: 2-3/4 inch (70 mm) unless otherwise indicated.
   4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
      a. Finish: To match lock or latch.

2.05 CLOSERS

A. Manufacturers; Surface Mounted:
   1. Corbin Russwin, Norton, Rixson, Sargent, or Yale; an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
   2. LCN, an Allegion brand; _____: www.allegion.com/us/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Closers: Comply with BHMA A156.4, Grade 1.
   1. Type: Surface mounted to door.
   2. Provide door closer on each exterior door.
   3. Provide door closer on each fire-rated and smoke-rated door.

2.06 PROTECTION PLATES

A. Manufacturers:
   1. Rockwood; an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
   2. Ives, an Allegion brand; _____: www.allegion.com/us/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Protection Plates: Comply with BHMA A156.6.

C. Metal Properties: Aluminum.
   1. Metal, Heavy Duty: Thickness 0.062 inch (1.57 mm), minimum.

D. Edges: Beveled, on four sides unless otherwise indicated.

E. Fasteners: Countersunk screw fasteners.

2.07 KICK PLATES

A. Manufacturers:
   1. Ives, an Allegion brand; _____: www.allegion.com/us/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
   1. Size: 8 inch (203 mm) high by 2 inch (51 mm) less door width (LDW) on push side of door.

2.08 WALL STOPS

A. Manufacturers:
   1. Rockwood; an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
   1. Type: Bumper, convex, wall stop.
   2. Material: Aluminum housing with rubber insert.

2.09 SILENCERS

A. Manufacturers:
   1. Ives, an Allegion brand; _____: www.allegion.com/us/#sle.
   2. Rockwood; an Assa Abloy Group company; _____: www.assaabloydss.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
   1. Single Door: Provide three on strike jamb of frame.
   2. Material: Rubber, gray color.

2.10 FINISHES

A. Finishes: Provide door hardware of same finish, unless otherwise indicated.
   1. Primary Finish: 626; satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D); BHMA A156.18.
   2. Exceptions:
      a. Hinges for Fire-Rated Doors: Steel base material with plated finish, in compliance with NFPA 80.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

C. Use templates provided by hardware item manufacturer.

D. Do not install surface mounted items until application of finishes to substrate are fully completed.

E. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
   1. For Steel Door Frames: Refer to Section 08 1213.
   2. For Wood Doors: Install in compliance with DHI WDHS.3 recommendations.
   3. Flush Wood Doors: Refer to Section 08 1416.
   4. Mounting heights in compliance with ADA Standards:
      a. Locksets: 40-5/16 inch (1024 mm).

F. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 ADJUSTING

A. Adjust work under provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Adjust hardware for smooth operation.

C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.04 CLEANING

A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

B. Clean adjacent surfaces soiled by hardware installation.

3.05 PROTECTION

A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Gypsum wallboard.

D. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017.

B. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.

C. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2018.

D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2019b.

E. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2018.

F. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

G. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.

H. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
   1. Fire Rated Partitions: as indicated on drawings.
   2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. ClarkDietrich; ____: www.clarkdietrich.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
   1. Studs: "C" shaped with knurled or emobossed faces.
   2. Runners: U shaped, sized to match studs.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company; ____: www.americangypsum.com/#sle.

2. CertainTeed Corporation; ____: www.certainteed.com/#sle.
3. Georgia-Pacific Gypsum; ____: www.gpgypsum.com/#sle.
4. National Gypsum Company; ____: www.nationalgypsum.com/#sle.
5. USG Corporation; ____: www.usg.com/#sle.
6. Substitutions: See Section 01 6000 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces, unless otherwise indicated.
2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
3. Thickness:
a. Vertical Surfaces: 5/8 inch (16 mm).
4. Paper-Faced Products:
a. American Gypsum Company; FireBloc Type X Gypsum Wallboard.
b. CertainTeed Corporation; Type X Drywall.
c. Georgia-Pacific Gypsum; ToughRock Fireguard X.
d. National Gypsum Company; Gold Bond BRAND Fire-Shield Gypsum Board.
e. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GYPSUM WALLBOARD ACCESSORIES

A. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
1. Fiberglass Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
2. Joint Compound: Setting type, field-mixed.

B. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Studs: Space studs at 16 inches on center (at 406 mm on center).
1. Extend partition framing to structure where indicated and to ceiling in other locations.
2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

C. Blocking: Install wood blocking for support of:
1. Toilet accessories.

3.03 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

3.04 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
2. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

END OF SECTION

SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.

B. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2019.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on suspension system components and acoustical units.

1.05 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. CertainTeed Corporation; ____: www.certainteed.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems:
   1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS

A. Acoustical Panels: Gypsum, with the following characteristics:
   1. Classification: ASTM E1264 Type XX.
   2. Size: 24 by 24 inches (610 by 610 mm).
   3. Thickness: 1/2 inches (____ mm).
   4. Ceiling Attenuation Class (CAC): 34, determined in accordance with ASTM E1264.
   5. Panel Edge: Square.
   6. Color: White.
   7. Suspension System: Exposed grid.
   8. Products:
      a. CertainTeed; Vinylrock: www.certainteed.com/ceilings.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 SUSPENSION SYSTEM(S)

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.

B. Exposed Suspension System: Aluminum grid and cap; factory-applied closed-cell foam gaskets.
   1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
   2. Profile: Tee; 15/16 inch (24 mm) face width.
   3. Finish: Baked enamel.

2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

B. Hanger Wire: 12-gage 0.08 inch (2 mm) galvanized steel wire.

C. Perimeter Moldings: Same metal and finish as grid.

D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

A. Install after major above-ceiling work is complete.

B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

B. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.

C. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

F. Support fixture loads using supplementary hangers located within 6 inches (152 mm) of each corner, or support components independently.

G. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

E. Cutting Acoustical Units:

1. Make field cut edges of same profile as factory edges.

3.05 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 6700
FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied flooring and base.

1.02 REFERENCE STANDARDS

A. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.

C. Samples: Submit two samples, 3 by 3 inch (____by____ mm) in size illustrating color and pattern for each floor material for each color specified.

D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

1.04 QUALITY ASSURANCE

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

B. Applicator Qualifications: Company specializing in performing the work of this section.
   1. Minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store resin materials in a dry, secure area.

B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.06 FIELD CONDITIONS

A. Maintain minimum temperature in storage area of 55 degrees F (13 degrees C).

B. Store materials in area of installation for minimum period of 24 hours prior to installation.

C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.01 FLUID-APPLIED FLOORING SYSTEMS

A. Fluid-Applied Flooring: Epoxy base coat(s), with broadcast aggregate.
   1. Aggregate: Vinyl flakes.
   2. Top Coat: Polyurethane.
   3. System Thickness: ____ inch (2 mm), nominal, when dry.
   4. Texture: Slip resistant.
   5. Sheen: High gloss.
   6. Color: As selected by Architect.
   7. Products:
      a. Stonhard; Stontec ERF: www.stonhard.com.

2.02 ACCESSORIES

A. Base Caps: Metal with projecting base of 1/8 inch (3 mm); _____ color.

B. Cant Strips: Molded material compatible with flooring.

C. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.

D. Primer: Type recommended by fluid-applied flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.

C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.

D. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
   1. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.

3.02 PREPARATION

A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Prepare concrete surfaces according to ICRI 310.2R, _____.

C. Vacuum clean substrate.

D. Apply primer to surfaces required by flooring manufacturer.

3.03 INSTALLATION - ACCESSORIES

A. Install cant strips at base of walls where flooring is to be extended up wall as base.

B. Install terminating cap strip at top of base; attach securely to wall substrate.

3.04 INSTALLATION - FLOORING

A. Apply in accordance with manufacturer's instructions.

B. Apply each coat to minimum thickness indicated.

C. Finish to smooth level surface.

D. Cove at vertical surfaces.

3.05 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

B. Barricade area to protect flooring until fully cured.

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Floors, unless specifically indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Base Manufacturer: Benjamin Moore.

C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each paint material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Architect after award of contract.

2.03 PAINT SYSTEMS - INTERIOR

A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board.
   1. Two top coats and one coat primer.
   2. Top Coat(s): Institutional Low Odor/VOC Interior Latex; MPI #143, 144, 145, 146, 147, or 148.
   3. Top Coat Sheen:
      a. Eggshell: MPI gloss level 3; use this sheen for corrdior walls.
      b. Satin: MPI gloss level 4; use this sheen for restroom walls.
      c. Semi-Gloss: MPI gloss level 5; use this sheen for door frames.
   4. Primer: As recommended by top coat manufacturer for specific substrate.

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
   1. Interior Institutional Low Odor/VOC Primer Sealer; MPI #149.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Room and door signs.

1.02 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
   1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
   2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
   3. Submit for approval by Owner through Architect prior to fabrication.

D. Samples: Submit one sample, of size similar to that required for project, illustrating sign style, font, and method of attachment.

E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

1.04 QUALITY ASSURANCE

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

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

C. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS

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

B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Flat Signs:

2.02 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 _____, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
   1. Sign Type: Flat signs with applied character panel media as specified.
   2. Provide "tactile" signage, with letters raised minimum 1/32 inch (0.8 mm) and Grade II braille.
   3. Character Height: 1 inch (25 mm).
   4. Sign Height: 8 inches (____ mm), unless otherwise indicated.
   5. Rest Rooms: Identify with pictograms, "COMPANION RESTROOM" and braille.

2.03 SIGN TYPES

A. Flat Signs: Signage media without frame.
   1. Edges: Square.
   2. Corners: Radiused.
   3. Wall Mounting of One-Sided Signs: Tape adhesive.

B. Color and Font: Unless otherwise indicated:
   1. Character Font: Helvetica, Arial, or other sans serif font.
   2. Character Case: Upper case only.
   3. Background Color: as selected from manufactuer's full range of colors.
   4. Character Color: white color.

2.04 TACTILE SIGNAGE MEDIA

A. Applied Character Panels: Acrylic plastic base, with applied acrylic plastic letters and braille.
   1. Total Thickness: 1/8 inch (3 mm).
   2. Letter Thickness: 1/8 inch (3 mm).
   3. Letter Edges: Square.

2.05 ACCESSORIES

A. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

D. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION

SECTION 10 2113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Solid plastic toilet compartments.

B. Urinal screens.

1.02 REFERENCE STANDARDS

A. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2019.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on panel construction, hardware, and accessories.

C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.

D. Samples: Submit two samples of partition panels, 3 by 3 inch (____by____ mm) in size illustrating panel finish, color, and sheen.

PART 2 PRODUCTS

2.01 PLASTIC TOILET COMPARTMENTS

A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor-mounted unbraced.
   1. Color: Single color as selected.
   2. Doors:
      a. Thickness: 1 inch (25 mm).
      b. Width: 24 inch (610 mm).
      c. Width for Handicapped Use: 36 inch (915 mm).
      d. Height: 58 inch (____ mm).
   3. Panels:
      a. Thickness: 1 inch (25 mm).
      b. Height: 58 inch (____ mm).
   4. Pilasters:
      a. Thickness: 1 inch (25 mm).
      b. Width: As required to fit space; minimum 3 inch (76 mm).

2.02 ACCESSORIES

A. Pilaster Shoes: Stainless steel, satin finish, 3 inches (76 mm) high; concealing floor fastenings.

B. Head Rails: Extruded aluminum, anti-grip profile.
   1. Size: Manufacturer's standard size.

C. Wall and Pilaster Brackets: Stainless steel; continuous type.

D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.

E. Hinges: Stainless steel, manufacturer's standard finish.
   1. Continuous-type hinge, self closing.

F. Door Hardware: Stainless steel, manufacturer's standard finish.
   1. Door Latch: Thumbturn type with exterior emergency access feature.

2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.

G. Coat Hook: One per compartment, mounted on door.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Maintain 3/8 inch to 1/2 inch (9 mm to 13 mm) space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

3.03 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 2800

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Electric hand/hair dryers.

C. Diaper changing stations.

1.02 REFERENCE STANDARDS

A. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.

B. ASTM C1036 - Standard Specification for Flat Glass; 2016.

C. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.

D. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004, with Editorial Revision (2016).

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
   1. Bobrick; www.bobrick.com.

B. Electric Hand/Hair Dryers:
   1. Excel Dryer; _____: www.exceldryer.com/#sle.

C. Diaper Changing Stations:
   1. Koala Kare Products; _____: www.koalabear.com/#sle.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.

B. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

2.03 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.

2.04 COMMERCIAL TOILET ACCESSORIES

A. Waste Receptacle: Recessed, stainless steel, seamless lower door for access to container, with tumbler lock, reinforced panel full height of door, continuously welded bottom pan and seamless exposed flanges.
   1. Products:
      a. Bobrick #B-43644.

B. Mirrors: Stainless steel framed, 1/4 inch (6 mm) thick annealed float glass; ASTM C1036.

1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
2. Size: 24" x 36".
3. Frame: 0.05 inch (1.3 mm)angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
4. Products:
    a. Bobrick #B-293 2436.

C. Grab Bars: Stainless steel, peened surface.
1. Standard Duty Grab Bars:
    a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
    b. Dimensions: 1-1/4 inch (32 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
    c. Finish: Satin.
    d. Length and Configuration: As indicated on drawings.
    e. Products:
        1) Bobrick #B-5806.99.

D. Device Holder: stainless steel, satin finish.
1. Products:
    a. Bobrick #B-635

2.05 ELECTRIC HAND/HAIR DRYERS

A. Electric Hand Dryers: Traditional fan-in-case type, with downward fixed nozzle.
1. Operation: Automatic, sensor-operated on and off.
2. Mounting: Surface mounted.
3. Cover: Epoxy painted steel or die-cast zinc alloy.
    a. Color: White.
    b. Tamper-resistant screw attachment of cover to mounting plate.
4. Electric Hand Dryer Products:
    a. Excel Dryer Inc; XLERATOR: www.exceldryer.com/#sle.
5. Wall Guards for Electric Hand Dryers: Match finish of dryer.
    a. Products:
        1) Excel Dryer Inc; 89W: www.exceldryer.com.

2.06 DIAPER CHANGING STATIONS

A. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
1. Material: Polyethylene.
2. Mounting: Surface.
3. Color: As selected.
4. Products:
    a. Koala Kare; KB200-01: www.koalabear.com .
    b. Koala Kare; KB102-01: www.koalabear.com.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.

3.02 PREPARATION

A. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
   1. Grab Bars: As indicated on drawings.
   2. Mirrors: 40 inch (_____ mm), measured from floor to bottom of mirrored surface.
   3. Electric Hand Dryers: Measured from floor to bottom of nozzle:
      a. Handicap: 38 inch (_____ mm).

3.04 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 12 3600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall-hung counters and vanity tops.

1.02 REFERENCE STANDARDS

A. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

B. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Complete details of materials and installation.

C. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

D. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

E. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
   1. Flat Sheet Thickness: 1/2 inch (12 mm), minimum.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
      a. Manufacturers:
         1) Dupont; _____: www.corian.com/#sle.
      b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
      c. Color and Pattern: As indicated on drawings.
   3. Other Components Thickness: 1/2 inch (12 mm), minimum.
   4. Back and End Splashes: Same sheet material, square top; minimum 4 inches (102 mm) high.
   5. Skirts: As indicated on drawings.

2.02 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.

2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
2. Height: 4 inches (102 mm), unless otherwise indicated.

C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches (3657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install vanities in accordance with manufacturer’s instructions and approved shop drawings

B. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

C. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet (3 mm in 3 m), maximum.

B. Offset From Wall, Countertops: 1/8 inch (3 mm) maximum; 1/16 inch (1.5 mm) minimum.

C. Field Joints: 1/8 inch (3 mm) wide, maximum.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 23 30 00
FIRE PROTECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00	MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 01 50	MECHANICAL: VIBRATION ISOLATION
Section 23 02 50	MECHANICAL: PIPE HANGERS AND SUPPORTS
Section 23 03 00	MECHANICAL: FIRE SAFING / FIRESTOPPING
Section 23 04 40	MECHANICAL: PIPE CLEANING TESTING

1.02 SCOPE:

A. Provide labor, equipment and materials to complete the fire protection work indicated on drawings and herein specified.

1.03 RELATED WORK:

A. Work in conjunction with this section shall be as designated below:

General Contractor:	Cutting, Patching and Painting
	Excavation
	Flashing, counter flashing
	Access panels/doors in walls, ceilings

1.04 PROJECT ADMINISTRATION:

A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.

B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

1.05 SUBMITTALS:

A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.

B. The following shop drawings shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list below is not intended

to be all-inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

Pipe and fittings
Hangers, supports
Sprinkler heads

All specialties

C. The following submissions are to be made at or near project completion:

Written Guarantee
Inspection Certificates

1.06 SPRINKLER SYSTEM DRAWING SUBMITTAL:

A. Submit for review complete fire protection data including:

Manufacturer's brochures, including model numbers and specifications on all equipment.

B. Submittal will be reviewed as to basic concept and layout, exact final pipe elevation and clearances, coordination with other trades, are to be field checked to insure proper coordination.

C. Deviation from indicated layout shall be the Contractor's sole responsibility with regard to conflicts with other trades.

D. Refer to PART 2 - SYSTEM DESIGN CRITERIA for additional requirements.

1.07 QUALIFICATIONS OF CONTRACTOR:

A. None but a qualified fire protection contractor, licensed by the State, regularly engaged in the installation of automatic sprinkler systems, standpipes shall be accepted for this project.

1.08 SPECIAL APPROVALS REQUIRED:

A. The Fire Protection Contractor shall prepare all drawings, plans, details and other requirements necessary for submission and approval of the fire insurance review agency.

1.09 SEQUENCE OF WORK:

A. Prepare a written schedule or bar type graph for all required system shut downs or drain downs. Coordinate the required system shut downs with the Owner, the Owner's Insuring Agency, and all local authorities.

B. Sequence the work such that installation will proceed with a minimum of system shut down.

C. Provide the Architect and Owner with at least 24 hours notice before any system shut down.

1.10 PIPING: INSTALLATION

A. General: Install pipe as indicated and specified herein. Arrange and install piping approximately as indicated, straight, pitched as required, and as direct as possible. Unless noted otherwise, conceal piping in building construction before erection of closing construction. When furred spaces are indicated, keep pipes as close to structural members as possible. Piping shall not interfere with openings, doors and windows. Allow for proper clearance at windows, doors, equipment and other building parts such that pipes does not interfere with access and building use.

B. Piping shall be cut accurately to measurements established at the site and shall be installed without springing, forcing and excessive cutting or weakening of building structure. Pipes shall be installed in a manner permitting proper drainage and free expansion and contraction.

C. Arrange piping passing through floors, walls and other partitions of building construction so that piping is centered in openings/sleeves and is rigidly supported on both sides of openings/sleeves. Provide flexible couplings at both sides of walls or floors, or oversized sleeves as required to conform to seismic isolation standards.

D. Clean pipe, pipe fittings, and valves before erection. Cap or plug open ends of piping and equipment during construction to keep dirt and foreign material out of system.

E. After threading steel pipe, clean pipe ends carefully to remove cutting oil and metal particles.

F. Provide concrete thrust blocks for certain underground piping as shown on the Drawings. Provide concrete support pads under valves as shown on the Drawings.

G. Unions or flanges shall be used to facilitate piping installation, and shall be installed between shut-off valves and equipment to facilitate removal of equipment for repair.

H. Provide dielectric unions where pipes of dissimilar metals are joined together.

I. Isolate and drain existing systems as required to complete the work. Fill, circulate and vent both new and existing systems as required for proper operation.

J. Do not route pipelines over switchboards, panels, motor control centers, individual motor starters and/or other electrical equipment. Avoid routing pipelines over electrical raceways and bus ducts. If these locations cannot be avoided, provide drip pans under pipelines. Also provide drip pans where indicated on the Drawings. Drip pans shall be constructed of minimum 22 gauge stainless sheet metal with waterproof mastic applied to interior seams and joints. Pan width shall be minimum 2 times pipe diameter and with sides turned up minimum of 4” high and fitted with hemmed edge. Do not hang drip pans from pipe. Pitch pans minimum 1/8” per foot and provide 3/4” drain connection at low points. Pipe drains to nearest floor drain or as shown on the Drawings. All piping systems that are to be routed above or adjacent to electrical systems shall be reviewed with the local Electrical Inspector prior to installation.

K. Swing Joints: Provide swing joints such that all sprinkler heads in ceiling tiles are located at the center of tiles unless indicated otherwise.

L. Provide sprinkler cabinet with required number of sprinkler heads (containing all types of heads provided on the project) and sprinkler wrench.

1.11 CROSS AND INTER-CONNECTIONS:

A. No piping for equipment, any device, or any apparatus internal connection shall be installed which will provide a cross or interconnection, under any circumstance of operation, between a distributing supply for drinking or domestic purposes and a not-potable supply or a drainage system or a soil or sanitary waste pipe which will permit or make possible the back-flow of sewage, polluted water or waste into the domestic water supply system.

1.12 COORDINATION WITH POWER DISTRIBUTION SYSTEMS:

A. No piping for equipment, device or any apparatus internal connection shall be installed above any electrical power distribution panels or apparatus. Piping found to be installed contrary to this directive will be removed and relocated at no extra cost to the Owner.

1.13 INSPECTION AND TESTING

A. Inspections, examinations and tests required by authorities/agencies shall be coordinated and paid for as necessary by the Fire Protection Contractor to obtain complete and final acceptance of the fire protection system. Transmit certificates of inspection, acceptance to the Architect.

1.14 PROJECT CLOSEOUT:

A. Review and provide closeout requirements of this section and Section 15000 Mechanical General Requirements, including:

Testing and Adjusting
Record Drawings
Operating, Maintenance Instructions
Written Guarantee
Cleaning
Certificates of acceptance

PART 2 - SYSTEM DESIGN CRITERIA

2.01 GENERAL:

A. The following Design Criteria has been prepared for use in the preparation of calculations and final design and installation shop drawings and details required for this project.

B. The data contained herein has been based upon data as published by NFPA and as furnished by the Owner's Insuring Agent.

2.02 DESIGN AND INSTALLATION STANDARDS:

A. NFPA National Fire Codes: Latest editions. Including but not limited to the following:

Standard No 13 - Sprinkler Systems, 2010 Edition
Standard No 101 - Life Safety
Standard No 72 - National Fire Alarm Code

2.03 ADDITIONAL REQUIREMENTS:

A. The fire protection system shall be designed and installed in strict accordance with the requirements of NFPA and Factory Mutual.

B. Coordinate the exact location of all materials with the other trades and with the building components prior to installation.

C. Sprinkler heads and fire protection system piping shall be installed allowing proper clearances from mechanical, plumbing, structural and rack system components. Proper clearances shall be as per NFPA 13. Maintain maximum space conditions at all points. Where space conditions appear inadequate, notify the Architect before proceeding with the installation.

D. Provide swing joints and piping offsets as required for installation of the sprinkler heads in the locations required.

E. Sprinkler heads within finished ceiling areas shall be spaced and installed for location at the center of ceiling tiles unless specifically indicated otherwise.

F. Refer to the Fire Alarm Drawings for alarm annunciation required.

G. Drain valves shall be provided at all trapped sections of the fire protection systems where required by NFPA-13. Drain valves shall be sized as per NFPA 13.

H. Inspector's Test Connections shall be provided at each zone of alarm annunciation. Pipe test pipe discharge to the building exterior as directed by the Architect.

I. All system shut off valves shall be fitted with valve tamper switches. Location and service of all valve switches shall be coordinated with the fire alarm system.

J. Minimum end head pressures as indicated include a minimum design cushion of 10 psig.

K. Provide sprinkler cabinet with required number of sprinkler heads (containing all types of heads provided on the project) and sprinkler wrench.

PART 3 - PRODUCTS AND INSTALLATION

3.01 GENERAL:

A. Provide new, standard products, materials and equipment which comply with the specification; are undamaged and unused at the time of installation; are complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use.

3.02 PIPING: GENERAL

A. General: Install pipe as indicated and specified herein. Pipe shall properly pitch, plumb and true to building parts as is the best practice of the trade.

B. Welding: Welding, brazing, soldering shall be with proper regard for fire prevention and safety. See Fire Watch requirements.

C. Clearances: Allow for proper clearance at windows, doors, equipment and other building parts such that pipe does not interfere with access and building use.

D. Protection: During the construction phase provide temporary caps, plugs at all open ended unattended piping.

3.03 PIPING: ABOVE GRADE, WET SYSTEMS:

A. Material: 2" and larger piping - Steel pipe ASTM A120 "thin wall", 1-1/2" and smaller piping shall be Schedule 40 steel pipe. Roll grooved Victaulic couplings are allowed.

B. Joints: Piping 2" and larger shall be with Victaulic Style 009N Rigid, or 004/75 Flexible grooved couplings designed for the application. Piping 1-1/2" and smaller shall be with standard screw joints and cast iron 175 psi fittings. Apply approved joint compound or tape to male threads only. Roll grooving Sch.40 1 ½" pipe, will be allowed.

C. Test: Apply hydrostatic test of 200 psig, or 50 psi above normal working pressure (whichever is greater) for a period of 2 hours with a loss of pressure of less than 5 psig, and with no apparent leakage.

D. Flanged Connections: At equipment, appurtenances, and valves 2-1/2" and larger provide connections with 150 pound weldneck flanges complete with Johns-Mansville ring gaskets and U S Standard machine bolts, washers and nuts.

E. Installation: Cut pipe accurately and install without springing or forcing and allow for proper clearance from all building components. Remove burrs and ream pipe prior to installation and allow for free pipe expansion without damage.

3.04 PIPE SUPPORTS AND HANGERS:

A. Pipe supports and hangers shall be installed in accordance with NFPA Standard No 13 - Section 3-4.

3.05 PIPE SLEEVES:

A. Walls: Provide steel pipe sleeve where fire protection piping passes through masonry walls. Sleeves shall be flush with wall.

B. Floors: Provide steel pipe sleeves where fire protection piping passes through concrete floors. Extend sleeve 1/2" above finished floor.

3.06 FIRE STOPS:

A. All pipes passing through fire rated floor and wall assemblies shall be sealed with glass wool to completely seal opening. Sleeves shall be packed full depth. Refer to Section 23 03 00-Mechanical:Fire Safing.

3.07 FLEXIBLE SPRINKLER RUNOUTS:

A. General: Provide flexible piping connections to sprinkler heads for both suspended and sheetrock ceilings. All flexible piping systems shall be UL Listed and FM Approved and suitable for their intended use.

B. All flexible piping connections to include a fully welded (non-mechanical fittings), braided, leak-tested sprinkler drop with a minimum internal corrugated hose diameter of 1 inch; and a one-piece multi-port ceiling bracket with removable attachment hub and self-securing integrated snap-on clip-ends, for attachment to ceiling grid without the need for a screw fastener.

C. Flexible runouts shall be of length between 2'-0" and 6'-0" as required.

D. Multiple-Use Flexible Drop System: In lieu of rigid pipe offsets or return bends for sprinkler drops, the Victaulic VicFlex™ Multiple-Use Flexible Stainless Steel Sprinkler Drop System may be used to locate sprinklers as required by final finished ceiling tiles and walls. The drop system shall consist of a braided type 304 stainless steel flexible tube, zinc plated steel 1" NPT Male threaded nipple for connection to branch-line piping, and a zinc plated steel reducer with a 1/2" or 3/4" NPT female thread for connection to the sprinkler head.

E. The drop shall include a UL approved Series AH2 braided hose with a bend radius to 2" to allow for proper installation in confined spaces. The hose shall be listed for [(4) bends at 31" length] [(5) bends at 36" length] [(6) bends at 48" length] [(6) bends at 60" length] [(7) bends at 72" length].

F. Union joints shall be provided for ease of installation. The flexible drop shall attach to the ceiling grid using a one-piece open gate Series AB1 bracket. The bracket shall allow installation before the ceiling tile is in place. The braided drop system is UL listed and FM Approved for sprinkler services to 175 psi (1206 kPa).

3.08 SPRINKLER HEADS:

A. Refer to the SCHEDULE on the Drawings for the model and type of sprinkler heads to be used for this project.

B. Provide sprinkler cabinet with required number of sprinkler heads (containing all types of heads provided on the project) and sprinkler wrench.

3.09 GUARDS AND ESCUTCHEONS:

A. Guards and escutcheons shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.

PART 4 - SYSTEM INSTALLATION

4.01 GENERAL:

A. The contract drawings intend to show only the scope of the design. The Fire Protection Contractor shall be responsible for the correct installation of this work in a manner satisfactory to the best practices of his trade and to complete the scope of this subcontract in all respects. All roughing to equipment shall be accomplished in all details to Specifications of equipment manufacturer and to approval of Architect. No work shall be accomplished until the pertinent manufacturer's shop drawings are approved.

B. The location of piping as indicated on the Drawings, unless otherwise noted, is diagrammatic only, and the exact locations shall be determined in the field. The run and arrangement of all pipes shall be approximately as shown on the Drawings, as directed during installation, in strict accordance with NFPA Pamphlets Standards, and as straight and direct as possible, forming right angles or parallel lines with building walls and other pipes, and neatly spaced. All risers and standpipes shall be erected true and plumb, parallel with walls and other pipes, and neatly spaced. All horizontal runs of piping, except where concealed in partitions, shall be kept as high as possible and close to walls. Where possible, adjacent pipe lines, and fire protection piping, shall be grouped in the same vertical or horizontal planes. All piping shall be concealed where required and concealed piping shall have a minimum number of fittings. Piping shall not interfere with the operation or accessibility of doors, windows, access panels, valves, H & V unit access, air flow patterns, or equipment, and shall not encroach on aisles or passageways. All piping shall be installed to preserve access to all valves, drains and equipment. Pipe will not be permitted to pass through footings, beams or ribs. Make such offsets and deviations from the Drawings as may become necessary to meet actual field conditions.

C. The Fire Protection Contractor shall be responsible for the correctness of field dimensions and shall check for himself all grades, lines, measurements, and other data in any way affecting his work. He shall refer to the project phasing schedule together with architectural and structural drawings of other trades for a full comprehension of the extent of the work to be performed and to avoid interference. He shall not be entitled to any extra compensation for any additional work or expense arising from his failure to do so. In case interference develops the Architect shall decide which work is to be relocated, regardless of which was first installed. Work installed by The Fire Protection Contractor which is improperly located and/or interferes with or modifies either the phasing schedule or the architectural or structural design, shall be changed as directed by the Architect, and all costs incidental to such changes shall be paid by The Fire Protection Contractor.

D. The Fire Protection Contractor shall coordinate all his work with the work of all other trades, and shall so arrange his work that there will be no delay in the proper installation and completion of any part or parts of each respective work wherein it may be interrelated with his, so that generally all construction work can proceed in its natural sequence without unnecessary delay, close coordination is also required with the HVAC, plumbing and electrical contractors in areas serving these trades.

E. Contact between piping and dissimilar metals such as hangers, building structural work, or equipment shall be avoided to prevent galvanic action.

F. Pipe shall be cut accurately to measurements established at the site and shall be worked into place without springing or forcing. All pipe, regardless of how cut throughout the job, shall be reamed smooth and all burrs removed before being installed. Pipe shall not be split, bent, flattened, nor otherwise injured either before or during the installation. Full lengths of pipes shall be used wherever possible and short lengths of pipe connected with couplings will not be permitted.

G. The Fire Protection Contractor shall use every precaution in the installation of all piping to prevent dirt, chips, or other foreign materials entering the inside of piping. All pipes shall be clean and blown out to the satisfaction of the Architect before closing of any line. Keep the ends of piping capped or blind flanged during the construction of the system to keep out dirt or other foreign matter. The plugs and caps are to remain until permanent and final installation is made. The use of paper, waste, rags and so forth to close openings will not be permitted.

H. Unions or flanges shall be installed at all equipment valves and at such other places as may be necessary to disconnect piping or at each piece of equipment or accessory which may have to be disconnected to make repairs.

I. Bushing will not be inserted in fittings for reduction in size where fittings of required size are manufactured.

J. The Fire Protection Contractor shall also provide the necessary data and supervision for the provision of all holes in the structure, and also for the installation of equipment foundations, including bolt hole templates, weights and manufacturer's recommendations for proper emplacement design.

K. Equipment and accessories shall be set level, plumb and in proper alignment with reference to adjacent walls. All surfaces coming in contact with walls, floors or other equipment shall have properly planed surfaces with suitable contact on wall and floors.

L. Clips, hangers, clamps, supports and other attachments to surfaces to be fireproofed shall be installed, insofar as possible, before start of spray fiber work. Piping and equipment that interfere with proper application of fireproofing shall be installed after completion of spray fiber work. Patch and repair spray fireproofing cut or damaged during course of work specified under this Section. Trade responsible for damage shall bear cost of repair.

4.02 INSTALLATION REQUIREMENTS:

A. The contractor shall comply with all the rules, Codes, Ordinances, regulations and requirements, of all legally constituted Authorities Having Jurisdiction over the whole or any part of the work herein specified and shall also comply with all applicable requirements of IRI and these specifications. These requirements are minimum criteria and no reductions permitted by Code will be allowed without written permission of the Architect.

B. All equipment and materials furnished in connection with the installation shall be new and furnished in accordance with the requirements of this specification and they shall be of the best grade and quality of their respective kinds, free from natural, manufacturing or construction flaws, defects or irregularities and finish, fittings and workmanship shall be equal to the highest commercial grade.

C. Castings of all metals, of all kinds, shall be clean, smooth, close grained, of uniform thickness and free from all defects such as sandholes, blisters or cracks.

D. Before the installation will be accepted, the contractor shall have every portion of his work in a first-class working condition.

E. Where planning the installation of any of the apparatus herein called for, sufficient clearance shall be allowed to permit the removal and replacing of parts that may require future removal for repairs and replacement.

4.03 TESTING AND INSPECTION:

A. The Fire Protection Contractor shall obtain and pay for all inspections and tests required for this Section of the work. Defects discovered in work, materials and/or equipment shall be replaced by the Fire Protection Contractor at no cost to the Owner, and the inspection and test shall be repeated. When work is completed, this Contractor shall furnish a Certificate of Inspection and Approval to the Owner before final payment of the Contract will be allowed.

B. Test sprinkler and standpipe piping and make watertight before painting and before concealment. Make partial tests as required, during the progress of the work. All tests shall be witnessed by the Architect, Owner's representative, or designated Authorities.

C. Standpipe and sprinkler system piping shall be tested to a hydrostatic test of 250 psi for two (2) hours or in accordance with other NFPA requirements as a minimum testing requirement.

D. The Fire Protection Contractor shall, with the parties noted herein, establish procedures to witness testing that are acceptable to the parties noted herein. All parties noted herein shall be notified in writing of the accepted testing procedure prior to any testing. The Fire Protection Contractor shall notify parties designated to witness testing at least 48 hours in advance of scheduled testing.

E. Conditions requiring testing in excess of the minimum requirements noted herein shall be performed in accordance with NFPA standards and any requirements of Authorities Having Jurisdiction.

F. Should the Owner, Architect, Engineer or any Authority Having Jurisdiction require, the Fire Protection Contractor shall provide factory trained, manufacturer's authorized representatives to perform testing on any equipment and/or devices that may be an integral part of this specification.

G. Dispose of test water and wastes after tests are complete, in a manner satisfactory to the Architect and Local Authorities.

H. Furnish to the Architect/Engineer completely executed test certificates with signatures of those required to witness testing. Test certificate forms shall follow NFPA formats as a minimum requirement.

I. The Fire Protection Contractor shall give all necessary notices, obtain and pay for all permits, pay all taxes, fees and other costs in connection with this work; file for necessary permits and approvals with the jurisdiction under which the work is to be performed. The Fire Protection Contractor shall obtain all required Certificates of Inspection for his work and deliver same to the Architect before request for acceptance of his portion of work is made and before final payment. All certificates and inspections shall be in accordance with NFPA standards as a minimum.

J. Existing systems shall be tested to the extent of new work added shall require. All testing of existing systems shall comply with this section.

K. All electrical alarm devices are to be tested and adjusted in conjunction with the Electrical and/or Fire Alarm Contractors. Testing or retesting and adjustment of these devices shall be at no additional cost to the Owner. Testing and adjustment shall be as required until these devices are performing as an integral part of the total alarm system as specified for that part of the work.

4.04 CLEANING OF SYSTEMS:

A. Before the Fire Protection Systems are accepted, all equipment shall be thoroughly cleaned to remove all dust, dirt, and/or other foreign matter which may be detrimental to the operation of the Systems or building finishes.

B. After the installation is complete, equipment with factory finished surfaces shall be cleaned. Damaged or scratched spots shall be touched up with the same type and color paint as applied at the Factory and all cleaning and touch up shall be accomplished at no additional cost to the owner.

C. All equipment that is to receive finish paint by the Painting Contractor shall be cleaned by The Fire Protection Contractor and left ready to have surfaces prepared to receive paint.

4.05 SYSTEM PRESSURIZATION:

A. The Fire Protection Contractor shall pressurize systems before the Painting Contractor applies the prime coat of paint. The Fire Protection Contractor shall schedule with the Painting Contractor and Construction Manager, the timing of the work to cause sufficient time to have passed between pressurization and painting to permit cleaning of pipe joint lubricant, grease, oil, metal filings, etc., from the piping to be painted.

PART 5 - SYSTEM ACCEPTANCE

5.01 GENERAL:

A. The installing contractor shall perform the following:

B. Notify the Architect/Engineer, the authority having jurisdiction and Owner's representative of the time and date testing will be performed.

C. Perform all required acceptance tests as listed herein and as required by NFPA-13.

D. Complete and sign the appropriate contractor's material and test certificate(s) per the requirements of NFPA-13 (copies attached herewith).

5.02 ACCEPTANCE REQUIREMENTS:

A. Hydrostatic tests: (Based upon NFPA-13, Chapter 25)

B. All piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi (13.8 bar) and shall maintain that pressure without loss for 2 hours.

C. Portions of systems normally subjected to system working pressures in excess of 150 psi (10.4 bar) shall be tested at a pressure of 50 psi (3.5 bar) in excess of system working pressure.

D. Where cold weather will not permit testing with water, an interim air test shall be permitted to be conducted.

E. Modifications affecting 20 or fewer sprinklers shall not require testing in excess of system working pressure.

F. Modifications that cannot be isolated, such as relocated drops, shall not require testing in excess of system working pressure.

G. Loss shall be determined by a drop in gauge pressure or visual leakage.

H. The test pressure shall be read from a gauge located at the low elevation point of the system or portion being tested.

I. Additives, corrosive chemicals such as sodium silicate, or derivatives of sodium silicate, brine, or other chemicals shall not be used while hydrostatically testing systems or for stopping leaks.

J. Piping between the exterior fire department connection and the check valve in the fire department inlet pipe shall be hydrostatically tested in the same manner as the balance of the system.

K. When deluge systems are being hydrostatically tested, plugs shall be installed in fittings and replaced with open sprinklers after the test is completed, or the operating elements of automatic sprinklers shall be removed after the test is completed.

L. Trenches shall be backfilled between joints before testing to prevent movement of underground piping.

M. Where required for safety measures presented by the hazards of open trenches, the pipe and joints shall be permitted to b back filled provided the installing contractor takes the responsibility for locating and correcting leakage in excess of that permitted by NFPA-13.

N. Provision shall be made for the proper disposal of water used for flushing or testing.

5.03 INSTRUCTIONS:

A. The installing contractor shall provide the owner with the following:

B. All literature and instructions provided by the manufacturer describing proper operation and maintenance of any equipment and devices installed

C. NFPA-25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection System*

5.04 CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR ABOVEGROUND PIPING:

A. All information included within the standard Contractor’s Material and Test Certificates shall be completed by the contractor and submitted for record at the completion of the project.

B. Contractor’s Material and Test Certificates shall be as noted in NFPA-13.

5.05 INSPECTION SERVICE:

A. After completion of the fire protection work and at start of the guarantee year, the Fire Protection Contractor shall execute the National Automatic Sprinkler and Fire Control Association, Inc. Standard Form of Inspection Agreement without charge to the Owner, calling for 4 inspections of the system during the guarantee year. During the year, inspections shall be made as per the Inspection Agreement plus the following maintenance shall be performed on the last inspection:

Operation of all control valves
Lubrication of stems of all control valves
Operation of all alarms
Cleaning of all types of alarm valves and parts
Inspection and testing of backflow prevention devices

B. The standard form, "Report of Inspection" shall be filled out in triplicate after each inspection and copies sent to the Owner and the Owner's insuring agency.

C. All inspections, testing and maintenance shall be in accordance with applicable NFPA Standards, including NFPA #25, as a minimum. Requirements of Owner's Insurance Company and other Authorities Having Jurisdictions are also a part of this service.

END OF SECTION 23 30 00

SECTION 23 00 00
MECHANICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings, provisions of the Contract, and Division 01 Specification Sections, apply fully to work in this section.

B. All requirements of this Section shall govern the work under all of the Sections of Division 23 - Mechanical including:

Section 23 01 50	**MECHANICAL: VIBRATION ISOLATION**
Section 23 02 50	**MECHANICAL: PIPE HANGERS AND SUPPORTS**
Section 23 03 00	**MECHANICAL: FIRE SAFING / FIRESTOPPING**
Section 23 04 00	**MECHANICAL: INSULATION**
Section 23 04 40	**MECHANICAL: PIPE CLEANING TESTING**
Section 23 10 00	**PLUMBING**
Section 23 15 00	**PLUMBING: FIXTURES**
Section 23 30 00	**FIRE PROTECTION**
Section 23 80 00	**HVAC: AIR HANDLING SYSTEMS**
Section 23 95 00	**HVAC: TESTING ADJUSTING BALANCING**

1.02 DEFINITIONS:

A. The term "Mechanical" applies and refers to all work specified within Division 23 and as indicated on the Contract Drawings.

B. The term "Mechanical Contractor(s)" applies and refers to all those furnishing labor and materials for the completion of the work specified within Division 23 and as indicated on the Contract Drawings. All subcontractors and sub-subcontractors, as defined within the General Conditions, are collectively termed "Mechanical Contractor(s)". The requirements of Section 23 00 00 apply to all Mechanical Contractor(s).

C. The term "this Section" shall mean "this Section of the Specifications". The term "this Division" shall refer to "Division 23 - Mechanical" and all of its Sections.

D. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use".

E. "Concealed" shall mean hidden from sight in trenches, chases, furred spaces, shafts, above hung ceilings, embedded in construction, in attic spaces or in crawl spaces.

F. "Work by others" shall mean "not by Mechanical Contractor but provided or installed by the General Contractor or any other sub-contractor performing their respective work within this contract".

1.03 INTENT:

A. The intention of these Specifications and Drawings is to call for finished work, tested and ready for operation.

B. The drawings are diagrammatic and not intended to show every pipe, offset, associated equipment or other minor detail. Provide such parts, materials, and appliances as required to complete the systems for operation.

C. Equipment and/or materials specified in the singular shall be provided in quantities as required for complete systems.

1.04 EXISTING CONDITIONS:

A. Prior to submitting a bid, visit the site, become familiar with the existing conditions, with the contract work of all trades, and become fully knowledgeable of how it relates to this Division.

1.05 PROJECT MEETINGS:

A. Provide knowledgeable personnel to attend meetings scheduled (Include all trades) as required.

1.06 COORDINATION / COOPERATION:

A. Cooperate with all other tradesmen, Contractors and Subcontractors to facilitate the completion of the work as a whole, as indicated on the drawings and specifications.

B. Wherever work interconnects with the work of other Contractors, coordinate the work with these Contractors to insure that all information is available such that all equipment and material may be installed properly with all necessary connections and appurtenances.

C. Coordinate the location of all openings required for apparatus and transmit this information sufficiently in advance, so that all openings in walls, slabs, roofs, piping supports, inserts and equipment including sleeves and access doors may be properly installed.

D. Where work will be installed in close proximity to, or interfere with the work of other trades, assist in coordinating space conditions to a satisfactory adjustment. If directed by the Architect, provide composite working drawings indicating the proposed adjustment.

E. All distribution systems which require pitch or slope such as plumbing drains, sprinkler piping, and condensate drain piping shall have the right of way over those systems which do not require pitch. Where the work to be installed is located by detail and or elevation, that work shall have the right of way over items indicated as schematic or without indicated location (electrical conduits, control conduits etc). Confer, coordinate and cooperate with other trades as to the location of pipes, lights, and apparatus and install all work to avoid conflict and interference.

F. Work that is installed to interfere with the work of others prior to proper coordination and cooperation, shall be adjusted to correct the situation without extra compensation.

1.07 DELAYS:

A. Become fully informed as to availability dates of materials and equipment to be provided. Where availability dates interfere with the progress of the work or the Sequence of Operations, notify the Architect and transmit all recommendations, including any changes in costs, to remedy the situation.

B. Final decisions as to the procedure in cases of delays, strikes, and acts of God shall be in writing by the Architect. **DO NOT alter work, materials or equipment without written authority by the Architect.**

C. Order equipment and materials in advance of the time of installation to avoid project delays.

1.08 WORKMANSHIP:

A. Workmanship shall be of the highest quality, in the best practice of the trade, and none but competent mechanics skilled in their respective trades shall be employed. Materials and apparatus shall be provided, delivered, erected, connected, and finished in every detail; and shall be so selected and arranged as to fit properly into building spaces.

1.09 DRAWINGS:

A. Refer to all Contract Drawings for a full comprehension of the extent and detail of the work. Drawings are supplementary to the specification and work indicated, mentioned or implied in either is considered as specified by both.

B. Work indicated on the drawings is intended to be approximately correct to scale, but dimensions and details are to assume precedence.

C. Typical details apply to every like item. They are not repeated in full on all of the drawings, which are diagrammatic only, but with the intention that such typical details are fully applicable.

1.10 INTERPRETATION OF PLANS AND SPECIFICATIONS:

A. The Architect, whose interpretation shall be final, conclusive and binding on all parties, shall decide questions or disagreements as to the true intent of this specification and drawings.

1.11 CODES, ORDINANCES, AGENCIES:

A. The State Building Code, Fire Code and local ordinances, with all amendments to date, are hereby made a part of these specifications. Work shall conform to State Codes and Regulations.

B. The codes and ordinances shall be considered as a minimum requirement, and work specified or indicated on the drawings in excess of code requirements shall be provided.

C. Notify authorities and agencies; obtain all permits; obtain all official licenses and certificates; obtain all necessary approvals of authorities having jurisdiction; file all necessary plans; perform all necessary testing; and transmit to the Architect all certificates of inspection.

D. Materials provided and work installed shall comply with the National Fire Codes of the NFPA; with the requirements of local utility companies; and with the requirements of agencies having jurisdiction.

E. Electrical materials and equipment shall be U.L. approved or listed. All electrical equipment shall be in compliance with the Energy Conservation Code and shall meet or exceed all operating energy efficiency requirements.

1.12 FEES, PERMITS:

A. Include the following costs within the bid amount;

The payment of all fees in connection with obtaining necessary permits, licenses, and inspections.

Note: All contractors and subcontractors must file for permits

The costs of all utility connections and extensions, to include the purchasing of meter(s) and appurtenances.

The payment of applicable taxes.

1.13 SPECIAL REQUIREMENTS:

A. This project requires that the building remain operational throughout the completion of renovations and alterations as indicated. See Contract documents and Division 01 for a complete knowledge of all special requirements.

PART 2 - SUBMITTAL GENERAL REQUIREMENTS

2.01 SUBSTITUTIONS, CONTRACTOR'S OPTIONS:

A. See Supplementary Conditions of the Contract for Construction.

B. Where only one product is specified, and the intention is to match existing equipment or materials within the mechanical system, the contractor shall submit his base bid on the product specified.

C. Where only one product is specified, but is followed by the phrase "or approved equal" the Mechanical Contractor(s) must submit his base bid on the product specified. Proposed substitutions for equivalent products shall be submitted for review under SUBSTITUTION PROPOSALS.

D. Where two or more products are specified for one use, the Mechanical Contractor(s) shall select from those products mentioned. Where specific model of one manufacturer is specified and other manufacturers are listed, the products of listed manufacturers must be equal in all major respect.

It remains the responsibility of the Mechanical Contractor to review the dimensions, weights, required clearances, required supporting structure, etc. of the equipment of "other" manufacturer's relative to the proposed use. The Mechanical Contractor is responsible for any changes to the design and to the building fabric (i.e. supporting structure, mechanical spaces, piping or ductwork connections and routing, etc.) resulting from the use of equipment of the "other" manufacturers.

No proposal for extra charges resulting from the use of equipment of the "other" manufacturers will be entertained for approval.

E. Where products are specified by reference standard, select any product that meets the standards by any reputable manufacturer.

2.02 SUBSTITUTION PROPOSALS:

A. Refer to the Schedule of Submissions for the time period allowed for submission of substitution proposals. The proposal shall state the exact products proposed for substitution and include a cost difference in total savings to the Owner for each proposal.

B. Include in the proposal complete engineering data, shop drawings, samples and state whether related changes in the project are involved if the proposal is accepted.

C. No substitutions of products, materials or methods are permitted without written authority by the Architect.

D. Where no substitution proposal is made within the specified time period, products, materials and equipment shall be submitted and installed as specified.

E. See Division 01 Specification Sections: Review additional requirements for substitutions.

2.03 SUBMISSIONS:

A. Refer to the SCHEDULE OF SUBMISSIONS below. Also refer to SUBMITTALS within other Sections of Division 23 in which some of the shop drawings to be submitted are listed. The listing is a minimum listing only. Submit lists of products and subcontractors; detailed drawings, catalog data of all products, equipment and materials required to complete the project and no item shall be ordered, delivered or installed until the reviewed shop drawing submittal is in the possession of the installing contractor.

2.04 SCHEDULE OF SUBMISSIONS:

ITEM	TIME PERIOD	COPIES
LIST OF SUBCONTRACTORS	10 days	7
LIST OF MANUFACTURERS/PRODUCTS	15 days	7
SUBSTITUTION PROPOSALS	20 days	7
SHOP DRAWINGS	25 days	7

Note: The time period above is based on the number of working days after the signing of the contract.

2.05 LIST OF SUBCONTRACTORS:

A. Submit a complete LIST OF SUBCONTRACTORS proposed for use; including complete firm names, address, and phone numbers.

2.06 LIST OF MANUFACTURERS / PRODUCTS:

A. Submit a complete LIST OF MANUFACTURERS of materials and equipment specified within this section proposed for use; including materials and equipment proposed by all subcontractors. **Partial lists will not be accepted**.

2.07 SHOP DRAWINGS:

A. Provide shop drawings (drawings, catalog cuts, spec sheets) for ALL equipment and products to be installed on the project.

B. Label all shop drawing submittals as follows:

Project Name
Contractor's Name
Specification paragraph

C. Mark in ink all catalog cuts, pamphlets to indicate options, accessories and model numbers.

D. Data submitted which is general and not labeled and marked as required above will not be accepted.

2.08 SHOP DRAWING REVIEW:

A. Review will be based on manufacturer's published data, and ratings. Any product, material or equipment submitted not in accordance with these specifications will be rejected.

B. Where substitute products are proposed and no exception is taken, the Mechanical Contractor shall assume the entire responsibility for any changes in the work required or occasioned by the use of the substitute.

C. Review of shop drawings is not a guarantee of suitable measurements, quantities required, or that other changes in the work are not required to permit proper installation. Review does not mean the submittal has been checked for every detail, or that the Contractor is relieved from responsibility of providing complete systems as required by the Contract Documents.

2.09 RECORD DRAWINGS:

A. During the period of on site construction, keep at the site, separate from construction documents, accurate construction drawings marked to indicate actual installation of all work of all of the trades specified within Division 23. Drawings shall reflect addenda, change orders, VE items or substitutions accepted for the project. Drawings shall be “red lined” with all modifications on a weekly basis.

All underslab, concealed or underground piping shall be located by dimension sufficient for exact location determination in the future.

All concealed work shall be accurately located and all points of adjustment (dampers etc) shall be shown in actual locations.

B. Final **Record Drawings** shall be prepared by the Mechanical Contractor on a set of reproducible drawings which accurately indicate all of the work as installed.

All adjustable setpoints shall be indicated on the drawings at the device sensor or point of adjustment.

C. Transmit originals and two sets of prints for review at project closeout.

D. At project closeout transmit final Record Drawings in electronic format indicated below

AutoCad dwg files
PDF files

2.10 OPERATING AND MAINTENANCE MANUALS:

A. Compile complete manuals including manufacturer's data, bulletins, maintenance instructions, approved shop drawings, parts lists, warranties etc for all equipment and materials provided.

Equipment data shall include:

Manufacturer / Models
Input and output capacities
Service and maintenance recommended actions
Manufacturers published instructions

Operations written narrative:

Include a complete written narrative of how each system and component is intended to operate.

B. Assemble and index three copies of each manual within suitable binders (8 ½" x 11"). Provide cover clearly indicating project title and "OPERATION AND MAINTENANCE MANUAL".

C. Transmit manuals to the Architect for review in advance of scheduled instruction periods.

2.11 GUARANTEE:

A. Transmit to the Architect a written guarantee from each of the Mechanical Contractors stating that the work provided under these specifications is guaranteed against defects in material and workmanship which shall become apparent during the period of one (1) year from acceptance of the systems.

The written guarantee shall list all contractors with contact names and phone numbers, and shall indicate the dates of acceptance of systems and any extended warrantees.

The written guarantee shall be posted as directed by the Architect

B. Extended guarantee or warrantee of certain equipment may be required. See specification of individual items.

PART 3 - PRODUCT HANDLING

3.01 PROTECTION AND STORAGE OF MATERIALS:

A. Equipment and materials furnished shall, at all times, be protected from weather, vandalism, and other construction phase exposures to include paint, plaster and dust.

B. Outdoor storage of equipment not intended for outdoor use will NOT be permitted.

C. Properly protect all pipe openings with temporary caps to prevent obstruction and damage. Post notices and prohibit use of fixtures, equipment and apparatus prior to the completion of the project.

3.02 RIGGING, HOISTING, STAGING:

A. Furnish rigging, hoisting equipment, staging and other services necessary for delivery and installation of any product provided. Remove rigging, staging from the site when no longer required.

PART 4 - PROJECT CONDITIONS

4.01 FIELD MEASUREMENTS AND DISCREPANCIES:

A. Base all measurements, both horizontal and vertical, from referenced points established by the General Contractor.

B. Prior to the start of work, check drawings and specifications for discrepancies.

C. Field verify spaces, dimensions and clearances where materials and equipment will be installed.

D. Where discrepancies arise which prevent or alter installation, notify the Architect.

E. Where discrepancies between drawings and specifications; between different drawings; or where the work of others is affecting work under this Division notify the Architect.

F. Where the work herein required is not clearly understood apply to the Architect for further clarification.

G. In each instance above, the Architect shall clarify the discrepancy and the Mechanical Contractor(s) shall complete the work at no additional cost to the Owner.

4.02 ACCESSIBILITY:

A. Install work so that parts requiring access are readily accessible for inspection, operation, maintenance, repair and removal. Minor deviations from the drawings may be made to accomplish this, but changes of magnitude shall not be made without written approval of the Architect.

4.03 TEMPORARY OPENINGS:

A. Examine contract documents and ascertain whether special, temporary openings will be required for the installation of apparatus and notify the Architect.

4.04 SOLDERING, BRAZING, WELDING:

A. Soldering, brazing, welding or other open flame operation shall be conducted only when a person, with approved firefighting equipment, trained in its use is on duty at the location of the operation.

4.05 INTERRUPTIONS TO SERVICES:

A. Where a temporary shutdown of an existing operating system is required, schedule the work at times designated by the Architect. Work requiring an interruption shall be completed by continuous performance, including overtime, to minimize the shutdown interruption.

4.06 USE OF INSTALLATION BY OWNER:

A. The Owner may use parts of the installation, including mechanical systems when complete, but such use shall not be considered as acceptance of the work in lieu of written certificate from the Architect.

B. Schedule obnoxious, noisy, or otherwise objectionable portions of the work at times approved by the Architect. Overtime work must be approved in writing.

PART 5 - PRODUCTS AND INSTALLATION

5.01 MATERIALS:

A. Provide new, first-class quality materials and apparatus, unless specifically directed otherwise by this specification or contract drawings.

5.02 ON-SITE INSPECTIONS

A. Arrange for and coordinate all on-site inspections with the authorities having jurisdiction.

B. Review project schedules and insure that such inspections as are necessary are completed in a timely manner.

5.03 MANUFACTURER'S RECOMMENDATIONS, IDENTIFICATION:

A. Obtain necessary data on equipment and materials to insure proper installation and testing in accordance with manufacturers' recommendations. Install all equipment and material per the recommendations and instructions of the manufacturer; this requirement shall take precedence over other requirements of this specification unless specifically noted.

B. Equipment and materials furnished for this work shall bear the manufacturers' nameplate, trademark or suitable identification permanently affixed. The nameplate of a contractor or distributor is not acceptable.

5.04 COLOR SELECTION; MATERIALS / EQUIPMENT:

A. Exterior: Provide metal louvers, grilles, fans, intake units, etc of equal coloration as indicated for exterior metal trim for the project. All exterior metal trim shall match.

B. Interior: Product color shall be selected by the Architect. Provide complete color selection charts, chips with product submittals. Equipment to be painted shall have prime coat, anti-rust as necessary, factory applied.

5.05 QUIET OPERATION:

A. Equipment and apparatus provided shall operate under all conditions of load without sound or vibration which are considered objectionable by the Architect. Eliminate same in a manner approved by the Architect.

5.06 ELIMINATION OF TRANSMISSION OF VIBRATION:

A. Eliminate objectionable transmission of vibration from mechanical systems to building structure. Select and install equipment with proper vibration control equipment and provide isolators on piping, equipment, ductwork and apparatus where necessary to prevent transmission of sound and vibration. Isolate all rotating equipment from the building structure.

5.07 BASES AND SUPPORTS:

A. Provide all bases and supports for mechanical equipment not part of the building structure of required size, type and strength, as approved by the Architect.

B. Equipment, bases, and supports shall be anchored to the building structure to prevent shifting of position under all conditions. Attachments shall be strong and of a durable nature and any attachments, anchors, piers, bases, or other supports that are, in the opinion of the Architect, not strong enough or durable shall be replaced as directed.

5.08 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS:

A. Provide steel members, channels as required for the proper installation, mounting and support of equipment provided. Pipe shall not be allowed for use as miscellaneous steel supports. All steel used for support shall be firmly attached to the building construction.

B. Size and type of supporting steel shall be determined by the installer and shall be of sufficient strength and size to allow only a minimum deflection under all conditions of load.

C. All steel provided for support shall be free from rust and shall be primed with antirust paint or shall be galvanized. All exterior steel shall be galvanized.

5.09 SLEEVES, PLATES:

A. Provide and locate sleeves, plates, anchors, and inserts required; mark openings before floors and walls are constructed or core bored.

B. Provide sleeves for piping passing through floors, walls, roofs, partitions and masonry. Sleeves for concrete or masonry shall be Schedule 40 steel pipe of size to allow for pipe expansion and passage of vapor barrier insulation. Other sleeves shall be 20 gauge galvanized sheet steel with lockseam joint.

Terminate sleeves flush with walls, partitions, and ceiling.
Terminate sleeves 1/2" above finished floor where piping is exposed.

C. Provide support systems such that access to equipment or appurtenances requiring access are not impeded in any way.

5.10 PIPE ESCUTCHEONS:

A. Provide escutcheons for pipe penetrations of building construction exposed to view.

B. Escutcheons shall closely fit bare or insulated pipe and shall conceal pipe sleeves.

C. Escutcheons in unfinished areas shall be of solid or split pattern steel, cast iron or malleable iron.

D. Escutcheons in finished areas shall be of chrome plated, solid pattern brass.

5.11 FIRE SAFING: PIPING, DUCTWORK AND EQUIPMENT OPENINGS:

A. Fire Stop: Pack all piping, ductwork and equipment openings and sleeves full depth with approved fire safing material to fully seal all openings.

B. Seal all sleeves, core holes, etc. through floors, walls and ceilings with approved fire safing material or fire safing system. Fire safing materials and systems shall be as manufactured by Nelson “Flame-seal”, 3-M Systems, Hilti Systems, Metacaulk Firestopping or Dow Corning. Install in accordance with manufacturer’s printed instructions.

C. Firestopping is to meet UL ratings for each penetration type and material for floors, walls and ceilings. Coordinate with Architectural Drawings for exact requirements and ratings at various conditions.

D. Refer to Section 23 03 00 Mechanical Fire Safing for Specific fire safing requirements.

5.12 MACHINERY DRIVES:

A. V-belt drives shall be designed to transmit safely equal to or greater than 150% of motor horsepower rating, but not less than manufacturer's recommendation for type of service intended.

5.13 PROTECTIVE GUARDS:

A. Provide protective guards at all belt drives, rotating shafts and rotating equipment. If not a part of equipment, guards shall be of galvanized angle frame with galvanized wire mesh, readily removable for service.

5.14 PORTABLE OR DETACHABLE PARTS:

A. Retain and be responsible for all portable or detachable parts provided as a part of the work. Install these parts just prior to project closeout when the site is secure. Replace all lost, stolen or damaged items prior to project acceptance.

5.15 LABELS, VALVE TAGS, PIPE, DUCTWORK, AND EQUIPMENT IDENTIFICATION:

A. General:

All new systems provided as a part of the contract are to be labeled in a manner that conforms to the following specification. All existing systems, at points of new connection or reconfiguration, shall also be labeled in accordance with the following standards.

All labels, unless otherwise directed, shall be made of hard black plastic. Lettering shall be affected by engraving or incising, and shall be white. All labels shall be securely mechanically attached with screws or equal. Letters and numbers shall be at least 1/4" high, or larger, if required to read clearly from a normal viewing distance. All labels must be made to withstand the temperatures and atmosphere in the area they are to be mounted. Any labels which are to be mounted outdoors must be treated to prevent degradation from sunlight, and must be mounted with stainless steel screws.

Where air or hydronic systems have been balanced, the Contractor shall permanently mark, ON THE DEVICE, the correct balancing setting of each valve, damper, or similar device. This will allow our skilled tradesmen to restore proper operation if the device is tampered with.

All Mechanical Systems to be labeled in accordance with these requirements include, but are not specifically limited to, the following: Additional, specific items may require to be labeled as directed separately in other sections of this specification package.

B. Pipe Labeling:

Labels for piping shall be Seton Setmark or equal. Labels to identify zone number may be self-stick type, but must wrap completely around pipe, and be adhered to itself. All self-stick labels must be plasticized to withstand washing with commercially available cleaning products.

Piping labels shall be placed over any insulation on the pipe installed. Stenciling on the insulation jacket is not permitted, except as noted above.

For piping outside of Mechanical spaces; labels shall be placed every 40 linear feet of pipe. For piping within Mechanical spaces, labels shall be every 20 feet or as needed to provide clear and concise identification from the floor.

Label must show:

Fluid contained and service
Flow direction

Pipe Marker Lettering:

Outside Diameter of Pipe Covering	Required Size of Lettering	Tag Length
¾" to 1-1/4"	½"	8"
1-1/2" to 2"	¾"	8"

2-1/2" to 6"	1-1/4"	12"

Pipe Marker Color Standards:

Pipe Line Type	Description	Background Color	Lettering Color
Water	Hot Potable Water	Yellow	Black
	Cold Potable Water	Green	White
Waste	Sanitary Waste	Green	White
	Sanitary Vent	Green	White

C. Valve Tagging:

Labels for valves shall be hard plastic and shall be no smaller than 2" in diameter.

Tags shall have the valve number incised or recessed into the plastic. The tag background and tag lettering shall conform to the color scheme as defined by this standard.

All valve labels shall be permanently attached with steel or brass jack chain, tags shall be color coded to correspond to the following color chart, if product is not listed, consult the Architect/Engineer.

Balancing Valves shall also be provided with tags, permanently marked, with the correct balancing setting. This will allow our skilled tradesmen to restore proper operation if the device is tampered with.

All valve labels must show a number that corresponds to a clearly posted valve legend.

Valve Tag Color Standards:

Pipe Line Type	Description	Background Color	Lettering Color
Water	Hot Potable Water	Yellow	Black
	Cold Potable Water	Green	White

PART 6 - PROJECT CLOSEOUT

6.01 TESTING AND ADJUSTING:

A. Where testing leaks develop or the installation fails to function properly, make all necessary corrections and repeat tests until all defects have been remedied. Corrections made shall be to the satisfaction of the Architect prior to the acceptance of the work.

B. Furnish labor, material, and instruments necessary for those tests required. See respective Sections for test requirements.

C. In addition to required tests specified, provide qualified personnel to adjust all parts of systems such that proper, economical operation is achieved.

D. Conduct and be responsible for all testing and adjusting of all complete systems to include providing all labor and equipment required and the submission of all reports. Systems shall be operated, tested and adjusted in all modes of operation.

E. All defects and deficiencies or failing to operate properly shall be corrected by the Contractor and the systems shall be re-tested or readjusted prior to final acceptance.

F. Any and all damage caused by tests shall be the responsibility of the Contractor.

G. The balancing of the air conditioning systems shall be performed by an independent balancing contractor.

SEE SECTION 23 95 00 TESTING AND BALANCING.

6.02 OPERATION, MAINTENANCE INSTRUCTIONS:

A. Schedule and conduct, after the mechanical -- electrical systems are complete and operational, instruction periods for Owner's personnel. Operation and Maintenance Manuals shall be distributed to the Owner in advance of scheduled instruction periods.

B. Instruction periods shall include:

Normal and emergency start up and shut down of all systems
Normal maintenance requirements for all systems and equipment
Maintenance tasks and schedules for proper operation.
Review of Operations and Maintenance Manuals
Review of AS BUILT drawings

C. In addition to instruction periods; a thorough project walk through shall be conducted and the location and access to all points of operation, control and maintenance shall be indicated and noted.

D. At the completion of instruction periods forward a letter (5 copies) stating the names of those giving and receiving instructions.

6.03 LUBRICATION:

A. Lubricate, as required, all motors, bearings, fans, etc. before operation of any equipment. Provide a final lubrication when system is accepted by Owner.

6.04 CLEANING:

A. At completion, thoroughly clean all parts of the installation. Equipment, materials and apparatus shall be free of grease, paint, plaster and debris. Any damage to the building due to leakage or by other means shall be properly and immediately cleaned and repaired to the satisfaction of the Architect.

B. At completion, replace, clean, such parts of systems as filters, strainers, and traps. This work shall be done after site is substantially free of dust.

6.05 SCRATCHES, SCRAPES, DENTS:

A. Repair and correct, to the satisfaction of the Architect, all minor equipment deficiencies such as scratches, scrapes, dents; where corrective methods are not satisfactory, replace the item.

6.06 PROJECT CLOSEOUT SUBMITTALS:

A. Review all project closeout submittal requirements of this specification and transmit in a timely manner.

B. Provide all required items including (but not limited to):

Record As Built Drawings
Written Guarantee including any extended warrantees
Operating / Maintenance Instructions Memorandum
Testing / Adjusting Logs

6.07 SERVICE:

A. At completion, provide the Architect with a complete listing of all service contractors including 24-hour phone numbers.

B. Provide service on equipment furnished for a period of one year from the date of final acceptance. Render service promptly at the request of the Owner. This shall not be construed to include routine maintenance.

END OF SECTION 23 00 00

SECTION 23 00 40
MECHANICAL: DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and Section 23 00 00 Mechanical General Requirements, and the following listed sections as a minimum, apply fully to work in this section.

B. Refer to all Section 23 00 00 Mechanical General Requirements and coordinate all work with the work of the following listed Sections.

Section 23 00 00	MECHANICAL GENERAL REQUIREMENTS

C. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 10 00	PLUMBING
Section 23 15 00	PLUMBING: FIXTURES
Section 23 30 00	FIRE PROTECTION
Section 23 80 00	HVAC: AIR HANDLING SYSTEMS
Section 23 95 00	HVAC: TESTING ADJUSTING BALANCING

1.02 DESCRIPTION OF WORK

A. Provide removal, relocation, rerouting and reconnecting of existing mechanical facilities, as shown and as required by contract documents, to accomplish alteration, restoration and to accommodate new construction.

B. Including but not limited to the following:

Demolition and removal of selected parts of mechanical systems.

Removal of debris and materials from the project site

Salvage of existing items and delivery to Owner.

C. All demolished materials and equipment are to be removed from the site and disposed of in an approved manner. Recycle materials where required.

1.03 QUALITY ASSURANCE

A. Reference Standards - Comply with the following:

B. American National Standards Institute (ANSI): Safety Requirements for Demolition - ANSI A 10.6.

C. National Fire Protection Association (NFPA): Safeguarding Building Construction and Demolition Operations - NFPA 241.

D. US Environmental Protection Agency (EPA)

E. The Federal Register - Emissions Standards for Hazardous Air Pollutants - 40 CFR-81.

F. Local city and state safety regulations including transportation and disposal regulations.

1.04 DEFINITIONS:

A. Remove: 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 Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.05 PREDEMOLITION CONFERENCE:

A. Predemolition Conference: Conduct conference at Project site.

B. Review methods and procedures related to selective demolition including, but not limited to, the following:

C. Inspect and discuss condition of construction to be selectively demolished.

D. Review structural load limitations of existing structure.

E. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.

F. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

G. Review areas where existing construction is to remain and requires protection.

1.06 SUBMITTALS:

A. Schedule of Selective Demolition Activities: Indicate the following:

B. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.

C. Interruption of utility services. Indicate how long utility services will be interrupted.

D. Coordination for shutoff, capping, and continuation of utility services.

E. Use of elevator and stairs.

F. Locations of proposed dust- and noise-control temporary partitions and means of egress.

G. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

H. Means of protection for items to remain and items in path of waste removal from building.

1.07 PROJECT CONDITIONS:

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Provide not less than 72 hours notice to Owner of activities that will affect Owner operations.

C. Review first paragraph and subparagraph below and revise if necessary. In subparagraph, include list of items that will be removed by Owner.

D. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

E. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

F. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
G. Retain subparagraph below to cover instances where hazardous materials are unexpectedly found and must be remediated.

H. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

I. Storage or sale of removed items or materials on-site is not permitted.

J. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

K. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.01 DESCRIPTION:

A. Provide all materials, equipment and labor necessary to perform the demolition as required.

B. For materials required for this work, comply with the applicable specification sections in Division 23.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

C. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

D. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.

E. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

F. Cover and protect furniture, furnishings, and equipment that have not been removed.

G. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."

H. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

I. Strengthen or add new supports when required during progress of selective demolition.

3.02 GENERAL:

A. Provide alteration and demolition of mechanical facilities as required by the drawings and specifications.

B. Do not begin work until time schedules and manner of operations have been approved by the Owner's Representative.

C. All interruptions of existing services shall be included in the Owner approved schedules, and so identified.

D. Verify the location of all related existing equipment, piping and other mechanical facilities. Provide for the removal, relocation, rerouting and reconnecting of this work as required because of demolition methods or sequences employed. Obtain the Owner's permission prior to commencing any work.

E. Comply with the installation procedures specified in the applicable specification sections in Division 23.

F. Where existing equipment must remain in service during construction, provide rerouting and reconnecting of mechanical services as required to maintain continuous service.

G. Maintain system continuity and operation of piping or ductwork circuits, whether spliced, extended, relocated or newly constructed.

H. Store, on the site, materials and equipment to be salvaged for future use by the Owner.

I. All ductwork and piping hangers, supports, anchors, etc., shall be removed along with all ductwork and piping shown to be removed.

J. Where equipment, ductwork and piping is removed or disconnected under DIVISION 23, perform the work in such a manner that no damage is done to the structure or remaining portions of the existing systems. Do not under any circumstances place a stress on existing ductwork or pipe and fittings which are to be reused. Be fully responsible for and repair, at no additional expense to Owner, any leaks developing in existing piping or ductwork due to failure to take proper precautions when making alterations.

3.03 PIPING:

A. All welded piping shall be cut off square at the locations indicated on the demolition drawings. All openings of any remaining valves, piping or fittings shall be closed off with weld caps or blind flanges to prevent debris from entering the existing systems.

B. All threaded piping shall be disconnected at the location indicated on the demolition drawings. All openings of remaining valves, piping, fittings and equipment shall be closed off with pipe plugs or pipe caps as required to prevent debris from entering the existing systems.

C. All pipe hangers, supports, and/or anchors shall be removed along with all piping shown to be removed.

D. Provide shutoff valves to isolate new work from existing and temporary or permanent connections to new work as required for proper testing and cleaning of new work.

3.04 DUST CONTROL:

A. Provide dust barriers as necessary to control the migration of dust during demolition of spaces.

B. Provide temporary ventilation of all spaces during demolition work.

3.05 INSULATION:

A. Insulation shall be removed from all piping, fittings, valves and equipment designated for demolition.

B. Comply with all safety precautions related to insulation removal.

3.06 CLEANING:

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

END OF SECTION 23 00 40

SECTION 23 01 50
MECHANICAL: VIBRATION ISOLATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00	MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed sections:

Section 23 02 50	MECHANICAL: PIPE HANGERS AND SUPPORTS
Section 23 03 00	MECHANICAL: FIRE SAFING / FIRESTOPPING
Section 23 10 00	PLUMBING
Section 23 15 00	PLUMBING: FIXTURES
Section 23 30 00	FIRE PROTECTION
Section 23 80 00	HVAC: AIR HANDLING SYSTEMS
Section 23 95 00	HVAC: TESTING ADJUSTING BALANCING

1.02 GENERAL REQUIREMENTS:

A. Provide vibration isolation supports for all air systems, equipment and piping as outlined below.

B. Devices shall be selected, installed, and adjusted in a manner to prevent objectionable vibration transmission to the structure.

C. Seismic restraints are not included in this section of the specification. See Division 23, Section 23 02 00 MECHANICAL SEISMIC RESTRAINT for seismic restraint requirements. All restraints to be separate and not interfere with vibration isolation devices or must be fully consolidated to perform both tasks.

PART 2 – EXECUTION

2.01 INDEPENDENT SUPPORTS:

A. Isolated systems shall be independent. Piping, ductwork, conduit or mechanical equipment shall not be hung from or supported on other equipment, pipes or ductwork installed on vibration isolators. Maintain 2” clearance between isolated equipment and walls, ceilings and other equipment. Drain piping connected to vibration isolated equipment shall not contact the building structure or other non-isolated systems.

2.02 SUPPORT DUCTWORK AS FOLLOWS:

A. In slabs and walls, provide a ½" to 1" clearance for all penetrating ducts when not precluded by fire dampers. Pack the clear space full-depth with fiberglass insulation, and caulk penetration airtight on both sides of wall or slab.

2.03 SUPPORT PIPES AS FOLLOWS:

A. For all pipes over 1" in diameter, provide metal sleeves sized for ¼" to ½: clearances at wall and slab penetrations, and seal tightly in place. Pack with fiberglass insulation, and caulk airtight at each end of the sleeve.

END OF SECTION 23 01 50

SECTION 23 02 50
MECHANICAL: PIPE HANGERS AND SUPPORTS

PART I GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed sections:

Section 23 01 50 MECHANICAL: VIBRATION ISOLATION

Section 23 04 00 MECHANICAL: INSULATION

Section 23 10 00 PLUMBING

Section 23 30 00 FIRE PROTECTION

1.02 SCOPE:

A. Section Includes: Pipe hangers and supports, pipe saddles and shields, and pipe guides and anchors for piping systems except for fire protection piping systems.

1.03 PROJECT ADMINISTRATION:

A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.

B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

1.04 SUBMITTALS:

A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.

B. The following shop drawings shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The listing below is not intended to be all-inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

Product data sheets:
Provide product data sheets for all hangers and supports intended for use on the project.

Pipe Hangers
Hanger Rod
Structural Attachments

Insulation Shields

1.05 QUALITY ASSURANCE:

A. Pipe hangers, pipe supports, hanger and support accessories, pipe saddles and pipe shields, where applicable, shall comply with provisions of latest edition of ASME Code for Pressure Piping ANSI/ASME B31.l - Power Piping, Fed. Spec. No. WW-H171, Manufacturers' Standardization Society Standard Practice SP-58 and SP-69, and these Specifications. Where there is conflict, these Specifications shall govern.

B. Hangers, supports, accessories, saddles and shields shall be load-rated. Load ratings shall be established by manufacturers based upon testing and analysis in conformance with above referenced codes. Manufacturers load tests shall be made on both supporting materials and configurations. Tests shall be performed by independent testing laboratory. Results of these tests shall be made available to the Owner upon request.

C. Manufacturers shall select hangers, supports, accessories, saddles and shields based on load ratings for applications involved.

PART 2 PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS:

A. Manufacturer(s) Specified:

Grinnell Corp.
Carpenter & Paterson, Inc.
Michigan Hanger Co., Inc.
Penn Pipe Hangers Div. of Penn Construction Industries
Power Piping Co.
Basic Engineers, Inc.
National Pipe Hanger Corp.
B-Line Systems, Inc.

B. General Requirements:

Pipe hangers, supports and accessories specified herein are from master specifications and include hangers, supports and accessories for various piping materials and applications. Refer to related Sections for actual piping materials required for the Project and select hangers, supports and accessories for applications involved.

Auxiliary structural steel, not part of building structure, required for support of piping shall be as required and necessary. Provide unistrut of strength required. Pipe used as supports is not acceptable. All metal surfaces shall be painted. Metal exposed to weather shall be galvanized.

Unless otherwise shown or specified, hangers, supports and accessories for insulated piping systems shall be sized to accommodate pipe insulation system, and shall fit around outside of pipe insulation without crushing and penetrating pipe insulation. Refer to specifications for piping insulation for detailed specifications of insulation and inserts at hangers and supports.

Hangers, supports and accessories exposed to weather or corrosive environments shall be protected with factory-applied corrosion-resistant finish. Provide galvanized or cadmium-plated

finish except when it is specified that components and assemblies are to be constructed of stainless steel, or copper-plated steel.

C. Upper Attachments:

Hanger rod shall be threaded steel, Grinnell Fig. 146 or 140.

Rod couplings shall be steel, Grinnell Fig. 135.

Extension pieces shall be malleable iron, Grinnell Fig. 157

Eye rods shall be threaded steel, Grinnell Fig. 248.

U-bolts shall be steel, Grinnell Fig. 137 with nuts.

D. Pipe Attachments:

Hangers for bare steel pipe 2" and smaller shall be Grinnell Fig. 65 light- duty steel clevis hangers. For 2-1/2" and larger use Grinnell Fig. 260 standard- duty steel clevis hangers.

Hangers for bare copper tubing 4" and smaller shall be Grinnell Fig. CT-69 adjustable, copper-plated steel, swivel ring hangers or Grinnell Fig. CT-65 lightweight, copper-plated steel, adjustable clevis hangers. For 5" and larger use Carpenter & Paterson Fig. 800 CT adjustable, swivel type, copper-plated steel ring hangers.

Hangers for bare cast iron or SCH 40 PVC soil pipe shall be Grinnell Fig. 260 standard- duty steel clevis hangers.

Hangers for insulated pipe and tubing of 4.1/2" OD combined and smaller shall be Grinnell Fig. 65 light-duty steel clevis hangers. Above 4-1/2" OD combined, use Grinnell Fig. 260 standard-duty steel clevis hangers.

2.02 PIPE SHIELDS:

A. Manufacturers:

Pipe Saddles and Shields with Inserts:

Grinnell Corp.
Carpenter & Paterson, Inc.
Michigan Hanger Co., Inc.
Penn Pipe Hangers Div. of Penn Construction Industries
Power Piping Co.
Basic Engineers, Inc.
National Pipe Hanger Corp.
B-Line Systems, Inc.

Preinsulated Pipe Shields

Pipe Shields, Inc.
Basic Engineers, Inc.
Power Piping Co.
B-Line Systems, Inc.

B. General Requirements:

Insulation Shields:

Provide galvanized steel insulation shields at locations of pipe hangers for piping systems with ID less than 2". Insulation shields shall extend 6" on either side of hanger and shall be with rounded edges.

PART 3 EXECUTION

3.01 PIPE HANGERS AND SUPPORTS:

A. General:

Supports shall secure pipes in place, prevent swaying and vibration, maintain required grading by proper adjustments and provide for expansion, contraction, anchorage and piping insulation protection. Design supports of strength and rigidity to suit loading and service. Include weight of water and fluids wed for cleaning and testing. Supports shall not unduly stress building construction.

Installation of pipe hangers and supports shall conform to:

Manufacturers Standardization Society (MSS) Standard Practice:

SP-69 Pipe Hangers and Supports - Selection and Application

In case of conflict, more stringent requirements shall apply.

B. Hanger and Support Spacing:

Pipe hangers and supports shall be selected and spaced on basis of building structure, loading limitations, imposed loads, and pipe stress. Tables below are based on pipe stress only.

Maximum pipe hanger and support spacing dimensions specified or listed herein are for bare pipe without additional loads such as flanges, valves, piping specialties, accessories, insulation or other forces. Certain spacing dimensions are recommended by piping manufacturers or are accepted good practice. Reduce spacing from maximums shown or specified as required to accommodate actual imposed loads of piping systems in conjunction with load limitations of building structure and elements of pipe hanger and support systems including pipe saddles, pipe shields and inserts.

Maximum spacing of hangers and supports for standard weightsteel pipe shall conform to requirements of ANSI/ASME B31.l - Power Piping and Manufacturer's Standardization Society Standard Practice (MSS) SP-69. Pipe Hangers and Supports for reference as follows:

Pipe Size Inches	Maximum Spacing Feet Water Service	Maximum Spacing Feet Vapor Service
½ and smaller	7	8
¾, 1, 1-1/4	7	9
1-1/2	9	12
2	10	13
2-1/2	11	14
3	12	15
4	14	17

Maximum horizontal spacing of hangers and supports for copper tubing shall conform to requirements of manufacturers Standardization Society (MSS) Stand Practice SP-69 listed for reference as follows:

Nominal Tube Size Inches	Maximum Spacing Feet Water Service	Maximum Spacing Feet Vapor Service
½ & 3/8	5	6
¾	5	7
1	6	8
1-1/4	7	9
1-1/2	8	10
2	8	11
2-1/2	9	13

For cast iron and SCH 40 PVC type piping systems provide minimum of one (1) hanger per pipe section and locate close to joint on pipe bar Provide hangers at changes in direction and at branch connections. Maximum hanger spacing shall not exceed 10 feet.

Provide supports for riser (vertical) piping at each floor except where shown or specified otherwise.

C. Intermediate Attachments:

Attachments shall be selected on basis of building structure and loads to be supported. Maximum applied loads shall not exceed manufacturer’s published load data. Install per manufacturer's instructions.

D. Pipe Attachments:

Do not hang one pipe from another nor from ductwork and conduits. Do not use perforated band iron, wire nor chain as hangers.

Unless otherwise specified or shown on the Drawings, piping shall be suspended by individual hangers.

Drainage piping shall be suspended by individual hangers only.

Where piping must be suspended closer to overhead than is possible with single rod clevis hangers, trapeze supports shall be used as specified further herein.

At pipe bends, place hanger no more than ½” from bend.

Apply double wraps of 3M Co. No. 51 Scotchwrap PVC tape with pressure-sensitive adhesive around bare piping where piping materials are dissimilar from pipe attachments. Scotchwrap is not required where pipe attachments are specified to have protective coating or match piping material being supported.

Select and install pipe attachments to permit expansion and contraction.

3.02 PIPE SHIELDS:

A. Install pipe shields on insulation such that shield is centered under insulation inserts. Coat inserts with compatible wet adhesive and insert into snuggly cut undersized holes in pipe insulation. Stabilize large and heavy pipes with additional inserts (hardwood dowels) at 4 and 8 o'clock positions. After installation, coat outer surface and vapor-seal with adhesive, then apply layer of pressure-sensitive adhesive vapor barrier tape.

B. Coordinate the Work with insulation subcontractor.

END OF SECTION 23 02 50

SECTION 23 03 00
MECHANICAL FIRE SAFING / FIRESTOPPING

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00	MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed sections:

Section 23 10 00	PLUMBING
Section 23 30 00	FIRE PROTECTION
Section 23 80 00	HVAC: AIR HANDLING SYSTEMS

1.02 SCOPE:

A. Provide labor, equipment and materials to complete the Firesafing / Firestopping work as herein specified.

1.03 RELATED WORK:

A. Work in conjunction with this section shall be as designated below:

General Contractor:	Cutting, Patching, and Painting Flashing Openings in walls

1.04 PROJECT ADMINISTRATION:

A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.

B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

1.05 SUBMITTALS:

A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.

B. The following shop drawings shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list below is not intended to be all-inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

C. Shop Drawings: For each different firestopping configuration, provide the following:

Listing agency's detailed drawing showing opening, penetrating items, and firestopping materials, all of which are identified with listing agency's name and number or designation, fire rating achieved, and date of listing.

Identify which rated assembly each system is to be used in.

Any installation instructions that are not included on the detailed drawing.

For proposed systems that do not conform strictly to the listing, submit listing agency's drawing marked to show modifications and stamped approved by firestop system manufacturer's fire protection engineer.

D. Submit listing agency's test report showing compliance with requirements, based on testing of current products.

E. Product Certificates: Submit certificates signed by firestop system manufacturer certifying that materials furnished comply with requirements.

F. Product Data: Manufacturer's data sheets on each material to be used in firestop system systems, including:

Product characteristics and Material Safety Data Sheets.
Listing numbers of systems in which each product is to be used.
Preparation instructions and recommendations.
Storage and handling requirements and recommendations.
Installation methods.

Installer's Qualification Documentation.

1.06 REFERENCES:

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2000a.

B. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2000a.

C. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2000.

D. ASTM E 1399 - Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems; 1997 (Reapproved 2000).

E. ASTM E 1529 - Standard Test Methods for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies; 2000.

F. ASTM E 1725 - Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems for Electrical System Components; 1995 (Reapproved 2001).

G. UL 1479 - Standard for Fire Tests of Through-Penetration Firestops; 1994.

H. UL 1709 - Rapid Rise Fire Tests of Protection Materials for Structural Steel; 1994.

I. ANSI/UL 2079 - Tests for Fire Resistance of Building Joint Systems; 1998.

1.07 DEFINITIONS:

A. Construction Gap: An open joint between adjacent rated assemblies; may be a moving joint or static opening, without penetrating items.

B. Firestop System: Specific firestop material or materials, which when installed in openings in a specific rated assembly, achieve the performance required.

C. Firestopping: Result of installation of firestop system.

D. Listing: The current, published listing of a system in a qualified listing agency's directory.

E. Listing Agency: Independent testing agency that has conducted tests and classified firestop systems for particular applications, which conducts routine in-plant follow-up inspections, and which lists tested systems in a published directory.

F. Penetrating Item: Any item (pipe, duct, conduit, cable, etc.) that passes completely through a rated assembly through an opening of any size.

G. Rated Assembly: A wall, floor, roof/ceiling, or other construction that is required to have an hourly fire rating or a smoke resistance rating.

H. Through Penetration: A hole through a rated assembly made to accommodate the passage of a penetrating item or an empty hole made for another purpose and not repairable using the original materials of construction.

1.08 QUALITY ASSURANCE:

A. Installer Qualifications: Firm who is qualified by having experience, staff, and training to install the specified products, and who:

Is a Certified and Trained contractor in the field of fire stopping and fire safing.
Is acceptable to or licensed by manufacturer.
Is acceptable to or licensed by authority having jurisdiction.
Has completed the manufacturer's certified product installation training.
Can provide a list of completed projects as evidence of experience; include project name and address, Owner's name and address, and Architect's name and phone number.

B. Pre-Installation Meeting: Conduct a meeting at the project site to discuss installation conditions and requirements; require the attendance of all relevant installers.

1.09 DELIVERY, STORAGE, AND HANDLING:

A. Deliver and store products until ready for installation in manufacturer's original unopened packaging, legibly marked with manufacturer's name and product identification, date of manufacture, lot number, shelf life, listing agency's classification marking, curing time, and mixing instructions if applicable.

B. Following manufacturer’s instructions, store and handle in such a manner as to prevent deterioration or damage due to moisture, temperature changes, contaminants, and or other causes.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.10 PROJECT CONDITIONS:

A. Coordinate construction and cutting of openings so that each particular firestop system may be installed in accordance with its listing, including sizing, sleeves, and penetrating items.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install firestopping under environmental conditions outside manufacturer's absolute limits.

C. Provide ventilation as required by firestopping manufacturer, including mechanical ventilation if required.

PART 2 PRODUCTS

2.02 MANUFACTURERS:

A. Acceptable Manufacturer:

3M Fire Protection Products, Inc
Hilti Fire Stop Products.

B. Single Source: All instances of a specific firestop system shall be made using products of the same manufacturer; where multiple installers (e.g. different subcontractors) are responsible for installation of firestopping, all installers shall use the same system made by the same manufacturer.

C. Where a proposed system is not listed by one of the listing agencies specified as acceptable, submit evidence prepared by a qualified independent testing agency that the system complies with the requirements.

2.03 MATERIALS:

A. Rated Assemblies: Provide installed firestopping that limits the spread of fire, heat, smoke, and gasses through otherwise unprotected openings in rated assemblies, including walls, partitions, floors, roof/ceilings, etc.45

B. Provide firestopping that has fire resistance rating equal to or greater than the fire-resistance rating of the assembly in which it is to be installed.

C. Provide firestopping that has movement capability appropriate to the potential movement of the gap.

D. Requirements for All Types of Firestopping:

Listing Agency: Provide systems that are listed by at least one the following:

Underwriters Laboratories Inc. (UL), in "Fire Resistance Directory" category XHEZ or XHBN as appropriate.

ITS, in “Directory of Listed Products.”

Omega Point Laboratories (OPL), in “Directory of Listed Products, Through Penetration Fire Resistance Directory.”

Any other qualified independent testing and inspection agency that conducts periodic follow-up inspections and is acceptable to authorities having jurisdiction.

Furnish products identical to those tested for classification by listing agency.

Mark product packing with classification marking of listing agency.

Unlisted Systems: Where firestop systems not listed by any listing agency are required due to project conditions, submit a substitution proposal with evidence specified.

Firestopping Exposed To View: Provide products with flame spread index of less than 25 and smoke developed index of less than 450, when tested in accordance with ASTM E 84.

Firestopping Exposed to View, Traffic, Moisture, or Physical Damage: Provide products that after curing do not deteriorate when exposed to those conditions during and after construction.

Materials: Use only products specifically listed for use in listed systems.

Compatibility: Provide products that are compatible with each other, with the substrates forming openings, and with the items, if any, penetrating the firestopping, under the conditions represented by this project, based on testing and field performance demonstrated by manufacturer.

Through Penetration Firestop Systems (All Types Except Electrical Penetrations): Provide firestop systems listed for the specific combination of fire rated construction, type of penetrating item, annular space requirements, and fire rating, and:

F-Rating: Provide firestopping that has F-rating equal to or greater than the fire-resistance rating of the assembly in which the firestopping will be installed.

T-Rating: In habitable rooms and areas, where penetrating items are exposed to potential contact with materials on fire side(s) of rated assembly, provide firestopping that has a T-rating equal to its F-rating.

Wall Penetrations: Provide systems that are symmetrical, with the same rating from both sides of the wall.

Cold Smoke Resistance: Provide firestopping that has L-rating of 1 cfm per linear foot (5.5 cu m/h/m), maximum.

Testing: Determine ratings in accordance with ASTM E 814 or UL 1479.

Provide asbestos-free products.

Schedule of Systems: Indicated on the drawings

Through Penetration Firestop System For Electrical Penetrations: Provide firestopping complying with UL system No.5, R11044, tested in accordance with UL 1709, ASTM E 119, ASTM E 1529, and ASTM E 1725.

Smoke and Flame Sealant: 3M FireDam(tm) 150+ Caulk, 3M Fire Barrier CP 25WB+ Caulk, or 3M Fire Barrier IC 15WB Caulk.

Tape for Vapor Barrier, Heat Reflector, and Installation Aid: 3M Interam(tm) T-49 aluminum foil tape.

Tape for Installation: Scotch 898 Filament Tape.

Sheet to Cover Openings and as Collar: 3M Fire Barrier CS-195+ Composite Sheet.

Cast In Place Devices: 3M Fire Barrier Cast In Place Devices.

PART 3 EXECUTION

3.01 EXAMINATION:

A. Do not begin installation until substrates have been properly prepared.

B. Conduct tests according to manufacturer's written recommendations to verify that substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt and other foreign substances capable of impairing bond of firestopping.

C. Verify that items penetrating fire rated assemblies are securely attached, including sleeves, supports, hangers, and clips.

D. Verify that openings and adjacent areas are not obstructed by construction that would interfere with installation of firestopping, including ducts, piping, equipment, and other suspended construction.

E. Verify that environmental conditions are safe and suitable for installation of firestopping.

F. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION:

A. Prepare substrates in accordance with manufacturer's instructions and recommendations.

B. Install masking and temporary coverings as required to prevent contamination or defacement of adjacent surfaces due to firestopping installation.

3.03 INSTALLATION:

A. Install in strict accordance with manufacturer's detailed installation instructions and procedures.

B. Install so that openings are completely filled and material is securely adhered.

C. Where firestopping surface will be exposed to view, finish to a smooth, uniform surface flush with adjacent surfaces.

D. After installation is complete, remove combustible forming materials and accessories that are not part of the listed system.

E. Repair or replace defective installations to comply with requirements.

F. At each through penetration, attach identification labels on both sides in location where label will be visible to anyone seeking to remove penetrating items or firestopping.

G. Clean firestop materials off surfaces adjacent to openings as work progresses, using methods and cleaning materials approved in writing by firestop system manufacturer and which will not damage the surfaces being cleaned.

H. Notify authority having jurisdiction when firestopping installation is ready for inspection; obtain advance approval of anticipated inspection dates and phasing, if any, required to allow subsequent construction to proceed.

I. Do not cover firestopping with other construction until approval of authority having jurisdiction has been received.

3.04 PROTECTION:

A. Protect installed systems and products until completion of project; where subject to traffic, provide adequate protection board.

B. Touch-up, repair or replace damaged systems and products before Substantial Completion.

END OF SECTION 23 03 00

SECTION 23 04 00
MECHANICAL INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed sections:

Section 23 02 50 MECHANICAL: PIPE HANGERS AND SUPPORTS

Section 23 10 00 PLUMBING

Section 23 80 00 HVAC: AIR HANDLING SYSTEMS

1.02 SCOPE

A. Provide labor, equipment and materials to complete the work indicated on drawings and herein specified.

B. Work includes but is not limited to:

Hot Piping systems insulation
Cold Piping systems insulation

Duct insulation

1.03 RELATED WORK

A. Work in conjunction with this section shall be as designated below:

General Contractor:

Cutting, Patching, and Painting
Flashing
Openings in walls
Equipment foundations and supports
All temporary heating

1.04 PROJECT ADMINISTRATION

A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.

B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

1.05 SUBMITTALS

A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.

B. The following shop drawings shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list below is not intended to be all-inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

Piping Insulation, All Systems
Duct Insulation, All Systems
Vapor Barrier Materials

C. General Materials:

A complete list of materials, including manufacturer's descriptive technical literature, performance data, catalog cuts, and installation instructions. The product number, k-value, thickness and furnished accessories for each mechanical system requiring insulation shall be included. Materials furnished under this section of the specification shall be submitted at one time.

Provide a schedule for each system including the following:

Material
Thickness
“k” value
Density
Finish
Jacket

D. Samples:

Thermal Insulation Materials: After approval of materials, actual sections of installed systems, properly insulated in accordance with the specification requirements, shall be displayed. Such actual sections must remain accessible to inspection throughout the job and will be reviewed from time to time for controlling the quality of the work throughout the construction site. Each material used shall be identified, by indicating on an attached sheet the specification requirement for the material and the material by each manufacturer intended to meet the requirement. The Owner will inspect display sample sections at the jobsite. Approved display sample sections shall remain on display at the jobsite during the construction period. Upon completion of construction, the display sample sections will be closed and sealed.

1.06 SYSTEM DESCRIPTION

A. Field-applied insulation and accessories on mechanical systems shall be as specified herein; factory-applied insulation is specified under the piping, duct or equipment to be insulated.

B. Insulation Systems are as follows:

Anti Sweat	AS
Heat Conservation:	HC
Cold Conservation:	CC
Energy Conservation	EC
Personal Protection:	PP

C. Piping Systems – Insulation systems are as follows:

Domestic cold water	AS/CC
Domestic hot water	HC

D. Ductwork – Insulation systems are as follows:

Cooling supply ductwork	CC/AS
Heating supply ductwork	HC

1.07 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. At the discretion of the Owner, the manufacturer of any material supplied will be required to furnish test reports pertaining to any of the tests necessary to assure compliance with the standard or standards referenced in this specification.

American Society for Testing And Materials (ASTM)

ASTM C 1136 (1995) Flexible, Low Permeance Vapor Retarders for Thermal Insulation

ASTM C 1290 (2000e1) Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts

ASTM C 195 (1995) Mineral Fiber Thermal Insulating Cement

ASTM C 449/C 449M (2000) Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement

ASTM C 647 (1995; R 2000) Properties and Tests of Mastics and Coating Finishes for Thermal Insulation

ASTM C 916 (1985; R 1996el) Adhesives for Duct Thermal Insulation

ASTM C 920 (2002) Elastomeric Joint Sealants

ASTM C 921 (1989; R 1996) Determining the Properties of Jacketing Materials for Thermal Insulation

ASTM D 882 (1997) Tensile Properties of Thin Plastic Sheeting

ASTM E 84 (2001) Surface Burning Characteristics of Building Materials

ASTM E 96 (2000e1) Water Vapor Transmission of Materials

1.08 GENERAL QUALITY CONTROL

A. Standard Products:

Materials shall be the standard products of manufacturers regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening.

B. Installer's Qualifications:

Qualified installers shall have successfully completed three or more similar type jobs within the last 5 years.

C. Surface-Burning Characteristics:

Unless otherwise specified, insulation not covered with a jacket shall have a flame spread index no higher than 75 and a smoke developed index no higher than 150. Insulation systems which are located in air plenums, in ceiling spaces, and in attic spaces shall have a flame spread index no higher than 25 and a smoke developed index no higher than 50. Insulation materials located exterior to the building perimeter are not required to be fire-rated. Flame spread, and smoke developed indexes, shall be determined by ASTM E 84. Insulation shall be tested in the same density and installed thickness as the material to be used in the actual construction. Material supplied by a manufacturer with a jacket shall be tested as a composite material. Jackets, facings, and adhesives shall have a flame spread index no higher than 25 and a smoke developed index no higher than 50 when tested in accordance with ASTM E 84.

D. Identification of Materials:

Packages or standard containers of insulation, jacket material, cements, adhesives, and coatings delivered for use, and samples required for approval shall have manufacturer's stamp or label attached giving the name of the manufacturer and brand, and a description of the material.

1.09 STORAGE

A. Materials shall be delivered in the manufacturer's unopened containers. Materials delivered and placed in storage shall be provided with protection from weather, humidity, dirt, dust and other contaminants. The Owner may reject insulation material and supplies that become dirty, dusty, wet, or contaminated by some other means.

PART 2 PRODUCTS GENERAL

2.01 GENERAL MATERIALS

A. Materials shall be compatible and shall not contribute to corrosion, soften, or otherwise attack surfaces to which applied in either the wet or dry state. Materials to be used on stainless steel surfaces shall meet ASTM C 795 requirements. Materials shall be asbestos free and conform to the following:

B. Mineral Fiber Insulation Cement:

C. Cement shall be in accordance with ASTM C 195.

D. Contact Adhesive:

Adhesives may be dispersed in a volatile organic solvent. Adhesives may be any of, but not limited to, the neoprane based, rubber based, or elastomeric type that have a flame spread index no higher than 25 and a smoke developed index no higher than 50 when tested in the dry state in accordance with ASTM E 84. The adhesive shall not adversely affect, initially or in service, the insulation to which it is applied, nor shall it cause any corrosive effect on metal to which it is applied. Any solvent dispersing medium or volatile component of the adhesive shall have no objectionable odor and shall not contain any benzene or carbon tetrachloride. The dried adhesive shall not emit nauseous, irritating, or toxic volatile matters or aerosols when the adhesive is heated to any temperature up to 212 degrees F. The dried adhesive shall be nonflammable and fire resistant. Natural cross-ventilation, local (mechanical) pickup, and/or general area (mechanical) ventilation shall be used to prevent an accumulation of solvent vapors, keeping in mind the ventilation pattern must remove any heavier-than-air solvent vapors from lower levels of the workspaces. Gloves and spectacle-type safety glasses are recommended in accordance with safe installation practices.

E. Caulking:

ASTM C 920, Type S, Grade NS, Class 25, Use A.

Fibrous Glass Cloth and Glass Tape:

Fibrous glass cloth and glass tape shall have flame spread and smoke developed ratings of no greater than 25/50 when measured in accordance with ASTM E 84. Tape shall be 4 inch wide rolls.

F. Staples:

Outward clinching type ASTM A 167, Type 304 or 316 stainless steel. Monel is a nickel rich alloy that has high strength, high ductility, and excellent resistance to corrosion.

G. Jackets:

ASTM C 921, Type I, maximum moisture vapor transmission 0.02 perms, (measured before factory application or installation), minimum puncture resistance 50 Beach units on all surfaces where a minimum puncture resistance of 25 Beach units is acceptable. Minimum tensile strength, 35 pounds/inch width. ASTM C 921, Type II, minimum puncture resistance 25 Beach units, tensile strength minimum 20 pounds/inch width. Jackets used on insulation exposed in finished areas shall have white finish suitable for painting without sizing. Based on the application, insulation materials that require factory applied jackets are mineral fiber, cellular glass, and phenolic foam. All non-metallic jackets shall have a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with ASTM E 84.

H. White Vapor Retarder All Service Jacket (ASJ):

For use on hot/cold pipes, ducts, or equipment vapor retarder jackets used on insulation exposed in finished areas shall have white finish suitable for painting without sizing.

I. Polyvinyl Chloride (PVC) Jackets:

Polyvinyl chloride (PVC) jacket and fitting covers shall have high impact strength, UV resistant rating or treatment and moderate chemical resistance with minimum thickness 0.030 inch.

J. Vapor Retarder Mastic Coatings:

The vapor retarder coating shall be fire and water resistant and appropriately selected for either outdoor or indoor service. Color shall be white. The water vapor permeance of the compound shall be determined according to procedure B of ASTM E 96 utilizing apparatus described in ASTM E 96. The coating shall be a nonflammable, fire resistant type. All other application and service properties shall be in accordance with ASTM C 647.

K. Laminated Film Vapor Retarder:

ASTM C 1136, Type I, maximum moisture vapor transmission 0.02 perms, minimum puncture resistance 50 Beach units on all surfaces except concealed ductwork, where Type II, maximum moisture vapor transmission 0.02 perms, a minimum puncture resistance of 25 Beach units is acceptable.

L. Polyvinylidene Chloride (PVDC) Film Vapor Retarder:

The PVDC film vapor retarder shall have a maximum moisture vapor transmission of 0.02 perms, minimum puncture resistance of 150 Beach units, a minimum tensile strength in any direction of 30 lb/inch when tested per ASTM D 882, and a maximum flame spread/smoke developed index of 25/50 per ASTM E 84.

M. Polyvinylidene Chloride Vapor Retarder Adhesive Tape:

Requirements must meet the same as specified for PVDC Film Vapor Retarder in paragraph above.

N. Non-Vapor Retarder Mastic Coatings:

ASTM C 1136, Type III, maximum moisture vapor transmission 0.10 perms, minimum puncture resistance 50 Beach units on all surfaces except ductwork, where Type IV, maximum moisture vapor transmission 0.10, a minimum puncture resistance of 25 Beach units is acceptable.

O. Wire:

Soft annealed ASTM A 580/A 580M Type 302, 304 or 316 stainless steel, 16 or 18 gauge.

P. Sealants:

Sealants shall be chosen from the butyl polymer type, the styrene-butadiene rubber type, or the butyl type of sealants. Sealants shall have a maximum moisture vapor transmission of 0.02 perms, and a maximum flame spread/smoke developed index of 25/50 per ASTM E 84.

PART 3 INSULATION SYSTEMS: PIPING

3.01 INSULATION: GENERAL

A. Install insulation in a neat and workmanlike manner, observing the best practices of the trade. Longitudinal seams shall be flat and face structure away from view. Insulation shall be smooth throughout. No raw ends of insulation will be permitted; cover raw ends with caps.

3.02 INSULATION SYSTEM: DOMESTIC WATER PIPING

A. Scope / Insulation System:

Domestic Cold Water	CC / AS
Domestic Hot Water	HC
Domestic Hot Water Recirculating	HC

B. Materials: Provide one piece insulation of long, fine flame attenuated glass fibers, covered with factory applied all purpose jacket of white kraft bonded to aluminum foil and reinforced with fiberglass yarn.

Flame spread:	25
Smoke developed:	50
Conductivity:	.24 at 100 degree F (mean)

C. Fittings and valves shall be covered with similar material, of same thickness, as pipe covering with vapor seal and PVC premolded plastic jacket.

D. Workmanship: Apply pipe insulation over clean, dry surfaces, with adjoining sections firmly together. Insulate flanges, valves and fittings with mitered segments of pipe insulation of equal thickness. Fittings on 2" and smaller pipe may be insulated with insulating cement of equal thickness. Insulation and vapor barrier shall pass uninterrupted through all hangers, supports and pipe sleeves.

3.03 INSULATION THICKNESS SCHEDULE

Pipe Size:	1/2" thru 1-1/2"	2" thru 3”	4” and larger
Pipe Use:			
Hot Water, Recirc.	1"	1"	2”
Cold Water	1/2"	1"	1 ½”

A. Scope: All new domestic water system piping and all existing domestic water piping at locations of removal and/or new connections. Premolded PVC coverings on exposed piping only.

3.04 PVC FITTING COVERS

A. Provide PVC premolded, one piece, high impact covers with fiberglass inserts and accessories for elbows tees, valves, caps, couplings, specialties, etc.

Surface burning characteristics	25 Flame 50 Smoke
UL Listed 94V-0	
Insert thermal conductivity	.26K @ 75°F

B. Installation: Fiberglass insert shall be wrapped completely around the fitting or snugly positioned inside the PVC Cover for proper fit. The Cover shall be applied over the fitting and insert, and the throat secured by tack fastening, taping, sealing with a solvent type PVC adhesive, or banding.

C. Cold Pipe: Fitting systems below ambient temperature shall be with a continuous vapor barrier, with PVC Tape, PVC Adhesive, or a vapor barrier mastic as specified by the engineer. When using PVC Tape, use a 2" minimum downward overlap. Care should be taken not to stretch the last 2" of PVC Tape, to avoid stretching or creeping.

D. Scope: Provide premolded PVC coverings on exposed piping only.

PART 4 INSULATION SYSTEMS DUCTWORK

4.01 INSULATION: DUCT / BLANKET TYPE:

A. Service / Insulation System: Conditioned Supply Air, Heating & Cooling CC / AS

B. Material: Lightweight blanket type insulation of long, fine flame attenuated glass fibers, bonded with a thermo-setting resin.

C. Insulation shall be as manufactured by Certain-Teed Corporation, Knauf, or Owens-Corning.

Conductivity:	.27 at 100 Degrees Fahrenheit
Density:	75 lbs. per cu. ft.
Facing:	0.004" thick, class 1 pigmented vinyl
Fire Hazard Classification:	25/50

D. Workmanship: Blanket insulation shall be applied in a neat, workmanlike manner and shall be securely fastened to the ductwork with No. 104 adhesive, as manufactured by The Minnesota Mining Company or an approved equal.

E. Longitudinal joints shall be lapped and stitched with staples. Joints shall be away from view where possible. Circumferential joints shall be lapped and taped, or lapped and cemented with approved materials.

F. R-value (ft2·°F·hr/Btu): R-8 unless otherwise noted
R-12 in all unheated spaces outside of building insulation envelope.

G. Thickness: 1½" unless otherwise noted
3" in all unheated spaces outside of building insulation envelope.

H. Scope: All new concealed supply ductwork and all existing supply air ductwork at locations of removal and/or new connections.

PART 5 EXECUTION

5.01 GENERAL:

A. Installation:

Insulation shall only be applied to non-operating, unheated and uncooled piping and equipment. Flexible elastomeric cellular insulation shall not be compressed at joists, studs, columns, ducts, hangers, etc. The insulation shall not pull apart after a one hour period; any insulation found to pull apart after one hour, shall be replaced.

Except as otherwise specified, material shall be installed in accordance with the manufacturer's written instructions. Insulation materials shall not be applied until tests specified in other sections of this specification are completed. Material such as rust, scale, dirt and moisture shall be removed from surfaces to receive insulation. Insulation shall be kept clean and dry. Insulation shall not be removed from its shipping containers until the day it is ready to use and shall be returned to like containers or equally protected from dirt and moisture at the

end of each workday. Insulation that becomes dirty shall be thoroughly cleaned prior to use. If insulation becomes wet or if cleaning does not restore the surfaces to like new condition, the insulation will be rejected, and shall be immediately removed from the job site. Joints shall be staggered on multi layer insulation. Mineral fiber thermal insulating cement shall be mixed with demineralized water when used on stainless steel surfaces. Insulation, jacketing and accessories shall be installed in accordance with MICA Insulation Stds plates except where modified herein or on the drawings.

B. Fire-Stopping:

Where pipes and ducts pass through firewalls, fire partitions, above grade floors, and fire rated chase walls, the penetration shall be sealed with fire stopping materials.

5.02 PIPE INSULATION INSTALLATION

A. General:

Pipe insulation shall be installed on aboveground hot and cold pipeline systems as specified below to form a continuous thermal retarder, including straight runs, fittings and appurtenances unless specified otherwise. Installation shall be with full-length units of insulation and using a single cut piece to complete a run. Cut pieces or scraps abutting each other shall not be used.

B. Pipe insulation shall be omitted on the following:

Pipe used solely for fire protection.

Chromium plated pipe to plumbing fixtures. However, fixtures for use by the physically handicapped shall have the hot water supply and drain, including the trap, insulated where exposed.

Sanitary drain lines.

C. Pipes Passing Through Walls, Roofs, and Floors:

Pipe insulation shall be continuous through the sleeve.

An aluminum jacket with factory applied moisture retarder shall be provided over the insulation wherever penetrations require sealing.

Where pipes penetrate interior walls, the aluminum jacket shall extend 2 inches beyond either side of the wall and shall be secured on each end with a band.

Where penetrating floors, the aluminum jacket shall extend from a point below the backup material to a point 10 inches above the floor with one band at the floor and one not more than 1 inch from the end of the aluminum jacket.

Where penetrating waterproofed floors, the aluminum jacket shall extend from below the backup material to a point 2 inches above the flashing with a band 1 inch from the end of the aluminum jacket.

Where penetrating exterior walls, the aluminum jacket required for pipe exposed to weather shall continue through the sleeve to a point 2 inches beyond the interior surface of the wall.

Where penetrating roofs, pipe shall be insulated as required for interior service to a point flush with the top of the flashing and sealed with vapor retarder coating. The insulation for exterior

application shall butt tightly to the top of flashing and interior insulation. The exterior aluminum jacket shall extend 2 inches down beyond the end of the insulation to form a counter flashing. The flashing and counter flashing shall be sealed underneath with caulking.

D. Pipes Passing Through Hangers:

Insulation, whether hot or cold application, shall be continuous through hangers. All horizontal pipes 2 inches and smaller shall be supported on hangers with the addition of a Type 40 protection shield to protect the insulation in accordance with MSS SP-69. Whenever insulation shows signs of being compressed, or when the insulation or jacket shows visible signs of distortion at or near the support shield, insulation inserts as specified below for piping larger than 2 inches shall be installed.

Horizontal pipes larger than 2 inches at 60 degrees F and above shall be supported on hangers in accordance with MSS SP-69.

Horizontal pipes larger than 2 inches and below 60 degrees F shall be supported on hangers with the addition of a Type 40 protection shield in accordance with MSS SP-69. An insulation insert of cellular glass, calcium silicate (or perlite above 80 F) or the necessary strength polyisocyanurate, shall be installed above each shield. The insert shall cover not less than the bottom 180-degree arc of the pipe. Inserts shall be the same thickness as the insulation, and shall extend 2 inches on each end beyond the protection shield. When insulation inserts are required per the above, and the insulation thickness is less than 1 inch, wooden or cork dowels or blocks may be installed between the pipe and the shield to prevent the weight of the pipe from crushing the insulation, as an option to installing insulation inserts. The insulation jacket shall be continuous over the wooden dowel, wooden block, or insulation insert.

5.03 DUCT INSULATION INSTALLATION

A. Installation on Concealed Ductwork:

For rectangular, oval or round ducts, insulation shall be attached by applying adhesive around the entire perimeter of the duct in 6-inch wide strips on 12 inch centers.

For rectangular and oval ducts, 24 inches and larger insulation shall be additionally secured to bottom of ducts by the use of mechanical fasteners. Fasteners shall be spaced on 16 inch centers and not more than 16 inches from duct corners.

For rectangular, oval and round ducts, mechanical fasteners shall be provided on sides of duct risers for all duct sizes. Fasteners shall be spaced on 16-inch centers and not more than 16 inches from duct corners.

Insulation shall be impaled on the mechanical fasteners (self stick pins) where used and shall be pressed thoroughly into the adhesive. Care shall be taken to ensure vapor retarder jacket joints overlap 2 inches. The insulation shall not be compressed to a thickness less than that specified. Insulation shall be carried over standing seams and trapeze-type duct hangers.

Self-locking washers shall be installed where mechanical fasteners are used. The pin shall be trimmed back and bent over.

Jacket overlaps shall be secured with staples and tape as necessary to ensure a secure seal. Staples, tape and seams shall be coated with a brush coat of vapor retarder coating or PVDC adhesive tape.

Breaks in the jacket material shall be covered with patches of the same material as the vapor retarder jacket. The patches shall extend not less than 2 inches beyond the break or penetration in all directions and shall be secured with tape and staples. Staples and tape joints shall be sealed with a brush coat of vapor retarder coating or PVDC adhesive tape.

At jacket penetrations such as hangers, thermometers, and damper operating rods, voids in the insulation shall be filled and the penetration sealed with a brush coat of vapor retarder coating or PVDC adhesive tape.

Insulation terminations and pin punctures shall be sealed and flashed with a reinforced vapor retarder coating finish or tape with a brush coat of vapor retarder coating. The coating shall overlap the adjoining insulation and non-insulated surface 2 inches. Pin puncture coatings shall extend 2 inches from the puncture in all directions.

Where insulation standoff brackets occur, insulation shall be extended under the bracket and the jacket terminated at the bracket.

END OF SECTION 23 04 00

SECTION 23 04 40
MECHANICAL: PIPE CLEANING AND TESTING

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 10 00 PLUMBING

Section 23 30 00 FIRE PROTECTION

1.02 SCOPE:

A. Provide labor, equipment and materials to complete the work indicated on drawings and herein specified.

B. This specification defines the requirements and procedures for field pressure testing of above ground and underground piping systems, connected equipment and integral components to assure mechanical strength and tightness. Also included are flushing and cleaning requirements for open and/or closed piping systems. Any deviation from this specification shall require written approval from the Engineer.

C. Testing Exclusions: The following are excluded from the testing requirements of this specification:

Any package unit previously tested by the manufacturer in accordance with the applicable codes.

Piping systems, which are tested in accordance with the applicable building and fire codes and the requirements of those codes are in excess of that required herein.

Lines and systems open to the atmosphere such as safety valve discharges, vents or drains downstream of the last shutoff valve. These lines shall be visually inspected to determine that all joints are properly made up.

1.03 RELATED WORK:

A. Work in conjunction with this section shall be as designated below:

General Contractor:

Cutting, Patching, and Painting
Openings in roofs
Openings in walls
All temporary heating

Electrical Contractor:

Power wiring for electrical equipment provided within this section.

1.04 PROJECT ADMINISTRATION:

A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.

B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

1.05 SUBMITTALS:

A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.

B. The following submittals shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list below is not intended to be all-inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

Sources of All Cleaning and Testing Agents
Pressures and Temperatures for Final Testing
Date of Test for Each System
Name and Address of Testing and Cleaning Contractor / Contractors
Test pressures and holding time
Calibration record of pressure measuring devices and relief devices settings
Cleaning and Testing Materials to be used with Recommended Temperatures
Chemical Treatment Materials to be used with Recommended Temperatures

Means of disposal of flushing, testing and cleaning solutions. *(The Contractor shall contain and legally dispose of all cleaning and testing solutions.)*

Summary report of testing and cleaning results, including testing log for all systems, chemical treatment solutions in place and chemical analysis of system water after testing and cleaning procedures are complete.

1.06 QUALIFICATIONS:

A. Qualified Contractors shall be recognized as firms specializing in providing services related to the requirements of this specification. All Contractors providing Pipe Cleaning and Testing Services shall have a minimum of three years of documented experience.

1.07 PROJECT CLOSEOUT:

A. Review and provide closeout requirements of this section and Section 23 00 00 Mechanical General Requirements.

PART 2 PRODUCTS

2.01 CLEANING PRODUCTS:

A. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products.

2.02 PIPE CLASS TABLE:

PIPE CLASS	PIPE MATERIALS	NOTES:
	Copper and brass	
U2	Copper Tubing Type L	Soldered Joints
	Plastic	
P1	PVC drainage	Solvent joints
P2	PVC Sewer	Tyton fittings

2.03 CLEANING CLASS:

A. Cleaning Class C1:

Covers water flushing and cleaning of piping systems after assembly and erection. Cleaning shall be accomplished by thoroughly flushing with clear water at sufficient velocity to remove all foreign matter.

B. Cleaning Class C2:

Covers the blowing-out of piping systems after assembly and erection. Blow out agent shall be steam (S), oil free air (A), or nitrogen (N)

C. Cleaning Class C3:

Covers water flushing and disinfecting of above and below ground potable water piping systems after assembly and erection. Cleaning of piping shall be accomplished by first thoroughly flushing with potable water at sufficient velocity (2.5 fps mm.) to remove all foreign matter and then sterilizing with chlorine solution (100 ppm of available chlorine for a minimum contact time of 2 hours).

2.04 TESTING CLASS:

A. Testing Class T1:

Covers initial service leak testing per ASME B31 .3, Category D, at operating pressure and leak test inspection of piping systems after assembly and erection.

B. Testing Class T2:

Covers hydrostatic leak and pressure testing and inspection of piping systems after assembly and erection.

C. Testing Class T3:

Covers pneumatic leak and pressure testing and inspection of piping systems after assembly and erection. Pneumatic agent shall be oil free air, or nitrogen (N).

D. Testing Class T4:

Covers static head leak test and test inspection of piping systems after assembly and erection. Piping systems are to be tested and inspected for leak tightness while being subjected to the internal test pressure of a 10 foot static head. Water shall stand in the system without change in level for a period of not less than 5 hours.

2.05 REFERENCES

A. Piping tests shall comply with the provisions of the latest edition of ASME B31 .3 Process Piping, section 345, Testing. Any conflict between Code and Specification shall be referred to the Engineer for resolution.

B. Piping cleaning/disinfecting of piping systems shall comply with the provisions of the current edition of the Uniform Plumbing Code, ANSI A40.8 Section 10.9 or AWWA C601. Any conflict between Code (5) and Specification shall be referred to the Engineer for resolution.

C. The maximum test pressure for each line shall be as per ASME B31 .3 Process Piping, section 345, Testing.

2.06 PIPING SYSTEMS: CLEANING AND TESTING:

PIPE SYSTEM	SYMBOL	PIPE CLASS	CLEANING CLASS	TESTING CLASS	TEST PRESSURE
PLUMBING:					
Cold Water - Domestic Potable	CW	U2	C3	T2	125 psig
Hot Water - Domestic Potable	HW	U2	C3	T2	125 psig
Hot Water Recirculating	HWR	U2	C3	T2	125 psig
Sanitary Waste - PVC	SAN	P1	C1	T4	10ft wc
Sanitary Vent - PVC	V	P1	C1	T4	10ft wc
FIRE PROTECTION SYSTEMS					
Wet Sprinkler System	F	F1	C1	T2	per NFPA
Dry Sprinkler System	F(D)	F4	C2(A)	T3	per NFPA
Chemical Fire Protection Piping	F(sym)	F1	C2(A)	T3	per NFPA
Wet Sprinkler System - plastic	F	P5	C2(A)	T3	per NFPA

2.07 CLEANING PRODUCTS:

A. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products.

PART 3 EXECUTION

3.01 PRESSURE TESTING: GENERAL REQUIREMENTS FOR TESTING

A. Leak testing shall be done in accordance with ANSI B31.3 Process Piping, section 345, Testing. Upon completion of system(s) erection work and cleaning, but prior to adjusting and balancing, all installed piping and/or tubing shall be pressure tested except where otherwise qualified in this specification.

B. Piping that is to be chemically cleaned after installation shall be tested and all repairs made before cleaning.

C. Contractor shall provide competent personnel to conduct all tests. System(s) shall not be considered complete until all tests have been concluded to the satisfaction of the Engineer. In the event of leakage or defects, tests must be repeated until all faults are corrected.

D. Contractor shall furnish all instruments, ladders, test equipment, test tees, accessories, and personnel required for the tests.

E. All successful tests shall be documented and certified by the General Contractor with the resulting data transmitted to the Architect, to be retained as a permanent record.

F. Tests shall be considered satisfactory if no leakage is detected on the piping and any of the joints. After this initial period, pressure shall be maintained until system is inspected for leaks and thereafter, for specified time periods according to system tested.

Areas requiring repairs shall be retested as originally specified.

G. Following the completion and approval of the test, Contractor shall restore all components of the system to normal operating condition. This includes removing the temporary provisions installed for the test.

H. Piping shall be tested at metal temperatures between 60°F and 100°F.

I. Hydrotest equipment shall include at least one NIST standard calibrated pressure measuring device (to be installed at the highest point in the tested system) and a calibrated pressure relieving device.

J. The following shall be excluded from all pressure tests:

Equipment and vendor furnished piping specifically recommended by the manufacturer not to be tested.

3.02 APPLICATION: TEST METHODS AND PRESSURES

A. Hydrostatic Testing of Piping Designed for Internal Pressure

The hydrostatic test pressure shall not be less than 1.5 times the design pressure.

If the design conditions of piping attached to a vessel are the same as those of the vessel, then the piping and vessel may be tested together at the test pressure of the vessel. However, if the piping should be subject to higher design conditions and requires a higher test than the connected equipment, or if the piping is designed for lesser operating conditions than the connected equipment and could be overstressed by a system test, then it shall be isolated and tested separately.

B. Pneumatic Testing:

If the piping is tested pneumatically, the minimum test pressure shall be 110 percent of the design pressure.

C. Static Head Test:

This test covers leak testing of all non-pressure plumbing and drainage systems, including sanitary sewer, storm drainage, etc. All piping in this test shall be subjected to an internal test pressure not less than 10-foot static head of water.

3.03 PRESSURE TESTING: PREPARATION FOR FIELD PRESSURE TEST

A. Restrictions to flow, such as orifice plates and flow or mixing nozzles, shall not be installed or shall be removed. When necessary, items shall be replaced with temporary spool pieces.

B. All valves (except vents, drains, and hydro boundary valves) within the system to be tested shall be in open position; control valves shall be specifically checked to assure that they are in an open position or they shall be bypassed or removed during testing.

C. Equipment that is not to be hydrostatically tested shall be isolated or removed from the system. If valves are used for isolation, Contractor shall verify that valves can withstand the test pressure in the closed position without any damaging effect.

D. All joints shall be left uninsulated and exposed for examination during the test; however, joints previously tested in accordance with this specification may be insulated or covered. If a sensitive test is required, all joints mentioned above shall be left unprimed and unpainted.

E. Underground portions of piping systems may be tested and covered before testing aboveground portions.

F. Before testing:

Piping systems shall have been completely checked (Punched Out).

All lines, vessels, and equipment shall be checked to ensure that the entire system can be completely drained after testing.

Vents or other high point connections shall be opened to eliminate air from lines that receive a hydrostatic test.

System shall be purged of air before hydrostatic test pressure is applied.

System shall be thoroughly vented to remove all air pockets before the hydrostatic test pressure is applied.

Field personnel shall review all vessels and internals in order to determine best method to prevent air entrapment when filling and to prevent vacuum when draining.

When a pressure test is required to be maintained for a period of time during which the testing medium in the system would be subject to thermal expansion, provision shall be made for relief of any pressure greater than the maximum test pressure.

3.04 FIELD PRESSURE TEST PROCEDURES

A. General:

Pressure Testing and Cleaning Procedure Index:

Pressure testing procedures shall be selected based on service and line class according to the table as included herein under the heading PIPING SYSTEMS: CLEANING AND TESTING.

The testing of piping and/or tubing, and equipment shall be performed on a system basis, in preference to the testing of individual lines or single components if at all possible. Breaking joints to insert blinds for hydrostatic testing shall be avoided wherever possible.

Special equipment shall be tested only as per instructions by the Engineer and/or Owner.

B. Hydrostatic Pressure Test:

In order to hydrostatic test as much piping as possible at one time, a systems test may be employed. This test shall include 1 or more lines and if possible connected vessels and equipment.

The minimum test pressure for a system test shall be such that each line in the system is subjected to a test pressure in accordance with the table as included herein under the heading PIPING SYSTEMS: CLEANING AND TESTING.

The maximum system test pressure shall not exceed the pressure test rating of any piping component or the shop test pressure of any vessels or equipment included in the test system.

Systems or sections of systems to be tested may be isolated by closed valves, provided the valve body and seat are suitable for the test pressure. Do not use closed diaphragm valves for isolation.

Where a suitable valve is not available, vessels, equipment, or other piping not included in the system pressure test shall be either disconnected from the a system or isolated by blinds or other means during the test.

The normal locations for the pressure test gauge are at grade near the pressure test pump. Readings may be made at higher points providing the gauge pressure reading and the static head (0.433 psi/ft) between grade and the point of measurement do not exceed the maximum

test pressure. Pressure test gauges shall be calibrated once a month, using a dead weight tester. Gauges shall be tagged with the date last calibrated, and this activity shall be recorded.

Hydrostatic test pressure shall not be applied until the vessel or equipment and its contents are at approximately the same temperature. To minimize the risk of brittle fracture, pressure tests through vessels and equipment shall not be conducted when the test liquid or metal temperature is below 60°F.

Hydrostatic test pressure shall be maintained for a sufficient length of time to visually determine whether there are any leaks, but not less than 1 hour. Contractor shall not be required to maintain test pressure in excess of 2 hours after notification of the client's authorized inspector.

C. Pneumatic Test Procedure:

Minimum Metal Temperature

At time of testing the minimum pipe metal temperature shall be as follows:

All ferric piping: 60°F
All copper: 40°F

Minimum temperatures for materials not listed above, shall be determined by the Engineer of Record and the Owner when required by field construction.

Clear the test area of all nonessential personnel before bringing the line up to test pressure. It may be desirable to conduct pneumatic tests during weekends when fewer personnel are deemed necessary to protect workers during such tests.

A pressure relief device shall be provided, having a set pressure not higher than the test pressure plus the lesser of 50 psi or 10 percent of the test pressure.

When pneumatic testing at over 25 psig, a preliminary check at 25 psig shall be made to locate major leaks. The pressure shall be increased in gradual steps of 5 psig, or 10 percent of the test pressure, whichever is greater.

A double block and bleed valve arrangement shall be included in the pressurizing line to the system being tested. A test pressure gauge shall be downstream of the double block. After each pressure step has been reached, close the block valve and open the bleeder to atmosphere. If after a 5-minute period the step pressure is held, proceed to the next step pressure. If not, examine the entire system for leakage.

Before soaping the joints, the entire line should be walked to determine whether there is any audible evidence of leakage. Any leaks found at the time shall be marked, and repaired after first de-pressuring the line.

When the system has been brought up to the test pressure shown on the line list, all joints and welds shall be covered with soap solution in order to detect any leakage.

Soap solutions are to be low chloride and designed specifically for use in pneumatic testing of stainless steel systems.

Bolting shall not be tightened while systems being tested are pressured above 30 psig.

Pneumatic test pressure shall be maintained for a sufficient length of time to permit thorough visual inspection of all joints and weld seams but not less than 2 hour. Pressure shall be reduced gradually when de-pressuring.

D. Static Head Test Procedure

Underground pipe joints shall be exposed for a distance of two feet on each side of joints and shall not be backfilled until piping has been tested and approved.

Piping which connects to or is continuous with lines installed by others shall be isolated from these lines by a valve or line blind.

All openings will be provided with temporary plugs except the highest (fill opening)

Piping system shall be filled with clean water to the top vent stack. Systems without a vent stack shall be provided a temporary vertical stack. Stack shall be at least 10 feet in length.

Water shall stand in the system without change in level for a time period of not less than 5 hours.

Joints having leaks shall be repaired and retested for a time period of I hour.

E. Test Completion

In the event that repairs or additions are made following the pressure test, the affected piping shall be retested at the pressures originally specified for the test

After completion of testing, all temporary blanks and blinds shall be removed, all operating blinds returned to proper position, and all lines and piping components shall be completely drained. Valves, orifice plates, expansion joints, and short pieces of piping that have been removed shall be reinstalled with as specified proper new gaskets in place. All valves that were closed during hydrotest shall be opened to ensure drainage of the bonnet cavity. Lines being drained after testing shall have all vents open. Piping systems downstream of check valves should be inspected to ensure complete drainage.

Direct connected transmitters at orifice flanges must be disconnected when replacing orifice plates to avoid distorting the connections.

Care shall be exercised in controlling the rate of drainage from vessels with respect to the inflow of air through the vent to ensure that the vessel is not subjected to vacuum. After vessels have been completely drained, vents, cyclones, and other internal closures that were opened before testing shall be closed.

After lines have been drained, temporary supports shall be removed, and insulation and painting completed. Spring hangers provided with stops to carry the test load shall have these stops removed in accordance with Field Instruction provided on Form E-326, Constant Support Spring Hanger, and Form E-327, Variable Support Spring Hangers for each hanger.

3.05 CLEANING; GENERAL PREPARATION

A. General Contractor shall schedule testing so that sanitizing and passivation of tubing system(s) immediately follows testing of system.

B. Schedule field cleaning as close to the commissioning of the equipment as possible.

C. Protect threaded connections, flange faces, and valves to prevent damage by abrasion.

D. Do not allow aluminum, copper, galvanized steel, magnesium, or zinc surfaces to come in contact with solutions having a pH of less than 4.0 or a pH more than 10.

E. Do not introduce chemical solution into equipment unless high point vents and low point drains (supplied by piping contractor) are available to ensure proper filing and complete removal of solutions.

END OF SECTION 23 04 40

SECTION 23 10 00
PLUMBING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00	MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 01 50	MECHANICAL: VIBRATION ISOLATION
Section 23 02 50	MECHANICAL: PIPE HANGERS AND SUPPORTS
Section 23 03 00	MECHANICAL: FIRE SAFING / FIRESTOPPING
Section 23 04 00	MECHANICAL: INSULATION
Section 23 04 40	MECHANICAL: PIPE CLEANING TESTING
Section 23 15 00	PLUMBING: FIXTURES

1.02 SCOPE:

A. Provide labor, equipment and materials to complete the work indicated on drawings and herein specified.

B. Work specified within this Section is limited to 5'-0" beyond building limit.

1.03 RELATED WORK:

A. Work in conjunction with this section shall be as designated below:

General Contractor:

Cutting, Patching, and Painting
Openings in roofs / Flashing
Openings in walls
Equipment foundations and bases
All temporary heating

Electrical Contractor:

Power wiring for electrical equipment provided within this section.

1.04 PROJECT ADMINISTRATION:

A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.

B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

1.05 SUBMITTALS:

A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.

B. The following shop drawings shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list is not intended to be all inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

Pipe and fittings
Hangers / Supports
Valves
Insulation
Clean outs
Fixtures and Fixture carriers (See Section 23 15 00)

1.06 INSPECTION AND TESTING: BY AUTHORITIES / AGENCIES

A. Inspections, examinations and tests required by authorities/agencies shall be coordinated and paid for as necessary by the Plumbing Contractor to obtain complete and final acceptance of the systems. Transmit certificates of inspection, acceptance to the Architect.

1.07 QUALITY ASSURANCE:

A. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.

1.08 FLUSHING, CLEANING AND TESTING: BY CONTRACTOR

A. Provide all labor, equipment and expertise to flush, clean and test all piping systems installed. Isolate all sections and equipment as necessary to complete the flushing, cleaning and testing according to the requirements of SECTION 23 04 40 MECHANICAL: PIPE CLEANING - TESTING.

1.09 UTILITY CONNECTIONS / COORDINATION / METERS

A. Review all contract documents with the proper utility companies prior to the start of any work to insure that meters, testing, inspections, acceptances will all be properly completed in a timely manner.

B. Report any alterations required to insure utility company coordination.

1.10 PROJECT CLOSEOUT:

A. Review and provide closeout requirements of this section and Section 23 00 00 Mechanical General Requirements, including:

Testing and Adjusting
Operating, Maintenance Instructions
Lubrication
Cleaning
Sterilization
Record Drawings
Written Guarantee
Operating, Maintenance Manuals
Test Log
Letters of compliance

PART 2 - PIPING: PRODUCTS AND INSTALLATION

2.01 PIPING: INSTALLATION, GENERAL:

A. Provide new, standard products, materials and equipment which comply with the specification; are undamaged and unused at the time of installation; are complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use.

B. Arrange and install piping approximately as indicated, straight, plumb, and as direct as possible. Form right angles or parallel lines with building wall. Keep pipe close to walls, partitions and ceilings. Offset only where necessary to follow walls. Where so indicated and wherever possible, conceal piping in building construction before erection of closing construction. When furred spaces are indicated, keep pipes as close to structural members as possible. Piping shall not interfere with openings, doors and windows. Allow for proper clearance at windows, doors, equipment and other building parts such that pipes do not interfere with access and building use.

C. Piping shall be cut accurately to measurements established at the site and shall be installed without springing, forcing and excessive cutting or weakening of building structure. Pipes shall be installed in a manner permitting proper drainage, venting and free expansion and contraction. Changes in direction shall be made with factory-manufactured fittings.

D. Install pipe to allow for expansion without excessive stress on pipe, hangers and building.

E. Welding, brazing, soldering shall be with proper regard for fire prevention and safety. See Fire Watch requirements.

F. Arrange piping passing through floors, walls and other partitions of building construction so that piping is centered in openings/sleeves and is rigidly supported on both sides of openings/sleeves.

G. Clean pipe, pipe fittings, and valves before erection. Cap or plug open ends of piping and equipment during construction to keep dirt and foreign material out of system.

H. As specified elsewhere, certain service piping and associated fittings. Valves and accessories will be furnished factory-cleaned and sealed.

I. Provide concrete thrust blocks for certain underground piping as shown on the Drawings. Provide concrete support pads under valves as shown on the Drawings.

J. Unions or flanges shall be used to facilitate piping installation, and shall be installed between shut-off valves and equipment to facilitate removal of equipment for repair.

K. Provide dielectric unions where pipes of dissimilar metals are joined together.

L. Isolate and drain existing systems as required to complete the Work. Fill, circulate and vent both new and existing systems as required for proper operation.

M. Copper tube, of annealed or bending temper quality, where indicated to be installed without joints or fittings, shall be bent to accomplish changes of direction. Bending shall not collapse outside nor buckle inside of bend. Proper radius, method and tools required shall comply with Copper Tube Handbook.

N. Do not route pipelines over switchboards, panels, motor control centers, individual motor starters and other electrical equipment.

O. Avoid routing pipelines over electrical raceways and bus ducts. If these locations cannot be avoided, provide drip pans under pipelines. Also provide drip pans where indicated on the Drawings. Drip pans shall be constructed of minimum 22 gauge stainless sheet metal with waterproof mastic applied to interior seams and joints. Pan width shall be minimum 2 times pipe diameter and with sides turned up minimum of 4” high and fitted with hemmed edge. Do not hang drip pans from pipe. Pitch pans minimum 1/8” per foot and provide 3/4” drain connection at low points. Pipe drains to nearest floor drain or as shown on the Drawings.

2.02 CROSS AND INTER-CONNECTIONS:

A. No piping for fixtures, equipment, devices or internal connections shall be installed which will provide a cross or interconnection, under any circumstance of operation, between a distributing supply for drinking or domestic purposes and a not-potable supply. A non potable supply would include a drainage system or a soil or sanitary waste pipe which would permit or make possible the backflow of sewage, polluted water or waste into the domestic water supply system.

2.03 PIPING: SANITARY WASTE and VENT, PVC (BELOW SLAB)

PIPE CLASS:	P1
PIPE SYMBOL	SAN
CLEANING CLASS	C1
TESTING CLASS	T4

A. Material: Provide type PVC Schedule 40 sanitary drainage piping with drainage type fittings, free of defects, as manufactured by Celanese, Yardley or ITT Grinnell.

B. Joints: Solvent fused socket type with chemical designed for use with the type PVC piping system.

C. Cleanouts: Provide cleanouts at changes of direction and at intervals as required by Code and as indicated.

D. Workmanship: Pitch piping at a rate of 1/4 " per foot unless noted otherwise and install parallel or perpendicular to building. Allow for continuous bearing of pipe on soil.

E. Connections: Provide wye branches with 45 deg elbows at connections. Use long sweep bends at bottom of all stacks.

F. Changes in direction/elevation: Roll down or offset at no greater than 45 deg.

G. Cleanouts: Provide cleanouts to grade at all changes of direction / elevation, at intervals as required by Code, and as indicated on the drawings.

H. Building Sewer Cleanout: Provide at the point sanitary piping exits the building a cleanout to floor level with specified cover/cap.

I. Inspection/Testing: Provide labor and equipment to test the underground piping system as follows:

10 feet water head applied to piping for a period of 2 hours.

Inspect all joints to insure watertight connections, coordinate approval of local authority prior to backfill.

2.04 PIPING: SANITARY WASTE and VENT - PVC (ABOVE SLAB)

PIPE CLASS:	P1
PIPE SYMBOL	SAN – For VENT see legend
CLEANING CLASS	C1
TESTING CLASS	T4

A. Material: Provide type PVC Schedule 40 sanitary drainage piping with drainage type fittings, free of defects, as manufactured by Celanese, Yardley or ITT Grinnell.

B. Joints: Solvent fused socket type with chemical designed for use with the type PVC piping system.

C. Cleanouts: Provide cleanouts at changes of direction and at intervals as required by Code and as indicated.

D. Workmanship: Pitch piping at a rate of 1/4 " per foot unless noted otherwise and install parallel or perpendicular to building.

E. Supports: See PIPE SUPPORTS.

F. Vents through roof: Provide no-hub cast iron vents through roof. Provide rigid support to structure at and below roof to insure stable vertical vent.

G. Fixture Waste Connections: Exposed piping to plumbing fixtures shall be chrome plated brass with chrome plated brass traps as specified. Fixtures shall be trapped separately with trap screws below water line.

H. Inspection/Testing: Provide labor and equipment to test the piping system as follows:

Fill system to roof for a period of 2 hours.

Inspect all joints to insure watertight connections, coordinate approval of local authority prior to closing in.

2.05 PIPING: DOMESTIC WATER, ABOVE GRADE:

PIPE CLASS:	U2
PIPE SYMBOL	CW / HW / HWR See Legend
CLEANING CLASS	C3
TESTING CLASS	T2

A. Material: Pipe shall be Type-L copper tubing with wrought copper fittings as manufactured by Revere, Anaconda, or Chase.

B. Joints: Install with sweat joints with lead free solder; remove all excess flux and solder from piping.

C. Water Hammer Arrestors: At all branches and risers, provide water hammer arrestor as specified under Part 5 -Equipment/Appurtenances.

D. Workmanship: Ream pipe to full inside diameter to remove all burrs before joining. Install piping parallel or perpendicular to building or as indicated. Install in a manner to allow for expansion.

E. Test: Perform a hydrostatic pressure test at 150 psi for a period of 30 minutes until system is proved tight. Test pressure drop shall not exceed 1 psi during test period. For piping that is to be concealed, perform all tests while accessible.

2.06 COPPER PRESS TYPE FITTINGS: (Contractor's Option)

A. Manufacturers, Copper Press Fittings:

Viega, 17545 Daleview Dr., Lakewood, OH 44107, 877.620.0016 or Ridge Tool Co., 400 Clark Street, Elyria, OH 44035, 800.519.3456

B. Material:

Press Fittings: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM.

C. Installation, Fittings for Copper Tubing:

Press connections: Copper press fittings shall be made in accordance with the manufacturers installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.

2.07 PIPE STERILIZATION, DOMESTIC WATER PIPING SYSTEMS:

A. Pipe Sterilization: Sterilize the system with chlorine prior to acceptance for domestic use in accordance with requirements of AWWA C651, AWWA C652, or as described as follows:

The piping system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.

Once clean water has been found to be flowing at all points of outlet, the system, or part thereof, shall be filled with a water/ chlorine solution containing at least 50 parts per million (50mg/L) of chlorine, and the system, or part thereof, shall be valved off and allowed to stand for 24 hours. As an alternate, the system, or part thereof, shall be filled with a water/chlorine solution containing at least 200 parts per million (200 mg/L) of chlorine and allowed to stand for 3 hours.

Following the required standing time, the system shall be flushed with clean potable water until the chlorine is purged from the system.

The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.

2.08 PIPING: REMOVAL

A. General: Provide labor, materials, and equipment necessary to remove piping indicated to include pipe, fittings, supports, hangers, attachments, and insulation. Remove debris associated with pipe removal from the project site. Maintain clean workspaces.

B. Coordination: Coordinate interruptions of service with Owner and Architect.

2.09 PIPING: SYSTEM TESTS

A. Provide labor, instruments, and equipment necessary to complete all tests.

B. Maintain a log of tests with dates, times, and type of test. Leaks found during testing periods shall be noted, identified, and corrected.

2.10 SUPPORTS: PIPE HANGERS:

A. General: Provide pipe supports, hangers, or other appurtenance to firmly support the piping systems. All pipes shall be independently supported from the building structure and not from other pipes, flues, conduits, ducts or pipe hangers, etc.

B. Refer to Section 23 02 50 – MECHANICAL PIPE HANGERS AND SUPPORTS for pipe hanging requirements.

2.11 VALVES: DOMESTIC WATER

A. General: Provide valves where indicated and as required for proper isolation and operation of the domestic water distribution system. Provide shut off valves on all piping serving system risers, equipment, fixtures or banks of fixtures, and at wall hydrants.

Valves shall be designated for 125 psi working pressure unless noted otherwise.
Valves 2-1/2" and smaller shall be bronze or brass.
Valves 3” and larger shall be iron body brass mounted flange ends.

Valves shall have the name or trademark of the manufacturer and the guaranteed working pressure cast on the body of the valve. Valves shall be as manufactured by Milwaukee, Stockham, Crane or Nibco. Valves for the project shall be the product of one manufacturer.

Ball Valves, Class 150: 1/4" to 2" cast bronze 600# W.O.G., full port, screwed ends.

All valves to be installed within insulated pipeline shall be provided complete with valve stem extensions. Stem extensions shall be 2” minimum.

Milwaukee	BA-300
Apollo	77-14
Nibco	T-585-70

Drain Valves: 1/4" to 2" cast bronze 600# W.O.G., full port, screwed ends w/ capped hose end, chain and cap.

Milwaukee	BA-1001T

Apollo 78-100

2.12 TRAPS:

A. Every plumbing fixture without a manufacturer's integral trap shall separately trapped by a water seal type trap. The vertical distance between the fixture outlet and the trap weir shall not exceed 14 inches. Plumbing fixtures shall not be double trapped.

B. Each fixture trap shall have a liquid seal of not less than 2" and not more than 4". (Deeper trap seals may apply to special designs for accessible fixtures.)

C. Where trap seals are subject to loss by evaporation, deep seal type traps shall be used.

D. All floor drains shall be provided with deep seal type traps.

2.13 SLEEVES, PLATES:

A. Provide and locate sleeves, plates, anchors, and inserts required; mark openings before floors and walls are constructed or core bored.

B. Provide sleeves for piping passing through floors, walls, roofs, partitions and masonry. Sleeves for concrete or masonry shall be Schedule 40 steel pipe of size to allow for pipe expansion and passage of vapor barrier insulation. Other sleeves shall be 20 gauge galvanized sheet steel with lockseam joint.

1. Terminate sleeves flush with walls, partitions, and ceiling.
2. Terminate sleeves 1/2" above finished floor where piping is exposed.

C. Where ceiling inserts are provided specifically for the use of the Owner, install all work, so as to not interfere, with a separate support system.

2.14 FIRE SAFING: PIPING AND EQUIPMENT OPENINGS:

A. Refer to Section 23 03 00 – MECHANICAL: FIRE SAFING, for requirements.

B. Fire Stop: Pack all piping and equipment openings full depth with approved fire safing material to fully seal all openings.

C. Seal all sleeves, core holes, etc. through floors, walls and ceilings with Nelson "Flame-Seal" Fire Stop Putty, 3-M Systems, Hilti Systems, Metacaulk Firestopping or Dow Corning "Fire-Stop" Sealant. Install in accordance with manufacturer's printed instructions.

D. Firestopping is to meet UL ratings for each penetration type and material for floors, walls and ceiling. Coordinate with Architectural Drawings for exact requirements and ratings at various conditions.

2.15 UNIONS:

A. Provide union connections at equipment and as indicated. Unions 2" and smaller shall be wrought copper sweat type; larger shall be wrought copper flange type.

2.16 SANITARY SYSTEM CLEANOUTS:

A. Provide cleanouts at all changes in direction, at intervals as required by Code, and as indicated.

B. Floor cleanouts: Provide with dura-coated iron body, inside caulk outlet, cadmium plated iron plug, lead seal, adjustable nickel bronze top; Zurn or approved equal.

For concrete floor:	ZN-1400	Set flush with floor
For tile:	ZN-1400-T	Set parallel with and level with tile

C. Wall Cleanout: Provide with cast iron supreme cleanout with cadmium plated plug, lead seal, and round stainless steel access cover with securing screw.

Model:	ZN-1445	With Z-1462 8x8 access
Model:	ZN-1446	With round wall access

PART 3 - INSULATION: PRODUCTS AND INSTALLATION

3.01 INSULATION: GENERAL:

A. Provide all insulation as specified in a neat and workmanlike manner observing the best practices of the trade. All longitudinal seams shall be flat and facing away from view. Insulation shall be smooth throughout. Vapor barriers, where required, shall be continuous. No raw ends of material shall be permitted; cover same with eight ounce canvas or approved equal.

B. Piping and equipment shall be insulated as specified within Section 23 04 00 – MECHANICAL INSULATION.

PART 4 – EQUIPMENT / APPURTENANCES

4.01 ACCESS PANELS:

A. Provide coordination to properly locate panels that are provided within other sections of this Specification.

END OF SECTION 23 10 00

SECTION 23 15 00
PLUMBING FIXTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 10 00 PLUMBING

1.02 SCOPE:

A. Provide labor, equipment and materials to complete the work indicated on drawings and herein specified.

1.03 RELATED WORK:

A. Work in conjunction with this section shall be as designated below:

General Contractor:

Cutting, Patching, and Painting
Openings in roofs / Flashing
Openings in walls
Equipment foundations and bases
All temporary heating

1.04 PROJECT ADMINISTRATION:

A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.

B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

1.05 SUBMITTALS:

A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.

B. The following shop drawings shall be prepared and submitted for approval within the time period stated (see SCHEDULE OF SUBMISSIONS in Section 23 00 00): (The list below is not intended to all inclusive. Provide submittals for all materials and equipment proposed for use on this project.)

Plumbing Fixtures
Fixture Trim

1.06 PROJECT CLOSE-OUT:

A. Review and provide closeout requirements of this section and Section 23 00 00 Mechanical General Requirements, including:

Testing and Adjusting
Operating, Maintenance Instructions
Written Guarantee
Lubrication
Operating, Maintenance Manuals
Cleaning

PART 2 - FIXTURES AND INSTALLATION

2.01 FIXTURES: GENERAL

A. The arrangement and quantity of plumbing fixtures shall be as indicated on the Architectural Drawings.

B. Provide fixtures, carriers, brass and appurtenances complete with trimmings ready for use.

C. Securely support fixtures from the building structure in a rigid manner. Provide hangers, frames, and carriers for proper installation. Wall hung fixtures shall be set tight to wall.

D. Protect all fixtures during construction and thoroughly clean at project closeout.

E. Air Gap: Provide only fixtures with an air gap between the level of supply openings and the level at the point of unrestricted external overflow.

F. Domestic water hot and cold water supplies shall be arranged with cold on the right and hot on the left. Faucets shall be indexed to indicate H and C.

2.02 WATER FLOW RATE:

A. General: Fixtures shall be limited to a flow rate of 1.6 gpm at 80 psig unless noted otherwise.

B. Public facilities:

Lavatories in restrooms of public facilities shall be equipped with faucet outlet devices that limit the flow to a maximum rate of .5 gpm.

Water closets shall use a maximum of 1.6 gallon per flushing cycle.

2.03 FIXTURES: MANUFACTURERS

A. General: Plate numbers and manufacturer's names used in the Schedule establish type and quality required.

Manufacturers:	Vitreous China	Toto American Standard Kohler
	Brass	Toto Sloan
	Toilet seats	Toto Church American Standard
	Flush valves	Toto Sloan

2.04 FIXTURE INSTALLATION:

A. General: Review all drawings and determine the mounting locations and heights. All fixtures intended for handicapped use shall be mounted to suit requirements. Provide carriers and wall supports for the proper mounting height and type of construction indicated. For all exposed hot water piping and drains at fixtures provide insulation as specified and / or required.

B. Review the installation of all fixtures to insure proper clearances. If necessary, request additional detail data prior to the installation of fixtures.

2.05 CARRIER SYSTEMS:

A. Provide fixture carrier systems as indicated at fixtures. Carriers shall be installed per manufacturer's recommendation and shall be secured to the building with adequate fastening systems.

Manufacturers:	Zurn; or equal system of; Smith Josam
Water Closets:	Zurn system Z1203 or Z1204
Wall hung Lavatory:	Use Zurn system Z1231 or Z1236

2.06 FIXTURES: SCHEDULE

A. Provide fixtures as indicated. Shop drawings are required. China fixtures are white unless indicated otherwise.

B. <u>P-1 Replacement Water Closet: (Wall hung")</u>

Provide all labor and material to remove the existing water closet and flush valve to allow replacement. The existing wall carrier and domestic cold water supply are to remain for re-connection. The new fixture and trim shall be as follows:

Toto CT708UGX wall hung flushometer, vitreous china elongated bowl, white, 1.0 / 1.28 G.P.F.

Cefiontect anti-microbial surface, top inlet spud

Toto SC534 elongated open front white seat with check stop hinges.

Toto TET1LA self powered sensor operated flush valve with screw driver stop.

Bolt covers
Gasket

C. P-3 Water Closet: (Wall hung, handicapped use, 18")

Toto CT708UGX wall hung flushometer, vitreous china elongated bowl, white, 1.0 / 1.28 G.P.F.
Cefiontect anti-microbial surface, top inlet spud

Toto SC534 elongated open front white seat with check stop hinges.

Toto TET1LA self powered sensor operated flush valve with screw driver stop.

Bolt covers
Gasket
Wall Carrier (refer to carrier specification)

D. P-3 Existing Water Closet: Flush Valve Replacement (Alternate to Base Bid)

Provide all labor and material to remove the existing flush valve at this existing plumbing fixture to allow valve replacement.

Install new flush valve and adjust for proper operation.

Flush valve shall be as follows:

Toto TET1LA self powered sensor operated flush valve with screw driver stop.

E. P-4 Lavatory – Base Bid: (Under Counter, handicapped use w/o faucet)

Provide all labor and material to remove the existing lavatory and faucet set to allow replacement. The existing faucet set, hot and cold domestic water supply and sanitary waste outlet piping are to remain for re-connection. The new fixture and trim shall be as follows:

Toto LT 569

3/8" CP angle supplies with stops
1-1/2" CP P-trap with clean out
Chrome plated brass drain strainer

F. P-4 Lavatory – Alternate Bid: (Under Counter, handicapped use w/ faucet)

Provide an alternate, unit price, to include a replacement faucet as a part of the scope of the P-4 lavatory replacement. The unit price shall be provided per replacement lavatory.

The replacement faucet to be included for unit pricing shall be as follows:

Toto TEL105-D10EM Eco Power touchless faucet with TLM mixing valve and Grid Strainer Assembly

G. P-5 Lavatory: (Wall hung, Handicapped Use)

0955.001EC "Murro" 22" x 21.25"
0059.020EC China knee shroud

Toto TEL105-D10EM Eco Power touchless faucet with TLM mixing valve and Grid Strainer Assembly

3/8" CP angle supplies with stops
1-1/2" CP P-trap with clean out
Wall carrier.

END OF SECTION 23 15 00

SECTION 23 80 00 – HVAC: AIR HANDLING SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00	MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 01 50	MECHANICAL: VIBRATION ISOLATION
Section 23 03 00	MECHANICAL: FIRE SAFING / FIRESTOPPING
Section 23 04 00	MECHANICAL: INSULATION
Section 23 95 00	HVAC: TESTING ADJUSTING BALANCING

1.02 SCOPE:

A. Provide labor, equipment and materials to complete the work indicated on drawings and herein specified.

1.03 RELATED WORK:

A. Work in conjunction with this section shall be as designated below:

General Contractor:

Cutting, Patching, and Painting
Openings in roofs / Flashing
Openings in walls
Equipment foundations and bases
All temporary heating

Electrical Contractor:

Power wiring for electrical equipment provided within this section.
All duct smoke detectors that are a part of the fire alarm system.

1.04 PROJECT ADMINISTRATION:

A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.

B. Prepare and transmit to the Architect all submittal requirements within the time period allowed. See Schedule of Submissions.

1.05 SUBMITTALS:

A. See SUBMITTAL GENERAL REQUIREMENTS within Section 23 00 00.

B. The following shop drawings shall be prepared (see Section 23 00 00) and submitted for approval within the time period stated: (This listing is not intended to all inclusive – provide submittals for all materials and equipment proposed for use on this project)

Air Handling Ductwork Layout Drawings

Air Handling Ductwork Materials

Steel

Diffusers, Grilles

1.06 PROJECT CLOSE-OUT:

A. Review and provide close-out requirements of this section and Section 23 00 00 Mechanical General Requirements, including:

Testing and Adjusting
Record Drawings
Operating, Maintenance Instructions
Written Guarantee
Cleaning
Letters of compliance.

PART 2 - PRODUCTS AND INSTALLATION

2.01 DUCTWORK: GENERAL

A. Provide all labor, materials, equipment, and supplies to fabricate and install all duct systems, including ductwork, fasteners, hangers, braces, caulking, fire stopping, access doors, flexible connections and all other items necessary and required for a complete and economically operated system as indicated.

B. Provide all labor, materials and supplies to properly install devices in the ductwork, including but not limited to; sensors, fire alarm equipment, control equipment, smoke detectors, flow devices, provided within other sections of the specifications. This work shall be coordinated and installed as required for proper operations.

C. Unless otherwise stated or indicated all ductwork shall be constructed following SMACNA standards of lock forming galvanized steel (ASTM A527) with a minimum galvanized coating of 0.90 oz./sf.

D. Maintain the cleanliness of the duct storage and installation work area such that the duct systems are internally clean. Provide temporary mylar caps during construction to insure that construction dust does not enter the duct systems. All duct openings shall be sealed until connected to equipment. Wipe down all exterior surfaces as necessary prior to project completion.

2.02 REPAIR and PATCHING of EXISTING SHEET METAL DUCTWORK:

A. General:

All penetrations and openings in existing ductwork systems, either pre-existing or resulting from component removal shall be patched and sealed airtight. Ductwork patching and sealing shall be completed to allow the ductwork system to meet all functional criteria defined in Section 7 of the 1995 SMACNA “HVAC Duct Construction Standards, Metal and Flexible”, Second Edition.

The locations of required patching and sealing of the existing duct system shall be as indicated on the drawings and as determined during the construction process.

B. Patching:

Openings in Duct Wall smaller than ½” in diameter, and rectangular openings with the largest dimension smaller than ½” shall be sealed by applying aluminum faced, mastic tape. Mastic sealing tape shall be Venture Tape, Type #1580 or equal. Tape shall be applied such that the patch extends a minimum of 1” beyond all sides of the opening in the duct wall.

Openings in duct wall equal to or greater than ½” in diameter, and rectangular openings with the largest dimension equal to or exceeding ½” shall be sealed by applying a sheet metal patch over the opening. The sheet metal patch shall be placed in a continuous bed of mastic sealant and shall extend a minimum of 1” beyond the edge of the opening on all sides. The patch shall be fastened to the exiting duct wall with self-tapping screws or pop rivets. The gauge of the sheet metal patch shall be equal to that of the existing ductwork and shall be at least as specified by the following table:

Rectangular Size	Gauge No.	Center Spacing
0" to 12"	26	48"
13" to 30"	24	48" to 60"
31" to 48"	22	48" to 60"
49" to 60"	20	48" to 60"
61 and more	18	48" to 60"

2.03 SHEET METAL DUCTWORK: RECTANGULAR

A. General:

Provide all of the sheet metal work as indicated on the drawings, as specified, and as required for the air handling, ventilation and exhaust systems. Construct ductwork to meet all functional criteria defined in Section 7 of the 1995 SMACNA “HVAC Duct Construction Standards, Metal and Flexible”, Second Edition, except as noted: All ductwork will not exceed the deflection limits established in The Uniform Mechanical Code Standard 6-1: Standard for Metal Ducts, 1997 Edition.

Ductwork shop drawings must be properly submitted. Any ductwork installed without prior written approval by the specifier shall be replaced at the expense of the contractor.

The contractor must comply with the enclosed specification in its entirety. If on inspections, the specifier finds changes have been made without prior written approval, the contractor will make the applicable changes to comply with this specification, at the contractor’s expense. At the discretion of the specifier, sheet metal gauges, and reinforcing may be randomly checked to verify all duct construction is in compliance.

Erect all ductwork in accordance with the "Standard Practice in Sheet Metal Work" published by the National Association of Sheet Metal Contractors.

B. Duct Sizes / Gauge: Low pressure not to exceed 3" WC static pressure

Rectangular Size	Gauge No.	Center Spacing
0" to 12"	26	48"
13" to 30"	24	48" to 60"
31" to 48"	22	48" to 60"
49" to 60"	20	48" to 60"
61 and more	18	48" to 60"

C. Fabrication:

Provide all ducts true to the dimensions indicated on the drawings.

Galvanized Steel**:** All interior ducts shall be constructed with G-60 or better galvanized steel conforming to ASTM A 653/A 653M and A 924 Standards, LFQ, chem treat. Exterior ductwork or duct exposed to high humidity conditions (i.e. kitchen exhausts) shall be G-90 or better galvanized steel, LFQ, chemical treat.

Aluminum: If specified, use aluminum alloy sheets, lock forming quality, conforming to ASTM B209, Alloy 3003, Temper H14. Dimensional tolerance per ANSI H35.2.

Rectangular Duct Deflection Limits: Shall conform to the Uniform Mechanical Code Standard 6-1 – Standard for Metal Ducts, 1997 Edition. Maximum allowable deflection for transverse joints and intermediate reinforcements will not exceed 0.250 inch for duct widths up to 100 inches and will not exceed 0.3 percent of the span for widths greater than 100 inches.

Ducts shall be straight and smooth on the inside with neatly finished joints. Outside surfaces shall be finished such that all sharp edges are removed. All notches for connecting sections of duct and all grooving seam notches shall not be cut deeper than necessary to insure tight corners.

Crossbreak all surfaces over 18" wide.

Longitudinal Seams Rectangular: For longitudinal seams, the Pittsburgh lock seam will be used on all ductwork 36" wide and larger, and may be used on ductwork 35" wide and smaller.

D. Joints Rectangular:

To SMACNA standards. Proprietary products must be tested in accordance with SMACNA procedures. Certified test results must be submitted.

Transverse joints, for ductwork 36" wide and larger shall be constructed with duct connector systems as manufactured by:

Ductmate 35 System
Ward Ductconnector

All ductwork shall be constructed in accordance with system manufacturer's recommendations.

Butyl gasket will be used between all flanges.

Slip Joints: Shall be made in the direction of the air flow with slips at least one gauge heavier than the duct, made in the form of a frame, mitered and riveted at corners to prevent leakage. Slip joints will be accepted for use on ductwork 30" wide or less and subjected to 2" static positive pressure or less.

Sealing of Duct Joints:

All ducts shall have mastic type sealants conforming to SMACNA's Class A sealing requirements, SMACNA Manual, 1995, Second Edition.

Apply tape over joints on exhaust ductwork joints.

On exposed architectural ductwork in the conditioned space the mastic may be eliminated.

E. Elbows:

Changes in direction, where space permits, shall be fabricated with the inside radius no less than the dimension of the duct in the plane of the elbow. Turning vanes shall be used where short radius or square elbows are used.

Turning vanes shall be provided as follows:

Short radius elbows up to 26" in width shall be equipped with one vane.

Short radius elbows greater than 26" in width shall be equipped with two vanes.

Vanes in square elbows shall be spaced on 3" radius on diagonal for ducts up to 24" wide, 5" radius for ducts 25" to 36" wide and 7" radius for ducts over 37" wide.

All vanes must be rigid so as not to rattle or vibrate in the air stream and all raw or sharp edges must be removed from the blades. Turning vanes as manufactured by Tuttle and Bailey Company or equal may be substituted for the above.

All fasteners and attachment supports shall be galvanized steel or of other, corrosion resistant, approved material.

F. Hangers, Supports:

Provide strap duct hangers of 16 gauge, 1" wide for ducts to 30" wide, and of 10 gauge, for ducts over 30" wide.

G. Installation:

No pipes or conduits shall pass through any duct without written approval. Where it is impossible to reroute such pipe or conduit, the duct shall be increased to that point to maintain a constant cross-sectional area and a streamlined enclosure for the pipe shall be provided.

All ducts shall be securely anchored to the building construction in any approved manner and shall be so installed as to be completely free from vibration under all conditions of operation. Horizontal ducts shall be supported with iron hangers from concrete inserts, or beam clamps. Vertical ducts in shafts shall be supported at each floor. The contractor shall furnish and erect all necessary supports and cross framing as required.

The contractor shall be responsible for the coordination of the sheet metal installation with the work of all other trades and shall prepare and submit for approval, shop fabrication drawings for all sheet metal work.

All ducts shall be independently supported from the building structure and not from other ducts, flues, conduits, pipe, pipe hangers etc.

Hangers shall be placed at all elbows and changes of direction and at intervals of no greater than

8'-0". Hangers shall be cross-braced, at proper intervals, to prevent duct sway.

H. Ductwork leakage:

Review all requirements for leakage testing within this section of the specifications

The contractor shall be responsible for the coordination of the sheet metal installation with the work of all other trades

2.04 DAMPERS

A. General: Provide automatic, manual or splitter type volume dampers as indicated on the drawings and where branch ducts split from main ductwork.

B. Volume Dampers, Quadrant Type: All dampers shall be (2) gauges heavier than the ducts in which they are installed. Damper blades shall be riveted to the supporting rods. Cast or malleable brackets shall be riveted to the sides of duct to support damper rod and shall have lock type quadrant at one end.

C. Dampers shall be multi-blade type if cross sectional area of ducts exceeds 1.0 square feet.

D. Splitter Dampers: Provide at all supply takeoffs and as indicated, splitter dampers of length equal to branch duct width to scoop branch duct air out of main duct air stream. Blade of splitter damper shall be adjusted by steel rod fastened to the end of the damper and pilot block with set screws.

E. Access Plate: Provide 6" X 6" minimum access sheet metal plate in duct at location of all volume dampers. Location shall provide hand access to damper blade. Pass insulation over this plate.

2.05 ACCESS DOORS - DUCTWORK:

A. Provide in all ducts where indicated for access to dampers, coils, volume controls, etc. access doors with continuous hinge and cam lock, or double cam lock if necessary. Units shall be complete with 1" insulation on door, 5/8" knock-over edges, 1/2" wide gasket all around and of a minimum size of 14" X 14" overall.

B. Units shall be as manufactured by:

Advanced-Air Model E5A or Model E5B.

C. Units sizes shall be determined by duct size, and purpose of accessibility. All fusible links shall be readily accessible. Access door shall be sized at coils such that door is not less than 8" less than duct size.

2.06 FIRE STOPS: DUCTWORK

A. Where ducts penetrate walls, floors; seal the space around the duct full depth with mineral wool or other non-combustible material. For oversized openings provide sheet metal closure to hold material in place as necessary.

2.07 AIR DIFFUSERS/GRILLES: EXISTING TO BE RE-USED:

A. General: Provide all labor and material to remove, clean and reinstall the existing registers and diffusers in the locations as specified on the drawings.

B. Provide all labor and material required to modify the existing duct drops to allow the re-installed diffusers to be aligned with the new ceiling planes.

PART 3 INSULATION PRODUCTS AND INSTALLATION

3.01 INSULATION: GENERAL:

A. Provide all insulation as specified in a neat and workmanlike manner observing the best practices of the trade. All longitudinal seams shall be flat and facing away from view. Insulation shall be smooth throughout. Vapor barriers, where required, shall be continuous. No raw ends of material shall be permitted; cover same with eight ounce canvas or approved equal.

B. Ductwork and equipment shall be insulated as specified within Section 230400 – MECHANICAL INSULATION.

END OF SECTION 23 80 00

SECTION 23 95 00 – HVAC TESTING ADJUSTING BALANCING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and the following listed sections as a minimum, apply fully to work in this section.

Section 23 00 00 MECHANICAL GENERAL REQUIREMENTS

B. Refer to and coordinate all work with the work of the following listed Sections:

Section 23 01 50 MECHANICAL: VIBRATION ISOLATION

Section 23 80 00 HVAC: AIR HANDLING SYSTEMS

1.02 SCOPE:

A. Provide for an independent balancing concern to provide labor, equipment and materials to complete the Balancing Adjusting Testing of the heating, ventilating and air conditioning system including temperature controls, and interrelated equipment indicated.

B. This Section specifies the requirements and procedures for testing, adjusting, and balancing air and water distribution systems. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications and recording and reporting the results.

C. Testing, adjusting and balancing is the process of checking and adjusting mechanical system parameters to produce the design objectives. It includes:

Balancing of air distribution systems

Adjustment of the total systems to provide the design quantities.

1.03 RELATED WORK:

A. Work in conjunction with this section shall be as designated below:

General Contractor:	Access to all equipment Coordination.
HVAC Contractor:	Provide coordination and data on equipment furnished.

1.04 PROJECT ADMINISTRATION:

A. Transmit questions, submissions, notices, and correspondence through the general contractor for transmittal to the Architect.

1.05 NOTIFICATION / COORDINATION:

A. The balancing concern shall notify the Engineer at all times when balancing is to be performed. The general contractor and the HVAC contractor shall insure that all systems are ready for balancing/final adjustment prior to notification of the balancing concern to proceed.

B. Systems shall be fully operational prior to beginning testing, adjusting, and balancing procedures.

1.06 SUBMITTALS REQUIRED:

A. Agency Data: Submit proof that the proposed testing, adjusting, and balancing agency meets the qualifications specified below.

B. Engineer and Technician Data: Submit proof that the Test and Balance Engineer assigned to supervise the procedures, and the technicians proposed to perform the procedures meet the qualifications specified below.

C. Procedures and Agenda: Submit a synopsis of the testing, adjusting, and balancing procedures and agenda proposed to be used for this project.

D. Maintenance Data: Submit maintenance and operating data that include how to test, adjust, and balance the building systems. Include this data in the maintenance manual.

E. Certified Reports: Submit testing, adjusting, and balancing reports bearing the seal and signature of the Test and Balance Engineer. The reports shall be certified proof that the systems have been tested, adjusted, and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of testing, adjusting, and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the systems.

1.07 SCHEDULE OF SUBMISSIONS:

A. Balancing Report Prior to substantial completion. 3 Copies.

1.08 QUALITY ASSURANCE:

A. Agency Qualifications:

Employ the services of an independent testing, adjusting, and balancing agency meeting the qualifications specified below, to be the single source of responsibility to test, adjust, and balance the building mechanical systems identified above, to produce the design objectives. Services shall include checking installations for conformity to design, measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, and recording and reporting results.

The independent testing, adjusting, and balancing agency shall be certified by NEEB, TAB and/or SMACNA in those disciplines required for this Project.

B. Codes and Standards:

NEBB: “Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems”.

ASHRAE: ASHRAE Handbook, 1987 Systems Volume, Chapter 57; Testing, Adjusting, and Balancing.

1.09 BALANCING CONCERN:

A. Selection of the Subcontractor for this work shall be subject to the Owner's approval.

B. Select from the following:

Leonhardt Company, 27 Harvard Street, Brookline, MA
Arden Engineering Service Group, 435 Narragansett Park Dr. Pawtucket, RI.
Thomas-Young Associates, Inc., P.O. Box 567, Marion, MA 02738 (508 748 0204)
Kyle Baker Associates, Poccasett Ave, Providence

1.10 DEFINITIONS:

A. Adjust: To regulate the specified fluid flow rate at the terminal equipment.

B. Balance: To proportion flows within the distribution system (submains, branches, and terminals) according to specified design quantities.

C. Branch: Duct or pipe serving a single terminal.

D. Branch main: Duct or pipe serving two or more terminals.

E. Main: Duct or pipe containing the system's major or entire fluid flow.

F. Procedure: Standardized approach and execution of a sequence of work operations to yield reproducible results.

G. Report Forms: Test data sheets arranged for collecting test data in logical order for submission and review. These forms should also form the permanent record to be used as the basis for required future testing, adjusting, and balancing.

H. Submain: Duct or pipe containing part of the system's capacity and serving two or more branch mains.

I. Terminal: The point where the controlled fluid enters or leaves the distribution system.

J. Test: To determine the quantitative performance of equipment.

1.11 `

A. Carry the amount proposed from anyone of the listed firms as a part of the base bid. Indicate with the bid which of the listed firms is included within the base bid.

PART 2 – BALANCING / FINAL ADJUSTMENT

2.01 GENERAL:

A. Test, adjust and balance the systems provided to achieve design operation and to set and mark all adjustable equipment for economical operation.

B. Obtain design drawings and specifications for the project and become thoroughly acquainted with the design intent.

2.02 PRELIMINARY PROCEDURES FOR AIR SYSTEM BALANCING:

A. Before operating the system, perform the following steps:

Walk the system from the system air handling equipment to terminal units to determine variations of installation from design.

Check volume and fire dampers for correct and locked position, and temperature controls for completeness.

Prepare report test sheets for both fans and outlets. Prepare a summation of required outlet volumes to permit a crosscheck with required fan volumes.

Determine best locations in main and branch ductwork for most accurate duct traverses.

Place outlet dampers in the full open position.

Prepare schematic drawing of system ductwork and piping layouts to facilitate reporting.

2.03 SYSTEM TESTS, GENERAL:

A. Scope: Subsequent to final Testing Adjusting and balancing, all control systems shall be adjusted and calibrated such that performance of all equipment is operating as intended.

2.04 MEASUREMENTS, INSTRUMENTS AND SUPPLIES:

A. Provide all required instrumentation to obtain proper measurements. Instruments shall meet the requirements specified in the referenced standards, and shall be calibrated to the tolerances specified therein. Instruments shall be properly maintained and protected against damage.

B. Use only those instruments that have the maximum field measuring accuracy and are best suited to the measurement being made.

C. Apply each instrument as recommended by the manufacturer.

D. Use instruments with the maximum number of scale subdivisions and with the minimum scale range for the value being measured.

E. When averaging values, take a sufficient number of readings to give a repeatability error of less than 5%. When measuring a single point, repeat readings until two consecutive identical readings are obtained.

F. Take all readings with the eye at the level of the indicated value to prevent parallax.

G. Use pulsation dampeners where necessary to eliminate error involved in estimating average of rapidly fluctuating readings.

H. Take measurements at locations that will render the most accurate data.

2.05 AIR FLOW BALANCE; GENERAL:

A. Scope: After the completion of the air distribution systems, adjust and balance the systems to deliver air quantities as indicated or as directed.

B. Perform testing, adjusting, and balancing procedures on each system identified in accordance with the detailed procedures outlined in the referenced standards.

C. Preliminary Procedures:

Adjust and balance flows to specified design quantities with a tolerance of +/- 5%.

Adjust and balance supply, return and exhaust airflows for systems.

Cut insulation, ductwork, and piping for the installation of test probes to the minimum extent necessary to allow adequate performance of procedures.

Patch insulation, ductwork, and housings using materials identical to those removed.

Seal ducts and test for and repair leaks.

Seal insulation to re-establish integrity of vapor barrier.

Mark equipment settings of controls and devices, to show final settings. Mark with paint or other suitable, permanent identification materials.

Retest, adjust, and balance systems subsequent to significant system modifications, and resubmit test results.

D. Instruments: Calibrate and maintain all instruments used in checking, balancing the system. Perform accuracy tests on instruments whenever requested by Owner, Engineer, or Architect.

E. Air Measurement: Measure air quantities in main ducts by pitot tube traverse of the entire cross section area of the duct. Openings in ducts for tests shall be sealed with snap-in plugs after tests. Outlet and inlet air quantities shall be determined by direct reading velocity meters.

F. Air Quantity Adjustments: Total air quantities shall be obtained by adjusting fan speed. Branch duct quantities shall be adjusted by volume or splitter dampers. Permanently mark set points of all dampers. Only minor air quantity adjustment by outlet dampers will be permitted.

G. Exhaust systems: Test and set all exhaust dampers, fans, or other device to exhaust the required amounts of air. Set exhaust systems to be tight closing when off. Note all amounts of airflow CFM.

H. Air System Data:

Fans:	Design RPM Final RPM	Design CFM Final CFM	Design Static Pressure Actual Static Pressure (suction - discharge)
Fan Motor:	Full Load Amps Operating Amps		

Grilles, Registers, Diffusers:

Mark drawings with actual CFM at each outlet, inlet to indicate final adjustment air quantity.

PART 3 - REPORT

3.01 GENERAL:

A. The balancing concern shall record and submit for evaluation and review three copies of a complete Balancing Report.

B. Record all data obtained during testing, adjusting, and balancing in accordance with, and on the forms recommended by, the referenced standards.

C. Prepare a report of recommendations for correcting unsatisfactory mechanical performance when system cannot be successfully balanced or performance tested.

3.02 REPORT FORMAT:

A. Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced.

B. In addition to the Report Forms, the Testing Adjusting and balancing results shall also be noted on reproducible drawings of the building provided by the Architect for that purpose. All data as specified herein shall be neatly and accurately indicated.

3.03 REPORT CONTENTS:

A. Identification of testing, adjusting, and balancing agency, Owner, and Project. Include addresses, contact names, and telephone numbers.

B. The seal and name, address, telephone number, and signature of the Test and Balance Engineer.

C. A listing of the instruments used for the procedures, and proof that all instrumentation has been calibrated to tolerances specified in the referenced standards, within a period of six months prior to starting the project.

D. The appropriate forms containing, as a minimum, the information indicated on the standard report forms prepared by the Associated Air Balance Council (AABC) and the National Environmental Balancing Bureau (NEBB) for each respective item and system. Prepare an accompanying schematic diagram that includes each item of equipment in the system being tested.

END OF SECTION 23 95 00

WARWICK PUBLIC LIBRARY

BID FORM

TITLE OF SPECIFICATION: ***Bid #2020L-03 Restroom Renovation***

BID: WHEREAS, the Warwick Public Library has duly asked for bids for performance of services and/or supply of goods in accordance with the above-indicated specifications.

The person or entity below does irrevocably offer to perform the services and/or furnish the goods in accordance with the specifications which are hereby incorporated by reference in exchange for the bid price below.

This offer shall remain open and irrevocable until the Warwick Public Library has accepted this bid or another bid on the specifications or abandoned the project.

The bidder agrees that acceptance below by the Warwick Public Library shall transform the bid into a contract. This bid and contract shall be secured by Bonds, if required by the specifications.

COMPANY NAME:_____

COMPANY ADDRESS: _____

BIDDER'S SIGNATURE:_____

BIDDER'S NAME/Position:(Print):_____

PRICE: _____TOTAL COST

_____ Hourly labor rate

_____Overtime Rate

Other similar jobs and reference contact information (add additional sheet if necessary):

SECTION 00 4322

UNIT PRICES FORM

PARTICULARS

1.01 THE FOLLOWING IS THE LIST OF UNIT PRICES REFERENCED IN THE BID SUBMITTED BY:

1.02 (BIDDER) _____

1.03 TO (OWNER): _____

1.04 DATED _____ AND WHICH IS AN INTEGRAL PART OF THE BID FORM.

1.05 THE FOLLOWING ARE UNIT PRICES FOR SPECIFIC PORTIONS OF THE WORK AS LISTED, AND ARE APPLICABLE TO AUTHORIZED VARIATIONS FROM THE CONTRACT DOCUMENTS.

UNIT PRICE LIST

2.01 ITEM DESCRIPTION UNIT QUANTITY UNIT VALUE

2.02 REPLACE (1) TOILET FLUSH VALVE (TOTO TET1GA) - _____

2.03 REPLACE (1) URINAL FLUSH VALVE (TOTO TEU1GA) - _____

2.04 REPLACE (1) LAVATORY FAUCET (TOTO TEL105) - _____

END OF SECTION