NOTICE INVITING SEALED BIDS
East Campus Art Department Expansion
(E5 Overhang Project)

Sealed Bids will be received until 3:00 P.M. (Tucson Time), July 15, 2014, by Pima County Community College District ("Owner"), to do the work required for the Owner's Project known as E5 Overhang ("Project"), which is located in Pima County, Arizona.

A MANDATORY Pre-Bid Conference will be held June 24, 2014 at 10:00 a.m. (Tucson Time) at the following location: Pima Community College East Campus, 8181 E. Irvington Rd., Tucson, AZ 85730 Room L101. Attendees will have fifteen minutes after the start time of the meeting to sign in. After that the attendance sheet will close.

Questions pertaining to this bid must be communicated in writing and be received via email by June 27, 2014 at 3:00 P.M. (Tucson Time) Questions must be sent to the email address below and include the specified Bid Number, Project Name and Buyer’s name in the subject field of the email. Any questions should include a reference to the appropriate page and section number of the bid. E-Mail questions to: DO-Staff-FO-Procur@pima.edu. Answers will be posted as an addendum to our website by 5:00 P.M. (Tucson Time) on July 1, 2014.

Buyers Name/Title: Jan Posz, C.P.M., Sr. Buyer

Bids will be opened publicly at the Owner's office, 4905D East Broadway Blvd, Room D232, Tucson Arizona, at 3:00 P.M. (Tucson Time), July 15, 2014, and read aloud by a representative of the Owner. All information and Bids submitted by bidders will be made available for public inspection during regular business hours after an award is made, if any. Any bid received after the date and time listed above will be returned and not considered.

Plans and Specifications for the work are available at Reproductions, Inc., 234 E. 6th Street, Tucson, Arizona 85705, phone (520) 622-7747. One copy available at no cost, additional copies at owner’s expense.

Copies of the NOTICE INVITING SEALED BIDS, Bid Documents and Forms as well as the College’s CONTRACT AND GENERAL CONDITIONS BETWEEN OWNER AND CONTRACTOR are available on the Pima Community College Website:

http://www.pima.edu/administrative-services/purchasing/current-requests-for-proposals-bids-quotes.html

The Owner intends to contract, if at all, with the lowest responsive and responsible bidder whose bid conforms in all material respects to the requirements of the bid documents, including the Plans and Specifications. "Responsive Bidder" means the bidder who submits a bid that conforms in all material respects to this Notice Inviting Sealed Bids, Instructions to Bidders and the Plans and Specifications which are incorporated herein by this reference. "Responsible Bidder" means the bidder who has the capability to perform the contract requirements and the integrity and reliability to assure complete and good faith performance and who submits the lowest bid. In order for the bid to be considered, bidders...
must complete and submit the Bid form and all other required forms, which are incorporated herein by reference.

A certified or cashier's check or Bid bond for ten percent (10%) of the Contract Amount proposed by the bidder must accompany each Bid as a guarantee that the bidder will enter into a contract to perform the work in accordance with the Plans and Specifications or as liquidated damages in the event of the bidder's failure or refusal to enter into a contract. The check or bond will be returned to the unsuccessful bidders. The successful bidder's check or bond will be returned upon the execution of satisfactory bonds and a contract as described by the bid documents.

It shall be mandatory on the contractor to whom the Contract is awarded, and upon any subcontractor under him, to comply in every respect with the applicable provisions of the Arizona Revised Statutes and with all other requirements of the laws of Arizona.

The bidder to whom the Contract is awarded shall furnish the Owner, within five (5) days after the award, satisfactory Payment and Performance Bonds in an amount equal to one hundred percent (100%) of the Contract Amount stated in the Bid. Individual surety bonds are not acceptable.

The Owner reserves the right to reject any or all Bids, to withhold the award of a contract for any reason it may determine and to hold any or all Bids for a period of forty-five (45) days. Any bid protests concerning this bid must be filed with the District Purchasing Director no later than the tenth calendar day following the date of award.

The Owner reserves the right to waive any irregularities in any Bid if such action is determined by the Owner, in its sole discretion, to be in the best interest of the Owner.

Thomas E. Harrington, C.P.M.
Director of Purchasing
Pima County Community College District
District Office – Purchasing
4905 East Broadway, Room 232
Tucson, Arizona 85709-1420
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SECTION ONE
INSTRUCTIONS TO BIDDERS

1. BIDS

To be entitled to consideration, Bids must be made in accordance with the following instructions:

a. Before submitting a Bid, each bidder shall examine the Notice Inviting Sealed Bids, these Instructions to Bidders, the Drawings, Specifications, Contract and General Conditions Between Owner and Contractor, and all other documents comprising the Contract Documents, and fully inform himself of all existing conditions and limitations, and include in the Bid a sum to cover the cost of all work required by the Contract Documents. The failure of any bidder to receive or examine any form, instrument, addendum, or other document, or visit the site and acquaint himself with conditions existing there, shall in no way relieve any bidder from obligations with respect to his Bid or the Contract Documents. Failure to attend the mandatory Pre-Bid Conference on June 24, 2014 at 10:00 a.m. (Tucson Time) will disqualify Bids received from any bidder not in attendance.

b. Bids shall be made only upon the form provided therefor. All blank spaces in the form shall be filled in completely. If some spaces do not apply, so state. Monetary amounts shall be stated both in writing and in numerals and, in case of any discrepancy between the two, the amounts in writing shall take precedence. The signature shall be in longhand and shall be that of an individual legally authorized to sign such form and bind the bidder. The completed form shall be without interlineation, alteration, or erasure.

c. Bids shall not contain any recapitulation of the work to be done. No oral, telegraphic, fax or telephonic bids or modifications shall be considered.

d. Bids shall be delivered to the place designated in the Notice Inviting Sealed Bids on or before the date and hour set for the opening of bids. Bids shall be enclosed in an opaque, sealed envelope, bearing the Bid Number, the title of the Project and the name of the bidder, except for that portion of the Bid bearing the title "List of Subcontractors and Material Vendors," which shall be enclosed in a separate, opaque, sealed envelope, as hereinafter specified in these Instructions to Bidders. It is the sole responsibility of the bidder to deliver his bid before the scheduled closing time. Any bids received after the scheduled closing time will be returned unopened.

e. The Contract Amount quoted is to include the furnishing of all materials, plant, equipment, tools, and all other facilities called for in the Contract Documents, and the performance of all labor and services necessary or proper for the completion of the Project, except such as may be otherwise expressly provided for in the Contract Documents.

f. The Bid form must be used without alteration.

2. LIST OF SUBCONTRACTORS AND MATERIAL VENDORS

a. For use of the Owner in determining competency and capability of those who will work on the Owner's Project, and quality and workmanship of those who will supply material to the Owner's
Bid No. B14/9866  
June 12/2014

Project, each bidder is required to submit with his bid a list naming the subcontractors who will be used in performing the work. The list shall include any subcontractor that might be used in the event any or all of the various alternates are chosen by the Owner. The circumstances under which each subcontractor will be used must be specifically set forth by identifying alternates for which a particular subcontractor would be used.

b. ONE, and only one, subcontractor shall be submitted for each portion of the work for the Base Bid. The listing of more than one Subcontractor for any separate portion of the work shall be considered grounds for rejection of the bid by the Owner at the Owner's sole discretion.

c. The list shall be filled out and enclosed in a separate, opaque, sealed envelope bearing the title "List of Subcontractors," and the name of the bidder, and the envelope then inserted in the general bid envelope with the other forms. The list submitted by the successful bidder will be privately opened and will be retained by the Owner for record as a part of the Bid. The lists of other bidders will be returned unopened.

d. No subcontractor not named in such list and approved by the Owner may be employed on the Owner's Project without express written permission of the Owner, notwithstanding any other provision of the Contract Documents which may be interpreted to the contrary. Should a change in the approved list become necessary in the opinion of the successful bidder, a written request shall be submitted to the Owner stating the reason for the change, and written approval of the Owner must be obtained before such change is made. This provision shall apply to work listed to be performed by the bidder, as well as work listed to be performed by vendors or subcontractors.

e. By this requirement of a List of Subcontractors, the Owner does not establish any contractual relation between the Owner and any subcontractor, nor will the Owner inquire into contractual or other relations of the bidder with any subcontractor, nor does this list establish limits to the contracts between the bidder and any subcontractor. The sole purpose and function of such requirement is set forth in the first sentence of the first paragraph of this section.

f. If prior to the signing of the Contract the Owner has a reasonable objection to any person or organization on the List of Subcontractors, the Owner shall notify the apparent successful bidder in writing of such objection. Failure of the Owner to make an objection to any person or organization on the list prior to the award shall constitute acceptance of such person or organization except in the case where a subcontractor is later found not to be qualified by law.

g. If, prior to the signing of the Contract, regardless of whether the Owner has evidenced any intention to award the Contract to Contractor or not, the Owner has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization except where such refusal is a result of the failure of a subcontractor to qualify by law, the apparent successful bidder may, prior to the signing, withdraw his bid without forfeiture of bid security. If the bidder submits an acceptable substitute the Owner may, at his discretion, accept or disqualify the bid.
3. **BASE BID AND ALTERNATES**

The Base Bid shall include all work as set forth on the Drawings, in the Specifications, and in all Contract Documents, plus the specified Contingency Reserve Fund and Cash Allowance, if any. Alternate bid items are described in the Specifications and indicated on the Bid. The Owner shall have the right to accept Alternates in any order or combination and to determine the low bidder on the basis of the sum of the Base Bid and the Alternates accepted.

4. **BID SECURITY**

All Bids shall be accompanied by the bid security in the form and amount as published in the Notice Inviting Sealed Bids and as acceptable to the Owner, and shall be payable without conditions to the Owner as a guarantee that the bidder, if awarded the Contract, will promptly execute such Contract in accordance with the Bid and in the manner and form required by the Contract Documents, and will furnish good and sufficient bonds for the faithful performance of the work and payment of all claimants supplying labor or materials. The bid security must be enclosed in the same envelope with the Bid.

Note: The Notice Inviting Sealed Bids requires that this bid security will also serve as liquidated damages in the event the Contractor fails or refuses to enter into a contract. Mistake shall not excuse any failure or refusal to enter into a contract.

5. **WITHDRAWAL OF BID**

Any bidder may withdraw his Bid, either personally or by telegraphic or written request, at any time before the scheduled closing time for receipt of Bids. No bid may be withdrawn for at least forty-five (45) days after the date the bids are opened, nor may any bid be withdrawn between the scheduled closing time for receipt of Bids and the time the bids are actually opened.

6. **INTERPRETATIONS AND ADDENDA**

Following the Mandatory Pre-Bid Conference, all prospective bidders shall have an opportunity to submit questions or request clarifications to drawings or other Contract Documents in writing to the Owner regarding the Project. The due date for these questions or clarifications is specified on the NOTICE INVITING SEALED BIDS for the project. The Owner shall post a response or Addendum to the Bid documentation on the College website under the Bid Number. The bidder submitting a request for interpretations will be responsible for its prompt delivery. All requests for interpretations shall be made in writing. The Owner will not be responsible for any explanations or interpretations except those duly issued in the form of written addenda. Receipt of any addenda so issued during the time of bidding shall be included in the bid and shall be acknowledged in the Bid and be made a part of the Contract Documents.

7. **APPROVAL OF EQUAL ITEMS OF EQUIPMENT AND/OR MATERIALS BEFORE SUBMISSION OF BIDS**

Products are generally specified by reference standard and/or manufacturer's name and model number or trade name. When specified only by reference standard, the bidder may select any product meeting this standard by any manufacturer. When several products or manufacturers are specified as
being equally acceptable, the bidder has the option of using any product and manufacturer combination listed.

When a specific manufacturer, installer (where pre-qualification is required), trade name or material is specified, or indicated, it is to establish a standard of quality and shall not be construed as limiting competition. If the bidder desires to use other than that specified, he shall request approval of such substitution in the manner specified below:

a. **Prior Approvals:** Substitutions will be considered only when a written request has been submitted by a bidder, who shall be a general contractor qualified to submit a bid to the Owner, for approval at least fourteen (14) calendar days prior to the original date for receipt of bids. No approvals will be granted to suppliers, distributors or subcontractors. Each request shall include all information requested hereinafter. If the Owner approves any proposed substitution, such approval shall be set forth in an Addendum.

b. **Submittal Requirements:** All requests shall contain sufficient information, descriptive brochures, drawings, performance and test data, samples or other data as is necessary for complete evaluation and shall indicate by direct comparison how the proposed substitution compares with the specified equipment or material in every material respect with that specified. Each submittal shall be well marked and identified as to the type and kind of items proposed to be substituted. It is the sole responsibility of the bidder to submit complete descriptive and technical information so that the Owner can make a complete evaluation. Lack of sufficient information will be cause for rejection. References to catalogs will not be acceptable. Submittals shall be accompanied by a written statement from the manufacturer or contractor on his letterhead certifying that the proposed substitution meets or exceeds that specified in all aspects and that it will coordinate properly with related construction. Any redesign necessitated by the substitution shall be paid for by the Contractor.

c. **As set forth in the Specifications,** the bidder’s request for prior approval shall include, without limitation:

   (1) Complete data substantiating compliance of the proposed substitution with the Contract Documents.

   (2) Product identification, including manufacturer's name, address and telephone number.

   (3) A tabulation comparing the specified product manufacturer’s complete product description, performance test data and reference standards with the same information for the proposed products.

   (4) Samples and colors of the proposed products.

   (5) Names and addresses of similar projects in which the proposed product was used and the date of installation.

   (6) For construction methods, include a detailed description for proposed method and drawings illustrating same.
(7) Accurate cost data on proposed substitution in comparison with product or method specified.

d. Any bidders, other than the bidder who requested a particular substitution, who choose to utilize a prior approved item, as approved by Addendum, shall comply with all terms and conditions of the original prior approval submittal. All provisions of this Paragraph 8 regarding using of substitutions shall apply to any bidder who chooses to utilize such substitution.

8. BIDDERS INTERESTED IN MORE THAN ONE BID

No person, firm, or corporation shall be allowed to make, file, or be interested in more than one bid for the same work. A person, firm, or corporation who has submitted a sub-bid to a bidder, or who has quoted prices on materials to a bidder, is not thereby disqualified from submitting a sub-bid or quoting prices to other bidders.

9. ACCEPTANCE OR REJECTION OF BIDS

The Owner reserves the right to reject any or all bids and to waive any informalities in the Bids received. The award of the Contract, if made by the Owner, will be made to the responsible and qualified bidder submitting the lowest bid, but the Owner shall determine in its own discretion whether a bidder is responsible and qualified to perform the Contract, what bid is the lowest, and whether it is in the interest of the Owner to accept the bid.

10. AGREEMENT AND BONDS

The form of agreement which the successful bidder will be required to execute, and the forms and amounts of surety bonds required at the time of execution of the agreement, are included in the Contract Documents and must be carefully examined by the bidder. As noted in the instructions, all bids must include any exceptions requested from the Contract Documents; subsequent requests for deviation from the Contract Document will not be considered. All sureties must be authorized to do business in Arizona, listed on the U.S. Department of Treasury's list of approved sureties, and must be satisfactory to the Owner. No individual sureties are acceptable. The successful bidder must furnish the required bonds and insurance certificates and commence work within five (5) days after issuance of the Notice of Intent to Award and Notice to Proceed. By submission of a Bid, a bidder will be deemed, and agrees to be so treated, to have actual notice of every term of every Contract Document.

11. NON-COLLUSION AFFIDAVIT

The successful bidder, before the award of the Contract, shall submit to the Owner non-collusion affidavits covering the bidder and all subcontractors.

12. LIST OF COMPARABLE PROJECTS

If requested by Owner, the bidder must submit, within 24 hours after bid opening, a list of all projects undertaken within the three (3) years immediately preceding the bid date and a Contractor's Qualification Statement in the form of AIA A-305. Such list shall include the name, address and phone
number of the owner and the architect of each project, the contract amount, and the starting date. Bidder consents to the use of the list and Qualification Statement by Owner to inquire into bidder's fitness, capabilities and responsibility in connection with Owner's consideration of the bid. Bidder agrees to hold harmless the Owner, the Architect, and each owner and architect listed from any action or claim that might arise from any adverse report received by Owner concerning bidder's performance on the projects listed. Failure to furnish a complete list and Qualification Statement as required herein may be considered grounds for rejection of the bid by the Owner, at the Owner's sole discretion.

13. BID PROTESTS

Any bid protests concerning this bid must be filed with the District Purchasing Director no later than the tenth calendar day following the date of award at: 4905D East Broadway Blvd, Tucson, Arizona 85708-1420.
SECTION TWO
CONTRACT AND GENERAL CONDITIONS
BETWEEN OWNER AND CONTRACTOR

THIS AGREEMENT, made this _____ day of ____________, 201__, by and between_________________________________________________________, hereinafter called the "Contractor," and Pima County Community College District, operating in Pima County, hereinafter called the "Owner":

W I T N E S S E T H:

That the Contractor and the Owner agree as follows:

ARTICLE 1
THE CONTRACT DOCUMENTS

1. CONTRACT DOCUMENTS.

1.1. The following listed documents constitute the Contract Documents, and they are all as fully a part of the Contract and General Conditions as if herein repeated:

1. This Contract and General Conditions between Owner and Contractor.
2. Notice of Award and Receipt of Notice
3. Notice to Proceed and Receipt of Notice
4. Performance Bond and Payment Bond.
5. Addenda Nos. __________________ dated ________________.
6. Specifications and Drawings (as modified by the above-referenced Addenda and selected alternates as listed herein, if any) as set forth in Exhibit A to this Contract.
7. Bid Form, dated ____________________.
8. Instructions to Bidders.
10. Certificates of Insurance.

1.1.2 In the event of any inconsistency between any of the terms of the before enumerated documents, such inconsistencies shall be resolved by giving precedence to the terms of the lowest numbered of the above numbered documents. Anything in these Contract Documents to the contrary notwithstanding, the provisions of all pertinent general public laws of the State of Arizona in effect at the time of the execution of this Contract shall be a part of the Contract between the parties and shall take precedence over all of the other Contract Documents.
ARTICLE 2
SCOPE OF WORK

2.1 As required by the Contract Documents, the Contractor shall furnish and install all of the materials and labor and perform all of the work for the Owner's Project known as East Campus Art Department Expansion (E5 Overhang Project) ("Project" herein).

ARTICLE 3
CONTRACT AMOUNT, TIME, LIQUIDATED DAMAGES AND EARLY COMPLETION BONUS

3.1 CONTRACT AMOUNT. The Owner shall pay the Contractor the sum of ______________________ Dollars ($__________) for the Base Bid and alternates __________, which is the Contract Amount. This sum is subject to additions or deductions made in accordance with the provisions of the Contract Documents.

3.2 CONTRACT TIME. The Contract Time as used and defined in Article 11 herein shall be __________ (___) calendar days.

3.3 LIQUIDATED DAMAGES AND EARLY COMPLETION BONUS.

3.3.1 Liquidated damages as used and defined in Article 11 herein shall be Two Hundred Dollars ($200.00) per calendar day for each day the Work remains not substantially complete after expiration of the Contract Time as defined in Article 11 and specified in Subparagraph 3.2 above.

3.3.2 An Early Completion Bonus shall be paid to the Contractor at the rate of Two Hundred Dollars ($200.00) per calendar day the work is Substantially Complete in advance of the expiration of the Contract time up to a maximum of Two Thousand Dollars ($200.00). For purposes of the Early Completion Bonus, the Contract Time(s) shall not be extended or changed for any reason.

3.4 CHANGE ORDERS. Limits on the amount of overhead and profit allowed on Change Orders are specified in Article 15. An item of additional work or change in Plans and Specifications which involves an extra cost shall be valid only if authorized by Change Order in accordance with Article 15 of this Contract and General Conditions.

ARTICLE 4
DEFINITIONS AND GENERAL PROVISIONS

4.1 OWNER, OWNER'S REPRESENTATIVE AND CONTRACTOR. The Owner, Owner’s Representative and the Contractor are those herein defined in this Contract and General Conditions. They are treated throughout the Contract Documents as though each were of the singular number and masculine gender.
4.2 SUBCONTRACTOR. See Article 8.

4.3 NOTICE. See Articles 7 and 10.

4.4 TIME. See Articles 3 and 11.

4.5 COST. The term "Cost" shall include all charges, costs, losses and expenditures of every kind whatsoever for the Work or portion thereof to which reference is made with respect to this term.

4.6 FINISH, SUBSTANTIAL COMPLETION AND FINAL COMPLETION DATES. See Article 11.

4.7 MODIFICATIONS. See also Article 1. A Modification is:

.1 A written amendment to the Contract and General Conditions signed by all parties;

.2 A Change Order properly signed by all parties pursuant to Paragraph 15.1; or

.3 A Field Order for a minor change in the Work issued by the Owner pursuant to Paragraph 15.4.

A Modification may be made only after execution of the Contract and General Conditions.

4.8 CONTRACT. The Contract consists of all the Contract Documents enumerated in Article 1. The Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Paragraph 4.7.

4.9 WORK. The term "Work" includes, without limitation, furnishing all labor, administrative services and supervision necessary to produce the construction required by the Contract Documents and furnishing and installing all materials and equipment incorporated, or to be incorporated, in such construction to complete the Project.

4.10 PROJECT. The Project is the total construction designed by the Owner of which the Work performed under the Contract Documents may be the whole or a part.

4.11 EXECUTION, CORRELATION, INTENT AND INTERPRETATIONS OF THE CONTRACT DOCUMENTS.

4.11.1 The Contract and General Conditions shall be signed by the Owner and the Contractor. By executing the Contract and General Conditions, each party accepts and agrees to be bound by each of the Contract Documents listed in Article 1.
4.11.2 By executing the Contract and General Conditions, the Contractor represents and warrants that he has visited the site, has familiarized himself with the local conditions under which the Work is to be performed, including any and all relevant weather conditions or records or both, and correlated all of his observations with the requirements of the Contract Documents.

4.11.3 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. The intention of the Contract Documents is to include, without limitation, all labor, materials, equipment and other items as provided in Subparagraph 7.4.1 necessary for the proper execution and completion of the Work. Words and abbreviations which have well known technical or trade meanings are used herein in accordance with such recognized meanings.

4.11.4 The organization of the Specifications into divisions, sections and articles, and the arrangements of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade, or constituting part of the Contract or having any legal or contractual significance.

4.11.5 Written interpretations necessary for the proper execution or progress of the Work, in the form of drawings or otherwise, will be issued with reasonable promptness by the Owner in accordance with any schedule agreed upon, or with reasonable promptness in any case. Such interpretations shall be consistent with and reasonably inferable from the Contract Documents.

4.12 COPIES FURNISHED AND OWNERSHIP.

4.12.1 The Contractor will be furnished, free of charge, all copies of Contract Documents reasonably necessary for the execution of the Work as determined by the Owner in his sole discretion.

4.12.2 All Drawings, Specifications and other data, and copies thereof, furnished to the Contractor are and shall remain the property of the Owner. They are not to be used on any other project, and, with the exception of one set for each party to the Contract, are to be returned to the Owner upon request at the completion of the Work.

4.12.3 It shall be the responsibility of the Contractor to ensure that each Subcontractor, Sub-subcontractor and supplier has a current set of those portions of the Construction Documents that may be required for proper execution of their respective portions of the Work.

ARTICLE 5
OWNER’S REPRESENTATIVE

Drawings and Specifications for this Project were prepared by NTD Architects (Owner’s Representative, hereinafter referred to as ‘OR’), who shall act as OR pursuant to the Contract Documents.

5.1 OR: DEFINITION

5.1.1 The OR is the person or organization identified as such in this Contract and General Conditions, and the term OR means the OR or his authorized representative.
5.1.2 Nothing contained in the Contract Documents shall create any contractual relationship between the OR and the Contractor.

5.2 ADMINISTRATION OF THE CONTRACT.

5.2.1 The OR will be the Owner's representative during construction, until final payment and including the warranty period. The OR will have authority to act on behalf of the Owner, unless otherwise modified by written instrument which will be shown to the Contractor. The OR will advise and consult with the Owner, and all of the Owner's instructions to the Contractor shall be issued through the OR, except where the Owner deems direct communication with the Contractor necessary. Any direct communication between Owner and Contractor shall be copied to the OR. The OR and any person designated by Owner as Special Agent shall be Special Agents acting for and on behalf of the Owner for the duration of this Contract.

5.2.2 The OR shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the OR may perform their functions under the Contract Documents.

5.2.3 Neither the OR's authority to act under this Contract, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty of responsibility of the OR to the Contractor, any Subcontractor or material supplier, any of their agents or employees, or any other performing any of the Work.

5.2.4 The duties, responsibilities and limitations of authority of the OR as the Owner's representative during construction as set forth in Articles 1 through 18, inclusive, of this Contract and General Conditions will not be modified or extended without written consent of the Owner and the OR, notice of which will be given to the Contractor.

5.2.5 The OR will not be responsible for the acts or omissions of the Contractor, any Subcontractors or Material Vendors, or any of their agents or employees, or any other persons performing any of the Work.

5.2.6 In case of the termination of the employment of the OR, the Owner shall appoint a successor, whose status under the Contract Documents shall be that of the former OR.

ARTICLE 6
OWNER – CONTRACT ADMINISTRATION

6.1 DEFINITION. The Owner is the person or organization identified as such in the Contract and General Conditions.

6.2 ADMINISTRATION OF THE CONTRACT.

6.2.1 The OR will provide general administration of this Contract, including performance of the functions hereinafter described.
6.2.2 The Owner and the OR shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Owner and the OR may perform their functions under the Contract Documents.

6.2.3 The OR shall make periodic visits to the site to observe the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents. These visits shall be of the frequency necessary to adequately observe the progress of the Work. On the basis of his on-site observations, he shall endeavor to guard against defects and deficiencies in the Work of the Contractor. The Owner shall not be responsible for the Contractor's ways and means, methods, techniques and procedures in the construction of the Project or for enforcement of safety requirements on the Project.

6.2.4 Based on such observations and the Contractor's Applications for Payment, the OR will make recommendations as to the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Subparagraph 12.4.1.

6.2.5 The OR will be, in the first instance, the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder by the Contractor, except where otherwise provided herein. The OR will promptly render such interpretations as he may deem necessary for the proper execution or progress of the Work.

6.2.6 All claims, disputes and other matters in question relating to the execution or progress of the Work, payment, time extension or interpretation of the Contract Documents shall be submitted to the Owner in the manner provided by Subparagraph 12.4.4, within the time limits prescribed in Subparagraph 15.2.1, for decision by the Owner, as the subject of the matter may require, which will be rendered in writing within a reasonable time.

6.2.7 The Owner's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

6.2.8 If a decision of the Owner states that it is final but subject to appeal, no claim, dispute or other matter covered by such decision may be made later than thirty (30) days after the date on which the party making the demand received the decision.

6.2.9 The OR shall have authority to reject Work which does not conform to the Contract Documents. Whenever, in the OR's reasonable opinion, he considers it necessary or advisable to ensure the proper implementation of the intent of the Contract Documents, he will require the Contractor to stop the Work or any portion thereof, or to require special inspection or testing of the Work as provided in Subparagraph 10.8.2, whether or not such Work be then fabricated, installed or completed.

6.2.10 The OR will review Shop Drawings, Product Data and Samples promptly as provided in Subparagraphs 7.12.1 through 7.12.8, inclusive.

6.2.11 The OR will prepare Change Orders in accordance with Article 15 and will have authority to order minor changes in the Work not involving extra cost as provided in Subparagraph 15.3.
6.2.12 The OR will conduct inspections to determine the date or dates of Substantial Completion and Final Completion and shall issue a Certificate of Substantial Completion and of Final Completion. He will receive written guarantees, record drawings, maintenance manuals and related documents required by the Contract and assembled by the Contractor.

6.2.13 The Owner will not be responsible for the acts or omissions of the Contractor, any Subcontractors or Material Vendors, or any of their agents or employees, or any other persons performing any of the Work.

6.3 INFORMATION AND SERVICES REQUIRED OF THE OWNER.

6.3.1 The Owner shall furnish all surveys describing the physical characteristics, legal limits and utility locations for the site of the Project.

6.3.2 Information or services under the Owner's control shall be furnished by the Owner with promptness to avoid delay in the orderly progress of the Work.

6.3.3 All final decisions concerning Change Orders, Payments, Substantial Completion, Final Completion, Liquidated Damages and Contract Time shall be reserved to the Owner, and this provision of the Contract shall take precedence over any other term hereof.

6.3.4 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Work by Owner or by separate contractors, payments, completion and insurance in Articles 9, 12 and 14, respectively.

ARTICLE 7
CONTRACTOR

7.1 DEFINITION.

7.1.1 The Contractor is the person or organization identified as such in this Contract and General Conditions and the term "Contractor" means the Contractor or his authorized representative. The Contractor, and all Subcontractors employed on the Project, shall possess valid Arizona Contractor's Licenses as required by law.

7.1.2 Whenever the words "as may be directed," "suitable," "or equal," "as approved," or other words of similar intent and meaning are used within the Contract Documents implying that judgment or discretion is to be exercised or a decision is to be made, it is understood that it is the judgment, discretion or decision of the OR to which reference is made.

7.1.3 All materials and articles of any kind necessary for this Work are subject to the approval of the Owner as provided in the Contract Documents.

7.1.4 After execution of the Contract, changes of brand named, trade named, trademarked, patented articles, or any other substitutions will be allowed only by written order signed by the Owner,
in which case the Owner shall receive all benefit of the difference in cost involved, except where choice of material or method is designated "or equal" or "acceptable alternates" in the Specifications.

7.2 REVIEW OF CONTRACT DOCUMENTS AND EXAMINATION OF SITE.

7.2.1 By executing this Contract, the Contractor warrants that he has examined the site and carefully studied and compared the Contract and General Conditions, Drawings, Specifications, Addenda, and all other Contract Documents before so executing the Contract. The Contractor shall at once report to the Owner any error, inconsistency or omission he may discover. The Contractor shall not be liable to the Owner for any damage resulting from any such errors, inconsistencies or omissions so long as the Owner is notified thereof, unless discovery of such error, inconsistency or omission should have been made by careful examination of the Contract Documents prior to submitting a Bid. The Contractor shall do no Work without appropriate Contract Documents, or where required, approved Shop Drawings, Product Data, Samples or interpretations from the Owner.

7.2.2 The Contractor shall be required to use for data and dimensions, figures marked on the drawings in preference to what the drawings may measure to scale. In the absence of figured dimensions, the Owner shall be notified and the dimensions provided within a reasonable time. Drawings shall not be scaled in the absence of figured dimensions.

7.2.3 The Contractor shall verify all dimensions shown and check all measurements in connection with any present building or buildings, levels of grades, walks, driveways, or other existing conditions, before executing any work. Contractor shall immediately report to the Owner any discrepancies between the Plans and actual field conditions. Failure to report any discrepancy within 24 hours after discovery will constitute a waiver of any claim arising out of such discrepancy. This provision shall have precedence over any other notice provisions contained herein.

7.3 SUPERVISION AND CONSTRUCTION PROCEDURES. The Contractor shall supervise the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

7.4 LABOR AND MATERIALS.

7.4.1 Unless otherwise specifically noted, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, heat, utilities, transportation and any other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. No materials shall be incorporated into this Work that contains any asbestos.

7.4.2 Any work necessary to be performed after regular working hours, on Sundays or legal holidays, shall be performed without additional expense to the Owner unless approved in advance by Change Order.

7.4.3 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned
to him. When requested by the Owner, the Contractor shall remove from the Project any person who commits trespass or is, in the opinion of the Owner, disorderly, dangerous, insubordinate, incompetent or violates any policies of the Owner. The owner will document the request within 1 work day if requested by the Contractor. The Contractor shall keep the Owner harmless from damages or claims for compensation that may occur in the enforcement of this requirement. The Contractor shall not permit the use of tobacco products (except in designated areas), alcohol or illegal drugs on the project site.

7.5 WARRANTY.

7.5.1 The Contractor warrants to the Owner that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not so conforming to these standards may be considered defective. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

7.5.2 The warranty provided in Paragraphs 7.5 and 18.1 shall be in addition to and not in limitation of any other warranty or remedy available pursuant to law or the Contract Documents.

7.6 TAXES. The Contractor shall pay all sales, consumer, use, transaction privilege and other taxes required by law in connection with the performance of this Contract, whether in force as of the date of this Contract or later imposed. If the Contractor's principal place of business is not in Arizona, Contractor shall post a bond for taxes in compliance with A.R.S. § 42-5007 and furnish evidence of such bond to Owner prior to submitting any application for payment hereunder.

7.7 PERMITS, FEES AND NOTICES.

7.7.1 Unless otherwise provided in the Plans, Specifications or by Addendum, the Contractor shall secure and pay for all permits, fees, inspections and re-inspections necessary for the proper execution and completion of the Work, including, without limitation, the following permits and fees: building, plumbing, mechanical, electrical permits, water meters, water service fees, sewer connection fees, sewer fees or assessments, gas service fees and electric service fees payable to the utility companies. The Contractor shall procure and pay for all necessary utilities for the Project, including temporary utility hook-ups and utilities used in course of construction.

7.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the Work. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Owner in writing. If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he shall assume full responsibility therefor and shall bear all costs attributable thereto, including any attorneys’ fees incurred by Owner in connection therewith.

7.8 SUPERINTENDENT. The Contractor shall employ a competent Superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The Contractor shall assign to the Project a Superintendent prior to the pre-construction meeting and shall furnish to the Owner the Superintendent's resume. The Superintendent shall be satisfactory to the
Owner and shall not be changed except with the consent of the Owner, unless the Superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The Superintendent shall represent the Contractor, and all communications given to the Superintendent shall be as binding as if given to the Contractor. Important communications will be confirmed in writing. Other communications will be so confirmed on written request in each case.

7.9 RESPONSIBILITY FOR THOSE PERFORMING THE WORK. The Contractor shall be responsible to the Owner for the acts and omissions of all his employees and all Subcontractors, their agents and employees, and all other persons performing any of the Work or supplying any material or equipment to be incorporated in the Work under a contract of any nature with the Contractor.

7.10 PROGRESS SCHEDULE AND REPORTS.

7.10.1 The Contractor, within fourteen (14) days after being awarded the Contract, shall prepare and submit for the Owner's review his planned Construction Progress Schedule for the Work as provided in the Specifications. The Construction Progress Schedule shall be related to the entire Project and shall indicate the dates for the starting and completion of the various components and phases of construction and shall be revised monthly or as required by the conditions of the Work, upon request of and subject to the review of the Owner. The Contractor shall comply with the requirements of the Specifications in connection with the preparation and revision of the Construction Progress Schedule. The Contractor agrees to promptly respond to all inquiries by the Owner concerning significant deviation of the progress of construction from the Construction Progress Schedule. Failure to timely respond to such request or significant delay from the Construction Progress Schedule may result in progress payments being withheld. Approval of the Construction Progress Schedule by the Owner shall not relieve the Contractor from his obligation to complete the Project within the Contract Time.

The Contractor shall furnish to the Owner four (4) copies of a complete list of all major items of architectural, mechanical, plumbing and electrical equipment and materials within fourteen (14) days of the Start Date. Include projected dates of submittal of all items of material for which submittals are required and delivery dates of all items of material and equipment that are considered by the Owner, in his sole discretion, critical or which may require, in order to obtain, long lead time. Submit a complete list. A partial list will not be acceptable unless prior permission is obtained from the Owner. The Contractor shall prepare and provide to the Owner a weekly Construction Schedule Status Report which will inform the Owner that, with respect to each category of the Construction Progress Schedule and each item on the material delivery date list, the work or delivery is: (a) on schedule; (b) behind schedule, but will not interfere with the completion of the Project within the Contract Time specified in the Contract; or (c) behind schedule and may prevent the completion of the Project within the Contract Time. In the event that the Construction Schedule Status Report indicates that a delay has occurred or may occur that may prevent the completion of the Project within the Contract Time because the Work in a particular category is behind schedule or a delay in material deliveries is anticipated, the Construction Schedule Status Report shall contain a statement of what corrective measures are being undertaken by the Contractor.

7.10.2 For purposes of determining time extensions resulting from additional work ordered by the Owner, adverse weather or other delays, all float or slack time in the Construction Progress Schedule shall be owned and controlled by the Owner. The Owner shall allow use of such float or slack time by
the Contractor as long as such allocation of float or slack time does not adversely affect the completion date of the Project. No additional time shall be allowed for claims for delay, whether or not caused by or the fault of the Owner, if such delay is less than the available float or slack time available for the particular task.

7.11  DRAWINGS AND SPECIFICATIONS AT THE SITE.

7.11.1  The Contractor shall maintain at the site for the Owner one (1) copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders, other Modifications, and manufacturers' printed specifications and recommendations, in good order and marked carefully, legibly and accurately to record on a daily basis all changes made during construction, all of which shall be available to the Owner at all times. These Drawings shall be delivered to the OR upon completion of the Work. The Drawings indicating the changes shall be maintained throughout the duration of the Project and are the Record Drawings which shall be transferred to electronic media by the Owner.

7.11.2  The Contractor shall also submit to the Owner for his record three (3) copies each (unless otherwise specified) of all manufacturers' maintenance manuals, printed specifications and recommendations, which by reference in the several divisions of the Specifications are a part thereof.

7.12  SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

7.12.1  Shop Drawings and Product Data are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are required by the Contract Documents and are prepared by the Contractor or any Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor, and which illustrate or describe some portion of the Work.

7.12.2  Samples are physical examples furnished by the Contractor to illustrate materials, equipment or workmanship, and to establish standards by which the Work will be judged.

7.12.3  The Contractor shall review, correct any errors, stamp with his approval and submit, with promptness and in orderly sequence so as to cause no delay in the Work or in the work of any other contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents or subsequently by the OR as covered by Modifications. Shop Drawings, Product Data and Samples shall be properly identified as specified, or as the OR may require. At the time of submission, the Contractor shall inform the Owner in writing of any deviation in the Shop Drawings, Product Data or Samples from the requirements of the Contract Documents. The OR's responsibility for reviewing Shop Drawings, Product Data, Samples and other submissions of the Contractor are limited to those required by the Contract Documents or Modifications to the Contract Documents.

7.12.4  By approving and submitting Shop Drawings, Product Data and Samples, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, and that he has checked and coordinated all Shop Drawings, Product Data and Samples with the requirements of the Work and of the Contract Documents.
7.12.5 The OR will review and take other appropriate action with respect to Shop Drawings, Product Data and Samples with reasonable promptness so as to cause no delay, but only for conformance with the Contract Documents.

7.12.6 The Contractor shall make any corrections required by the OR to comply with the Contract Documents and shall resubmit the required number of corrected copies of Shop Drawings, Product Data or new Samples until approved. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings and Product Data to revisions other than the corrections requested by the Owner on previous submissions.

7.12.7 The OR's review of Shop Drawings, Product Data or Samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Owner in writing of such deviation at the time of submission and the OR has given written approval to the specific deviation, nor shall the Owner's approval relieve the Contractor from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples.

7.12.8 No portion of the Work requiring a Shop Drawing, Product Data or Sample submission shall be commenced until the submission has been approved by the Owner. All such portions of the Work shall be in accordance with approved Shop Drawings, Product Data and Samples.

7.13 CUTTING AND PATCHING OF WORK. Any cutting and patching required shall be performed in accordance with instructions contained in the technical specifications of this project.

7.14 CLEANING UP.

7.14.1 The Contractor at all times during the progress of the Work shall keep the buildings and site free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work, he shall remove all his waste materials and rubbish from and about the Project, as well as all his tools, construction equipment, machinery and surplus materials not specified to be left at the site, and shall clean all glass surfaces and other areas or materials as specified, and leave the Work "broom-clean" or its equivalent, except where more stringent cleaning requirements are provided by the Contract Documents.

7.14.2 If the Contractor fails to satisfactorily clean up, the Owner will do so and the cost thereof shall be charged to the Contractor as provided in Paragraph 10.6.

7.15 COMMUNICATIONS. The Contractor shall forward all written communications to the OR except where otherwise required herein.

7.16 INDEMNIFICATION. To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the District, its agents, representatives, officers, directors, officials and employees from and against all claims, damages, losses and expenses (including but not limited to attorney fees, court costs, and the cost of appellate proceedings), relating to, arising out of, or alleged to have resulted from the acts, errors, mistakes, omissions, work or services of the Contractor, its employees, agents, or any tier of subcontractors in the performance of this Contract. Contractor’s duty to defend, hold harmless and indemnify the District, its agents, representatives, officers, directors,
officials and employees shall arise in connection with any claim, damage, loss or expense that is attributable to bodily injury, sickness, disease, death, or injury to, impairment, or destruction of property including loss of use resulting therefrom, caused by any acts, errors, mistakes, omissions, work or services in the performance of this Contract including any employee of the Contractor or any tier of subcontractor or any other person for whose acts, errors, mistakes, omissions, work or services the Contractor be legally liable.

The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

ARTICLE 8
SUBCONTRACTORS

8.1  DEFINITION.

8.1.1  A Subcontractor is a person or organization who has a direct contract with the Contractor to supply materials or equipment or to perform any of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative.

8.1.2  A Sub-subcontractor is a person or organization who has a direct or indirect contract with the Subcontractor to perform any of the Work at the site, or to supply any materials or equipment to be used in the Project. The term "Sub-subcontractor" is referred to throughout the Contract Documents as singular in number and masculine in gender, and means a Sub-subcontractor or an authorized representative thereof.

8.1.3  Nothing contained in the Contract Documents shall create any contractual, master-servant or principal-agent relationship between the Owner, and any Subcontractor or Sub-subcontractor.

8.2  AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK.

8.2.1  If, after the actual signing of this Agreement, the Owner refuses to accept any person or organization on the Subcontractor and Material Vendor List for good and substantial reason, the Contractor shall submit an acceptable substitute and the Contract Amount shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued. However, no increase in the Contract Amount shall be allowed for any such substitution unless the Contractor has acted promptly and responsibly in submitting a name with respect thereto.

8.2.2  The Contractor shall not contract with any Subcontractor proposed to perform portions of the Work designated in the Construction Documents, or if none is so designated, with any Subcontractor proposed for the principal portions of the Work who has not been accepted by the Owner. The Contractor will not be required to contract with any Subcontractor against whom he has a reasonable objection.
8.2.3  If the Owner requires a change of any proposed Subcontractor previously accepted by it, the Contract Amount shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued.

8.2.4  The Contractor shall not make any substitution for any Subcontractor who has been accepted by the Owner unless the substitution is approved in writing by the Owner.

8.2.5  Notwithstanding any provisions to the contrary in the Contract Documents, if any Subcontractor listed is found not to be qualified to perform public work as a matter of law, upon written notice from the Owner, the Contractor shall submit a qualified Subcontractor for the Owner's approval and shall substitute such qualified and approved Subcontractor at no additional cost to the Owner.

8.3  SUBCONTRACTUAL RELATIONS.

8.3.1  All work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate written agreement between the Contractor and the Subcontractor (and where appropriate between Subcontractors and Sub-subcontractors) which shall contain provisions that:

.1 preserve and protect the rights of the Owner under the Contract with respect to the Work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;

.2 require that such work be performed in accordance with the requirements of the Contract Documents;

.3 require submission to the Contractor of applications for payment under each subcontract to which the Contractor is a party, in reasonable time to enable the Contractor to apply for payment in accordance with Article 12;

.4 require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to subcontracted portions of the Work shall be submitted to the Contractor (via any Subcontractor or Sub-Subcontractor where appropriate) in the manner provided in the Contract Documents for like claims by the Contractor upon the Owner;

.5 waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance described in Article 14, except such rights as they may have to the proceeds of such insurance held by the Owner as trustee under Article 14; and

.6 obligate such Subcontractor specifically to consent to the provisions of this Paragraph 8.3.
8.4 PAYMENTS TO SUBCONTRACTORS.

8.4.1 The Owner may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding percentages of completion certified to the Contractor on account of work done by such Subcontractors.

8.4.2 The Owner shall not have any obligation to pay or to see to the payment of any monies to any Subcontractor except as may otherwise be required by law.

ARTICLE 9
SEPARATE CONTRACTS

9.1 OWNER'S RIGHT TO AWARD SEPARATE CONTRACTS. The Owner reserves the right to award other contracts in connection with other portions of the Project under conditions similar to this Contract.

9.2 MUTUAL RESPONSIBILITY OF CONTRACTORS.

9.2.1 The Contractor shall afford other contractors reasonable opportunity for the introduction to the site and storage of their materials and equipment thereon and the execution of their work, and shall properly connect and coordinate his Work with theirs.

9.2.2 If any part of the Contractor's Work depends for proper execution or results upon the work of any other separate contractor, the Contractor shall inspect and promptly report to the Owner any apparent discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper to receive his Work, except as to defects which may develop in the other separate contractor's work after the execution of the Contractor's Work.

9.2.3 Should the Contractor cause damage to the work or property of any separate contractor on the Project, the Contractor shall, upon written notice, promptly attempt to settle such other contractor's claim. If such separate contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner shall promptly notify the Contractor, who shall defend such proceedings at the Contractor's expense, and if any judgment against the Owner arises therefrom, the Contractor shall promptly pay or satisfy it and shall immediately, upon presentation to it of a statement thereof, reimburse the Owner for all attorneys’ fees and court costs which the Owner has incurred.

9.3 CUTTING AND PATCHING UNDER SEPARATE CONTRACTS.

9.3.1 The Contractor shall do all cutting, fitting or patching of his Work that may be required to fit it to receive or be received by the work of other contractors indicated in the Contract Documents. The Contractor shall not endanger any work of any other contractors by cutting, excavating or otherwise altering any work and shall not cut or alter the work of any other contractor except with the written consent of the Owner.
ARTICLE 10
MISCELLANEOUS PROVISIONS

10.1 LAW OF THE PLACE. The Contract shall be governed by the law of the State of Arizona, and any other subordinate jurisdiction in which the Project is located.

10.2 SUCCESSORS AND ASSIGNs. The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or any part hereof or sublet it as a whole or in part without the written consent of the other, nor shall the Contractor assign or pledge any monies due or to become due to him hereunder without the previous written consent of the Owner.

10.3 WRITTEN NOTICE. Written notice shall be deemed to have been duly served if delivered in person to the individual for whom it was intended or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

10.4 CLAIMS FOR DAMAGES. Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his employees, agents or others for whose acts he is legally liable, which claim is not covered by Article 15 hereof, a claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

10.5 PERFORMANCE BOND AND PAYMENT BOND. The Contractor shall furnish and maintain performance and payment bonds as required by Arizona law covering the faithful performance of the Contract and the payment of all obligations arising thereunder in such form and amount as the Owner may prescribe and with such sureties as may be agreeable to the Owner. The premiums shall be paid by the Contractor. The Contractor shall, prior to commencement of the Work, submit such bonds to the Owner. Individual sureties are not acceptable.

10.6 OWNER'S RIGHT TO COMPLETE THE WORK. If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, or fails to perform any provision of the Contract, the Owner may, after seven (7) days written notice to the Contractor and/or his surety, if any, and without prejudice to any other remedy he may have, proceed to make such other necessary and reasonable arrangements to carry out the Work in accordance with the Contract Documents, all at the expense of the Contractor, including the Owner's attorneys' fees and other costs.
10.7 ROYALTIES AND PATENTS. The Contractor shall pay all royalties and license fees. He shall defend all suits or claims from infringement of any patent right and shall save the Owner harmless from loss on account thereof, including Owner's attorneys' fees and court costs, except that Owner shall be responsible for all such loss when a particular design, process or product of a particular manufacturer or manufacturers is specified. But, if the Contractor has reason to believe that the design, process or products specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives information to the Owner prior to starting the Work.

10.8 TESTS.

10.8.1 Where the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any of the Work to be inspected, tested or approved, the Contractor shall give the OR timely notice of its readiness and of the date arranged so the OR may observe such inspection, testing or approval. The Owner shall pay the cost of all such tests, except where otherwise provided herein, and except for retest or re-inspection of Work which fails to comply with the Contract Documents.

10.8.2 All equipment and materials used in the construction of the Project, especially those upon which the strength and durability of the structure may depend, shall be subject to adequate inspection and testing in accordance with accepted standards to establish conformity with Specifications, applicable codes and standards and suitability for use intended, all as set forth more particularly in the Specifications.

10.8.3 If after the commencement of the Work the OR determines that any of the Work requires special inspection, testing or approval which Subparagraph 10.8.1 does not include, he will, upon written authorization from the OR, order such special inspection, testing or approval, and the Contractor shall give notice of readiness as in Subparagraph 10.8.1. If such special inspection or testing reveals a failure of the Work to comply:

.1 with the requirements of the Contract Documents, or

.2 with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over the Work,

the Contractor shall bear all costs thereof, including the cost of the Owner's additional services made necessary by such failure, and the costs of such inspection or testing and other expenses related thereto, including without limitation Owner's legal fees, if any, incurred in connection with advising Owner of such failure of compliance; otherwise, the Owner shall bear such costs.

10.8.4 Required certificates of re-inspections or testing to secure compliance with Clauses 10.8.3.1 or 10.8.3.2 above shall be paid for by the Contractor.

10.8.5 If the Owner wishes to observe the inspections, tests or approvals required by this Paragraph 10.8, he will do so promptly and, where appropriate, at the source of supply.
10.8.6 Neither the observations of the OR or the Owner in their administration of the Construction Contract, nor inspections, tests or approvals by persons other than the Contractor, shall relieve the Contractor from his obligations to perform the Work in accordance with the Contract Documents.

10.9 LEGAL FEES AND COSTS. The prevailing party shall be entitled to recover its attorneys’ fees, any costs of suit, any expert witness fees and the actual cost of any test or inspection incurred in connection with any effort undertaken to enforce any of the terms of this Contract.

ARTICLE 11
 TIME AND LIQUIDATED DAMAGES

11.1 CONTRACT TIME, LIQUIDATED DAMAGES AND RELATED PROVISIONS.

11.1.1 It is understood and agreed that the construction of the Work under the Contract Documents shall be commenced on the date stated in the Notice to Proceed issued by the Owner and shall be Substantially Complete by the Contractor no later than the number of consecutive calendar days from that date, which number is the Contract Time as specified in Paragraph 3.2, herein. The Contract Time is the period of time from (1) the date specified in the Notice to Proceed as the date upon which the Contractor is to commence the Work (the "Start Date"), through (2) the date when the agreed time for Substantial Completion of the construction of the Project expires (the "Finish Date"). The date of beginning, rate of progress, and time for completion are essential conditions of the Contract, and the Contractor agrees that said Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will ensure full completion thereof within the Contract Time specified. It is expressly agreed that the Contract Time is reasonable.

11.1.2 If the Substantial Completion Date as defined in Subparagraph 11.1.3 for the Project or any Phase thereof occurs after the expiration of the Contract Time, the Contractor shall pay the Owner the amount or amounts stated in Article 3 as liquidated damages for each calendar day the Work remains incomplete after expiration of the Contract Time. These amounts are agreed upon because of the impracticability and extreme difficulty of ascertaining the actual damages the Owner would sustain. It is expressly agreed that the amounts of liquidated damages set forth herein are reasonable. Said amounts may be retained from time to time by the Owner from payments due the Contractor.

11.1.3 The date of the Substantial Completion of the Work, or designated portion thereof, is the date established by a Certificate of Substantial Completion prepared by the OR when construction is sufficiently complete, in accordance with the Contract Documents as they may have been modified by any Change Orders agreed to by the parties, so that the Owner may occupy the Project, or a designated portion thereof, if he so elects, for the use for which it is intended. Certification of a designated portion of the Work by the OR as being "Substantially Complete" and occupancy of that portion thereafter by the Owner shall neither release, or otherwise operate to excuse, the Contractor from his duty to complete the remainder of the Work within the Contract Time nor relieve the Contractor from any liability for not completing expeditiously the remainder of Work.

11.1.4 The Final Completion Date is the calendar date when all items of the Work are one hundred percent (100%) finished, with no items of any scope, large or small, outstanding and remaining
to be completed, and all known defective work has been corrected. When the Owner certifies in writing, pursuant to the terms of Subparagraph 12.6.2, that the Final Completion Date is reached and it is approved by the Owner, the Contractor may make application for final payment pursuant to Subparagraph 12.6.2.

11.2 PROGRESS AND COMPLETION.

11.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

11.2.2 The Contractor shall begin the Work on the Start Date as defined in Subparagraph 11.1.1. He shall carry the Work forward expeditiously with adequate forces and shall complete it as required herein.

11.3 DELAYS AND EXTENSIONS OF TIME.

11.3.1 If the Contractor is delayed at any time in the progress of the Work by any cause which the OR determines may justify the delay, including, but not limited to, unforeseeable cause beyond the control and without the fault or negligence of the Contractor, its agents and employees and Subcontractors and Sub-subcontractors and their agents and employees, including, but not restricted to: acts of God, acts of the public enemy, acts of the Owner, acts of another contractor in performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and unusually severe weather over the entire Contract Time, then the Contract Time shall be extended by Change Order for such reasonable time as the OR may determine. No extension of the Contract Time pursuant to this paragraph shall relieve the Contractor from any obligation attendant upon him under any of the provisions of this Contract. It is expressly agreed that the Owner's liability for delay from any cause shall be limited to granting a time extension to the Contractor, and there is no other obligation, expressed or implied, on the part of the Owner to the Contractor for delay from any cause other than Owner caused delay. If the Contractor makes a claim for delay, as provided herein, for which he alleges that the Owner is responsible, which is unreasonable under the circumstances and which was not within the contemplation of the parties, the Owner agrees to negotiate with the Contractor the validity of such claim and the amount of damages incurred by the Contractor, if any.

11.3.2 The Contractor's Construction Progress Schedule must reflect the anticipated adverse weather delays on all weather dependent activities.

11.3.3 All claims for extension of time shall be made in writing to the Owner no more than fifteen (15) days after the occurrence of the delay; otherwise, they shall be waived. In the case of a continuing cause of delay, only one claim is necessary, and the Contractor shall promptly notify the Owner in writing of the date of the termination of the continuing cause of delay.

11.3.4 If no schedule or agreement is made stating the dates upon which written interpretations as set forth in Subparagraph 4.12.5 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen (15) days after demand is made for them, and not then unless such claim is reasonable.
ARTICLE 12
PAYMENTS AND COMPLETION

12.1 CONTRACT AMOUNT. The Contract Amount is as stated in this Contract and General Conditions and is the total amount payable by the Owner to the Contractor for the performance of the Work under the Contract Documents, subject to credits or increases resulting from Change Orders.

12.2 SCHEDULE OF VALUES. Before the first Application for Payment, the Contractor shall submit to the Owner a schedule of values reflecting as nearly as reasonably possible the actual values of the various components of the Work aggregating the total Contract Amount, prepared in such form as Owner may require, and supported by such data to substantiate its correctness as the Owner may require. Each item in the schedule of values shall include its proper share of overhead and profit. This schedule shall be used only as a basis for the Contractor's Application for Payment.

12.3 PROGRESS PAYMENTS IF PRE-AUTHORIZED BY OWNER

12.3.1 On or about the first day of each calendar month during the course of construction, the Contractor shall submit to the Owner an itemized Application for Payment, which shall be AIA Document G702 and G703, supported by such data substantiating the Contractor's right to payment as the Owner may require.

12.3.2 Payments shall be based on the Work actually performed during the preceding calendar month. Payment may be made for materials not incorporated in the Work but delivered and suitably stored at the site under such conditions agreed upon in writing by the Owner.

12.3.3 Material delivered and suitably stored at the site by the Contractor, Subcontractors, Sub-subcontractors, or Material Vendors shall be insured to the full value of the material and shall be suitably stored and protected. Only such material that is in accordance with the Contract Documents shall be installed into the Work. Until the Final Completion and acceptance of the Work by the Owner, it shall be the Contractor's responsibility to protect all materials installed in or delivered to the Project.

12.3.4 The Contractor warrants and guarantees that title for all work, materials and equipment covered by the Contract Documents shall pass to the Owner upon Final Completion and acceptance by the Owner and that such work, materials and equipment shall be free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 12 as "claims".

12.4 CERTIFICATION OF PAYMENT.

12.4.1 If the Contractor has made Application for Payment as above, the Owner shall approve or modify the Application and forward for payment for such amount as the Owner determines to be properly due, or state in writing the Owner's reasons for withholding, in whole or in part, the amount applied for as provided in Subparagraph 12.5.1.

12.4.2 The Application for Payment will constitute a representation by the Contractor to the Owner, that:
.1 the Work has progressed to the point indicated;

.2 to the best of his knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole upon Substantial Completion, to the results of any subsequent tests required by the Contract Documents, to minor deviations from the Contract Documents correctable prior to Final Completion, and to any specific qualifications stated in his certification of the Application for Payment); and

.3 the Contractor is entitled to payment in the amount certified.

12.4.3 The Owner shall make a payment to the Contractor on the basis of the value of the Work actually performed during the preceding calendar month in accordance with Subparagraph 12.3.2, less the amount of retention specified in Subparagraph 12.4.5 hereof. Such payments shall be made within thirty (30) days after receipt of Application for Payment. If the Contractor has properly requested the Owner pursuant to Subparagraph 12.3.1 of this Contract and General Conditions to accept substitute security, the Owner shall pay to the Contractor one hundred percent (100%) of the value of the Work actually performed during the preceding calendar month in accordance with this Paragraph 12. If the Contractor did not request an acceptance of substitute security, made an incomplete or incorrect assignment or made a legally insufficient assignment of substitute security, as determined by Owner or Owner's attorney, the Owner shall retain the amount of such approved Application for Payment specified in Subparagraph 12.4.5 hereof as a guarantee of the complete performance of the Contract. Any amounts retained or any securities held by Owner shall be returned to the Contractor within sixty (60) days after the Final Completion Date as specified in Subparagraph 12.6.2 of this Contract and General Conditions, provided the Contractor has by that time duly furnished the Owner any and all documents indicated to be furnished by the close out requirements of the Specifications or required for the proper maintenance and functioning of the Work as a whole. The Contractor shall submit along with the Application for Payment lien waivers from each subcontractor, materials or equipment supplier, the aggregate sum of which shall be the amount of the previous progress payment issued to the Contractor. If lien waivers from all subcontractors, materials or equipment suppliers do not equal the aggregate sum of the previous progress payment, the Contractor shall submit the following statement along with the current progress payment request: "I hereby certify as General Contractor on this project that I have paid all subcontractors, materials or equipment suppliers, for the Work provided in conjunction with the Project for which I have previously received payment."

12.4.4 In his Application for Payment, or in a separate notice, the Contractor shall include and itemize, and furnish such supporting particulars as the Owner shall require, all claims for additional compensation against the Owner arising under the Contract Documents or any covenant thereof, express or implied, or from any cause whatsoever, within the time limits prescribed in Subparagraph 15.2.1. It is expressly covenanted that the purpose of this provision is to guard the Owner against surprise claims, to permit the Owner to investigate claims as the same may arise, and to prevent vexatious litigation of claims. It is expressly covenanted that the Owner shall have no liability on any claim unless such claim was submitted in writing at the time and in the manner required hereby.

12.4.5 The Owner shall retain ten percent (10%) of the amount of each Application for Payment as insurance of proper performance of the Contract. Once the Contract is fifty percent (50%) complete,
one-half of the retention then held shall be paid to the Contractor provided the Contractor is making satisfactory progress and there is no specific cause or claim requiring a greater amount to be retained. After the Contract is fifty percent (50%) completed, five percent (5%) of the amount of each subsequent Application for Payment shall be retained provided the Contractor is making satisfactory progress on the Project. If at any time the Owner determines that the Contractor is not making satisfactory progress, then the Owner may retain ten percent (10%) of all subsequent Applications for Payment.

12.4.6 No certificate for a progress payment, nor an acceptance of any security in lieu of the cash retention, nor any progress payment, nor any partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

12.5 PAYMENTS WITHHELD.

12.5.1 The OR may decline to certify payment and may withhold his Certificate in whole or in part if, in his opinion, he is unable to make representations to the Owner as provided in Subparagraph 12.4.2. The OR may also decline to certify any Applications for Payment or, because of subsequently discovered evidence or subsequent inspections, he may nullify the whole or any part of any Certificate for Payment previously issued to such extent as may be necessary in his opinion to protect the Owner from loss because of:

- .1 defective work not remedied,
- .2 claims filed or reasonable evidence indicating probable filing of claims,
- .3 reasonable doubt that the Work can be completed for the unpaid balance of the Contract Amount,
- .4 damage to the Owner or another contractor,
- .5 reasonable indication that the Work will not be completed within the Contract Time, or
- .6 unsatisfactory prosecution of the Work by the Contractor.

12.5.2 When the grounds in Subparagraph 12.5.1 are removed, or in the case of 12.5.1.3 above, when the Owner is satisfied that the Contractor will complete the Project at the agreed upon price, payment shall be made for amounts withheld because of them.

12.6 SUBSTANTIAL COMPLETION AND FINAL PAYMENT.

12.6.1 When the Contractor believes that the Work or a designated portion thereof acceptable to the Owner is substantially complete, the Contractor shall prepare for submission to the OR a "punch list" of items to be completed or corrected. Any item on such list shall be completed or corrected before the Final Completion Date without regard to whether such item may be characterized by anyone as a "warranty item" or otherwise. The failure to include any items on such punch list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.
When the OR, on the basis of an inspection, determines that the Work or a portion thereof is substantially complete, he will then prepare a Certificate of Substantial Completion, which shall be AIA Document G704, which shall state the responsibilities of the Owner and the Contractor for maintenance, heat, utilities and insurance. The Certificate(s) of Substantial Completion shall be submitted to the Owner for their written acceptance of the responsibilities assigned to them in such Certificate.

12.6.2 Upon receipt of written notice from the Contractor that the Work is ready for final inspection and acceptance, the OR will promptly make such inspection and, when the OR finds (1) the Work acceptable under the Contract Documents; (2) the Contract fully performed; and (3) the Final Completion Date has been reached, as that term is defined in Subparagraph 11.1.4, then, and only then, the Contractor shall promptly issue a final Invoice stating that, to the best of his knowledge, information and belief, and on the basis of observations and inspections, the Work has been fully completed in accordance with the terms and conditions of the Contract Documents, that the entire balance found to be due the Contractor is payable, and that any securities held by the Owner in lieu of a cash retention are returnable. The Contractor's written notice required by this Paragraph shall state the Date of Final Completion.

12.6.3 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Owner (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied; (2) consent of surety to final payment; (3) if required by the Owner, other data establishing payment or satisfaction of all such obligations, to the extent and in such form as may be designated by the Owner; and (4) written certification by the Contractor, and such subcontractors, material suppliers and manufacturers as the Owner shall designate, that no materials have been incorporated into the Work which contain any asbestos.

12.6.4 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except previously made in writing and still unsettled.

ARTICLE 13
PROTECTION OF PERSONS AND PROPERTY

13.1 SAFETY PRECAUTIONS AND PROGRAMS. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work in compliance with all local, state and federal laws and regulations.

13.2 SAFETY OF PERSONS AND PROPERTY.

13.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss, to:

.1 all employees engaged in the Work and all other persons who may be affected thereby;
.2 all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

13.2.2 The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by existing conditions and the progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

13.2.3 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

13.2.4 All damage or loss to any property referred to in Clauses 13.2.1.2 and 13.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor.

13.2.5 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's Superintendent unless otherwise designated in writing by the Contractor to the Owner.

13.2.6 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

13.3 EMERGENCIES. In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided by the applicable provisions of the Contract Documents.

ARTICLE 14
CONTRACTOR'S INSURANCE

14.1 GENERAL REQUIREMENTS The Contractor, at Contractor’s own expense, shall purchase and maintain the herein stipulated minimum insurance with companies duly licensed to do business in the State of Arizona with policies and forms satisfactory to the District and possessing a current A.M. Best, Inc. Rating of B++6.
All insurance required herein shall be maintained in full force and effect until all work required to be performed under the terms of the Contract is satisfactorily completed and formally accepted; failure to do so may, at the sole direction of the District, constitute a material breach of the Contract.

The Contractor’s insurance shall be primary insurance, and any insurance or self-insurance maintained by the District shall not contribute to it.

Any failure to comply with the claim reporting provisions of the policies or any breach of an insurance policy warranty shall not affect coverage afforded under the policy to protect the District.

All policies, except Workers’ Compensation, shall contain a waiver of transfer rights of recovery (subrogation) against the District, its agents, representatives, directors, officers, and employees for any claims arising out of the Contractor’s work or service.

The insurance policies may provide coverage which contains deductibles or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to the District under such policies. The Contractor shall be solely responsible for deductible and/or self-insured retention and the District, at its option, may require the Contractor to secure the payment of such deductible or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit.

The District reserves the right to request and to receive, within 10 working days, certified copies of any or all of the herein required insurance policies and/or endorsements. The District shall not be obligated, however, to review same or to advise Contractor of any deficiencies in such policies and endorsements, and such receipt shall not relieve Contractor from, or be deemed a waiver of the District’s right to insist on, strict fulfillment of Contractor’s obligations under the Contract.

The insurance policies, except Workers’ Compensation, required by the Contract shall name the District, its agents, representatives, officers, directors, officials, and employees as Additional Insureds.

14.2 REQUIRED COVERAGE

14.2.1 General Liability - Contractor shall maintain Commercial General Liability insurance with a limit of not less than $2,000,000 for each occurrence with a $2,000,000 Products and Completed Operations Aggregate and $2,000,000 General Aggregate Limit. The Contractor’s policy shall be endorsed to include a separate designated construction project general aggregate limit applicable to this project with a per project limit of $1,000,000 which coverage will be at least as broad as insurance Service Office, Inc. Policy Form CG 25030397. The policies shall include coverage for bodily injury, broad form property damage, personal injury, products/completed operations and blanket contractual coverage including, but not limited to, the liability assumed under the indemnification provisions of the Contract, which coverage will be at least as broad as Insurance Service Office, Inc. Policy Form CG 000211093 or any replacement thereof. The coverage shall not exclude X, C, U.

Such policies shall contain a severability of interest provision, and shall not contain a sunset provision or commutation clause, or any provision that would serve to limit third party action over claims.
The Commercial General Liability additional insured endorsement shall be at least as broad as the Insurance Service Office, Inc’s, Additional Insured, Form B CG20101185, and shall include coverage for Contractor’s operations and products and completed operations.

14.2.2 Certificates if Insurance - Prior to commencing Services under the Contract, Contractor shall furnish the District with Certificates of Insurance, or formal endorsements as required by the Contract, issued by Contractor’s insurer(s), as evidence that policies providing the required coverages, conditions and limits required by the Contract are in full force and effect.

In the event any insurance policy(ies) required by the contract is(are) written on a “claims made” basis, coverage shall extend for two years past completion and acceptance of the contractor’s work or services and as evidenced by annual Certificates of Insurance.

If a policy does expire during the life of the contract, a renewal certificate must be sent to the District thirty (30) days prior to the expiration date.

All Certificates of Insurance required by the Contract shall be identified with a bid serial number and title.

Insurance evidenced by these certificates shall not expire, be canceled, or materially changed without thirty (30) days prior written notice to the District.

14.2.3 Automobile Liability - Contractor shall maintain and cause any subcontractors to maintain Commercial/Business Automotive Liability insurance with a combined single limit for bodily injury and property damage of not less than $1,000,000 each occurrence with respect to the Contractor’s owned, hired, and non-owned vehicles assigned to or used in performance of the Contractor’s work. Coverage will be at least as broad as coverage code 1, “any auto”, (Insurance Service Office, Inc. Policy Form CA 00011293, or any replacements thereof). Such insurance shall include coverage for loading and off loading hazards. If hazardous substances, materials or wastes are to be transported, MCS 90 endorsement shall be included and $5,000,000 per accident limits for bodily injury and property damage shall apply.

14.2.4 Workers’ Compensation - This Contractor shall carry Workers’ Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Contractor’s employees engaged in the performance of the work; and, Employer’s Liability insurance of not less than $2,000,000 for each accident, $1,000,000 disease for each employee, and $1,000,000 disease policy limit.

In case any work is subcontracted, the Contractor will require the Subcontractor to provide Workers’ Compensation and Employer’s Liability to at least the same extent as required of the Contractor.
ARTICLE 15
CHANGES IN THE WORK AND CLAIMS

15.1 CHANGE ORDERS.

15.1.1 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions. The Contract Amount and/or the Contract Time shall be adjusted accordingly pursuant to the terms of the Contract Documents.

15.1.2 A Change Order is a written amendment to the Contract Documents signed by the Owner, OR and the Contractor, issued after the execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Amount or the Contract Time. The Contract Amount and the Contract Time may be changed only by Change Order.

15.1.3 The debit or credit, as the case may be, to the Owner resulting from a change in the Work shall be determined in one or more of the following ways as mutually agreed:

1. by a lump sum properly itemized and supported as described below in order to permit evaluation;

2. by unit prices stated in the Contract Documents or subsequently agreed upon; or

3. by actual cost and specified percentage fee covering overhead and profit.

The total amount of overhead and profit allowed on any Change Order, whether increase or decrease, shall not exceed 15% of the direct costs of the Change Order Work when the Work is performed by the Contractor, or 5% of the Direct Costs for the Contractor's overhead and profit and 15% for the Subcontractor's overhead and profit when the Work is performed by any level of Subcontractor or Sub-subcontractor. The aforesaid amounts shall include the general conditions, overhead and profit for both the Contractor, Subcontractor(s), and Sub-subcontractor(s), if any. The costs of bond premiums and sales tax shall be added, in that order, after calculation and addition of overhead and profit.

The overhead and profit margin shall cover the costs of any additional supervision and project management, including the Contractor's and any Subcontractor's job superintendent, project manager, estimator, field office support, home office support, small tools and all other general conditions items.

For each and every proposed change in the Contract Amount, the Contractor shall provide an itemized breakdown of direct costs, hereinafter called the cost breakdown, that: (1) clearly describes each item, location and scope of work; (2) identifies in detail all labor (by trade classification), materials, equipment and services required to complete the work; (3) lists and extends all respective man hours (or unit hours), labor rates, quantities of materials, dimensions used to compute quantities, material units and unit prices, equipment time and rental rates. This cost breakdown shall be organized in a format that clearly identifies the subtotal of direct costs before overhead (if any), profit, bond and tax are added. The cost breakdown format is subject to the approval of the Owner.
Change bids from the Contractor shall include separate cost breakdowns as described above from any and all Subcontractors involved with the change. Subcontractor cost breakdowns are to be in writing on their letterhead and signed by the Subcontractor. Contractor shall provide any additional data needed to substantiate costs of changes, including invoices from suppliers and payroll information upon request of the Owner. The Contractor shall respond to requests for quotations from the Owner within five (5) calendar days.

The Direct Cost is defined as the lowest locally available cost to the Contractor or Subcontractor after all discounts, rebates and concessions are calculated. The Direct Cost is the basis for computing Contractor and Subcontractor overhead and profit margins. The Direct Costs that may be included in the price of a change are limited to the following items directly attributable to the change in the Work:

1. Costs of materials, including cost of delivery;
2. Cost of labor, including social security, old age and employment insurance, and fringe benefits required by agreement and workers’ compensation insurance;
3. Rental value of equipment used to perform the Work.

15.1.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order that application of the agreed unit prices to the quantities of Work proposed will create a hardship on the Owner or the Contractor, the applicable unit prices shall be equitably adjusted to prevent such hardship.

15.1.5 Should concealed conditions encountered in the performance of the Work below the surface of the ground be at variance with the conditions indicated by the Contract Documents or should unknown physical conditions below the surface of the ground of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, the Contract Amount shall be adjusted by Change Order upon claim by either party made in compliance with Subparagraph 12.4.4 and within the time limits prescribed in Subparagraph 15.2.1.

15.1.6 If the Contractor claims that additional cost or time is involved because of:
   1. any written interpretation issued pursuant to Subparagraph 4.12.5,
   2. any order by the Owner to stop the Work pursuant to Subparagraph 5.2.11 where the Contractor was not at fault, or
   3. any written order for a minor change in the Work issued pursuant to Paragraph 15.3,
the Contractor shall make such claim as provided in Paragraph 15.2.
15.2 CLAIMS FOR ADDITIONAL COST OR TIME. If the Contractor decides to make a claim for an increase in the Contract Amount or any other claim, except one for an extension of Contract Time, he shall give the Owner written notice thereof within fifteen (15) days after the occurrence of the event giving rise to such claim or include such notice in the Application for Payment for the month in which the event giving rise to the claim occurred, whichever is earlier. Notice of a claim for extension of Contract Time shall be given within fifteen (15) days of the occurrence of the event giving rise to such claim. Any notice other than one made for an extension of the Contract Time shall be given by the Contractor before proceeding to execute the Work which is the subject matter of the claim, except in an emergency endangering life or property, in which case the Contractor shall proceed in accordance with Subparagraph 13.3.1. All claims shall be made as provided in Subparagraph 12.4.4 within the time limits prescribed herein, and no such claim shall be valid unless so made. No change in the Contract Amount or Contract Time resulting from such claim shall be valid unless approved by the Owner and authorized by Change Order.

15.3 MINOR CHANGES IN THE WORK. The OR has authority to order minor changes in the Work not involving an adjustment in the Contract Amount or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents.

15.4 FIELD INFORMATION MEMOS. The OR may issue written Field Information Memos which interpret the Contract Documents in accordance with Subparagraph 4.12.5 or which order minor changes in the Work in accordance with Paragraph 15.3 without change in Contract Amount or Contract Time. The Contractor shall carry out such changes specified in the Field Information Memos promptly.

ARTICLE 16
UNCOVERING AND CORRECTION OF WORK

16.1 UNCOVERING OF WORK.

16.1.1 If any Work should be covered contrary to the request of the OR, it must, if required by the OR, be uncovered for his observation and replaced, all at the Contractor's expense.

16.1.2 If any other Work has been covered which the OR has not specifically requested to observe prior to being covered, the OR may request to see such Work and it shall be uncovered by the Contractor. If such Work is found to be in accordance with the Contract Documents, the cost of uncovering and replacement after approval by the OR shall, by appropriate Change Order, be charged to the Owner. If such Work is found not to be in accordance with the Contract Documents, the Contractor shall pay such costs unless it is found that this condition was caused by a separate contractor employed as provided in Article 9, and in that event, the Owner shall be responsible for the payment of such costs.

16.2 CORRECTION OF WORK.

16.2.1 The Contractor shall promptly correct all Work rejected by the Owner as defective or as failing to conform to the Contract Documents whether observed before or after Final Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work.
16.2.2 If, within two (2) years after acceptance of the Work by the Owner or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, including the original conformance with the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor, without cost to the Owner, shall correct it promptly after receipt of a written notice from the Owner to do so. The Owner shall give such notice promptly after discovery of the condition.

16.2.3 All such defective or non-conforming Work under Subparagraphs 16.2.1 and 16.2.2 shall be removed from the site where necessary, and the Work shall be corrected to comply with the Contract Documents without cost to the Owner.

16.2.4 The Contractor shall bear the cost of making good all work of separate contractors destroyed or damaged by such removal or correction.

16.2.5 If the Contractor does not remove such defective or non-conforming Work within a reasonable time fixed by written notice from the Owner, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten (10) days after receipt of a statement of charges therefor, the Owner may, upon ten (10) additional days written notice, sell such Work at auction or at private sale and shall account for the net proceeds thereof after deducting all the costs that should have been borne by the Contractor, including compensation for additional architectural services and any attorneys' fees incurred by Owner in connection therewith. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner, and all attorneys' fees and other costs that the Owner may incur in collecting same.

16.2.6 If the Contractor fails to correct such defective or non-conforming Work, the Owner may correct it in accordance with Paragraph 10.6.

16.2.7 The obligations of the Contractor under this Paragraph 16.2 shall be in addition to and not in limitation of any obligations imposed upon him by special guarantees required by the Contract Documents or otherwise prescribed by law.

16.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK. If the Owner prefers to accept defective or non-conforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the Contract Amount, or, if the amount is determined after final payment, it shall be paid by the Contractor.
ARTICLE 17
TERMINATION OF THE CONTRACT

17.1 TERMINATION BY THE CONTRACTOR. If the Work is stopped for a period of thirty (30) days, and the Owner is immediately notified of such stopping, under an order of any court or other public authority having jurisdiction through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, and by reason of some act or omission of Owner, then the Contractor may, upon thirty (30) days written notice to the Owner, terminate the Contract and recover from the Owner payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including the percentage profit stated in Paragraph 3.4 herein for Work accomplished through the date the notice of termination is given.

17.2 TERMINATION BY THE OWNER.

17.2.1 If the Contractor files or has filed against it any petition in bankruptcy, or if he makes a general assignment for benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or sufficient and proper materials to complete the Work in accordance with the Progress Schedule and Contract Time, or he fails to make prompt payments to Subcontractors or for materials or labor, or disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a material breach of any provision of the Contract Documents, then the Owner may, without prejudice to any other right or remedy and after giving the Contractor and/or his surety seven (7) days written notice, terminate the employment of the Contractor and take possession of the site and all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the Work is finished. Termination of the Contract under this Subparagraph 17.2.1 shall not relieve the Contractor of any warranty obligations he would otherwise have on all Work performed hereunder, and such obligations shall survive termination of this Contract.

17.2.2 If the unpaid balance of the Contract Amount exceeds the costs of finishing the Work, including attorneys' fees and all other costs incurred by Owner in completion of the Contractor's obligations, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the Owner.

ARTICLE 18
WARRANTY AND SITE CONDITIONS

18.1 TWO-YEAR WARRANTY.

18.1.1 The Contractor shall warrant all Work under this Contract against defects of material and workmanship for a period of at least two (2) years from the Final Completion Date; provided, however, that those items of the Work specified as having longer warranties shall be warranted for the period specified.
18.1.2 The Contractor shall be responsible for the total cost of repairing and restoring such defective Work to a new condition, at no cost to Owner.

18.1.3 In any case where the subject matter of the defect relates to Work done under a subcontract between the Contractor and any Subcontractor, it is the responsibility of the Contractor, not the Owner, to secure the Subcontractor's performance in compliance with this Paragraph and, in the event of the Subcontractor's failure or refusal within a reasonable time to perform after notice, it shall be the Contractor's responsibility to repair and restore such defective Work to a new condition, at no cost to Owner.

18.1.4 In any case where the defective Work has been brought to the attention of the Contractor by the Owner and the Contractor fails or refuses to correct it, the Owner may elect, without precluding its use of any other remedy it may have available to it, to have the defective Work repaired and restored to a new condition in whatever manner it deems appropriate, regardless of the cost, and the Contractor shall be liable to the Owner for the total cost thereof, including, without limitation, any architectural and legal fees related to effecting the repair.

18.1.5 Material and workmanship made good through compliance with such warranty shall be subject to the same warranty period as the original materials and workmanship. Such warranty period shall begin on the date the replaced material and work is certified as acceptable in writing by the Owner.

18.2 USE OF PREMISES.

18.2.1 The Contractor shall confine his equipment and plant, the storage of materials, and the operations of his workmen to limits indicated by law, ordinances, permits, or directions of the Owner and shall not unreasonably encumber the premises with materials or equipment.

18.3 SEVERABILITY. In the event any provision in this Contract is held invalid by any court of competent jurisdiction, the remaining provisions in this Contract shall be deemed severable and shall remain in full force and effect.

18.4 IMMIGRATION LAW COMPLIANCE.

18.4.1 The Contractor warrants compliance with the Federal Immigration and Nationality Act (FINA) and all other Federal and State immigration laws and regulations related to the immigration status of its employees. Contractor shall obtain statements from its subcontractors of every tier certifying compliance and shall furnish the statements to the Owner upon request. These warranties shall remain in effect through the term of the Contract, and the Contractor and its subcontractors of every tier shall also maintain Employment Eligibility Verification forms (I-9) as required by the U.S. Department of Labor’s Immigration and Control Act for all employees performing work pursuant to this Contract. I-9 forms are available for download at USCIS.GOV.

18.4.2 The Owner may request, and the Contractor agrees to furnish, verification of compliance from the Contractor or its subcontractors of any tier performing work pursuant to this Contract. Should the Owner reasonably believe or discover that the Contractor or its subcontractors of any tier are not in compliance, the Owner may pursue any and all remedies allowed by law, including, but not limited to: suspension of work, termination of the Contract for default, and suspension and/or debarment of the
Contractor or its subcontractors. All costs necessary to verify compliance are the responsibility of the Contractor.

18.5 CANCELLATION. This Agreement is subject to cancellation by the Owner for violation of the provisions of Arizona Revised Statutes Section 38-511.

IN WITNESS WHEREOF, four (4) identical counterparts of this Agreement, each of which shall for all purposes be deemed an original thereof, have been duly executed by the parties hereinabove named, on the day and year first above written.

OWNER: Pima County Community College

By _________________________________ Date ________________
Its _________________________________

CONTRACTOR: _________________________________

By _________________________________ Date ________________
Its _________________________________

2. Drawing List

<table>
<thead>
<tr>
<th>Sheet No.</th>
<th>Sheet Title</th>
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PROJECT MANUAL

Pima Community College
East Campus
E5 Overhang Art Studios

100% Construction Documents

Pima Community College
Tucson, Arizona

NTD Architecture Project Number #2013-0203-00

June 1, 2014
PROJECT MANUAL

for the Renovations
of portions of

E5 Overhang Art Studios

for

Pima Community College

Prepared By

NTD Architecture
2940 North Swan Road, Suite 214
Tucson, AZ 85712

NTD # 2013-0203-00

June 1, 2014
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E5 Overhang Art Studios
NTD Project No. 2013-0203-00

Pima Community College
Facilities Division
Facilities Operations & Construction
6680 South Country Club Road
Tucson, AZ 85709-1810

NTD Architects
2940 North Swan Road, Suite 214
Tucson, AZ 85712
(520) 784-0975
(520) 784-0964 FAX

PCC East Art Studios
NTD Architecture
NTD # 2013-0203-00

DIRECTORY/CERTIFICATIONS
June 4, 2014

SPECIFICATIONS FOR
PIMA COUNTY COMMUNITY COLLEGE DISTRICT

East Campus
Expand Art Department – E5 Overhang Project
8181 East Irvington Road
TUCSON, AZ 85709

VOLUME 1

Facilities Planning Project # PR001438

Pima County Community College District
Facilities Operations & Construction
6680 South Country Club Road
Tucson, AZ 85709-1810
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011100.01 GENERAL:

A. Requirements of "Instructions to Bidders" become a part of this work.

B. The scope of this contract consists of all supervision, labor, materials, equipment, appliances, transportation, tools, permits, fees, taxes and incidentals necessary to perform all operations required to install, alter, construct and complete, all in accordance with these specifications and the applicable drawings and documents, and work reasonably inferable from the specifications and drawings, and subject to the terms and conditions of the contract.

PROJECT SCOPE: Enclosing approx. 2,000 Square Feet of covered space (Overhang) work includes:
Demo of existing concrete slab and foundations, new aluminum front window wall, millwork, new metal stud partitions, associated mechanical and electrical work.

C. Contract Time:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tr>
<td>Anticipated Notice of Intent to Award Contract:</td>
<td>July 17, 2014</td>
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<tr>
<td>Anticipated Date of Notice to Proceed:</td>
<td>July 28, 2014</td>
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<tr>
<td>Start Construction:</td>
<td>July 28, 2014</td>
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<td>Substantial Completion:</td>
<td>November 7, 2014</td>
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<td>Final Completion:</td>
<td>November 14, 2014</td>
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If the Contractor is delayed at any time in the progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, which the Architect determines justifies relief, then Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

1. An extension of time shall be the Contractor’s sole remedy for delay. The Contractor expressly agrees not to make, and hereby waives any claim for damages against the Owner on account of any delay, obstruction, or hindrance for any cause whatsoever, and agrees that the Contractor’s sole right and remedy in the case of delay shall be an extension of the time fixed for completion of the contract.

2. Contract Time shall not be adjusted unless a change affects the critical path of the Work.

D. Warranty: If, within two years after the date of Substantial completion of the work, any of the work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner. See also Section 01 78 36.

E. Liquidated Damages: See also Contract Article VI, Paragraph 8 "Special Conditions of the Contract".

1. If the Contractor neglects, fails or refuses to substantially complete the Work within the Contract Time, or any extension granted by Change Order, then the Contractor shall, as part consideration for the award of this contract, pay to the Owner a sum of not less than two hundred dollars ($200.00) per calendar day, not as a penalty, but as liquidated damages for such breach of contract, for each and every calendar day that the Contractor fails to substantially complete the work.

2. Early Completion Bonus: If the Contractor completes the work prior to the expiration of the Contract Time, the Contractor shall be paid an Early Completion Bonus at the rate of two hundred dollars ($200.00) for each calendar day the work is Substantially Complete in advance of the expiration of the Contract Time up to a maximum of two thousand dollars ($2,000.00). For purposes of the Early Completion Bonus, the Contract Time shall not be extended or changed for any reason.
011100.02 DEFINITIONS:

A. The term "Contractor" means the person or organization awarded the contract to complete work specified herein, and shall be a General Contractor registered and licensed by the State of Arizona, who has successfully completed a minimum of three comparable projects and can provide references for those projects.

B. The term "Owner" as used herein means Pima County Community College District of the State of Arizona. The Owner's Representative is the Director of Facilities Operations & Construction, or his designee, and shall act on behalf of the Owner. Communication is not received unless directed to the attention of the Owner's Representative.

C. The term "Architect" as used herein means Architect of Record – NTD Architects.

011100.03 INTENT OF DOCUMENTS:

A. Drawings and Specifications are cooperative and supplementary. Portions of the work which can be best illustrated by drawings may not be included in specifications, and portions best described by specifications may not be depicted on the drawings. The Intent of the Bid Documents is to include labor, materials and services necessary for proper completion of this project.

B. Completeness and correctness of Bid Documents shall be verified before execution by Contractor who shall notify the Architect of any errors, inconsistencies or omissions within ten (10) days. The Contractor shall be liable to the Owner or the Architect for any damages resulting from any errors, inconsistencies or omissions and knowingly failed to report it to the Architect. If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Architect, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

C. Where drawings and specifications appear to conflict, specifications shall govern. Detail drawings have priority over other drawings and large scale plans have priority over small scale plans. Discrepancy in figures, drawings or specifications shall be promptly submitted to the Architect, who shall promptly make a determination in writing.

011100.04 DETAIL DRAWING INTERPRETATION:

Before doing any work or ordering any materials, Contractor shall verify measurements of existing and new work and be responsible for their correctness. Differences which may be found shall be submitted to the Architect for consideration before proceeding with the work. No extra compensation will be allowed because of differences between actual dimensions and those indicated on working drawings. The Contractor will be responsible for the locations and elevations of all the construction indicated by the construction documents.

011100.05 PROTECTION OF ADJACENT PROPERTY:

A. Contractor is responsible for preservation of public and private property on the surface or underground, along and adjacent to the work, and shall conduct his operations so as to ensure the prevention of injury or damage thereto.

B. Whenever direct or indirect damage or injury is done to public or private property by or on account of acts, omissions, neglect or misconduct in the execution of the work, or in consequence of non-execution thereof on the part of the Contractor, such property shall be restored by Contractor at his expense, to a condition equal to that existing before such damage or injury was done, by repairing, rebuilding or otherwise restoring same, or the contractor shall make good such damage or injury in an acceptable manner to the Owner.

END OF SECTION
SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes administrative and procedural requirements governing allowances.
   1. Certain materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following: NA

1.3 SELECTION AND PURCHASE
A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS
D. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

E. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.
3.2 PREPARATION
   A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES
   NA

END OF SECTION 012100

12300 ALTERNATES

PART 4 - GENERAL

4.1 RELATED DOCUMENTS
   A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

4.2 DEFINITION
   A. An Alternate is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.

4.3 COORDINATION
   A. Coordinate related Work and modify or adjust adjacent work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the project. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation which are reasonably inferable from the specifications and drawings describing the Alternate.

4.4 BID
   A. Indicate the amount of each alternate separately on the bid form. Indicate if the alternate amount is to be added to the base bid or deducted from the base bid. The alternate amount must include all costs related to the alternate such as, but not limited to, cost to coordinate related Work, subcontractor costs, taxes, and cost of bond.

4.5 NOTIFICATION
A. Immediately following the award of the Contract, prepare and distribute to each party involved, notification of the status of each Alternate. Indicate whether Alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to Alternates.

4.6 SCHEDULE OF ALTERNATES

A. Schedule of Alternates is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the Work described under each Alternate.

B. ALTERNATES

1. ADDITIVE ALTERNATE 1: LINEAR METAL CEILING
   
   1.1 Identify as Additive Alternate 1, the cost associated with deleting the exterior suspended gypsum board soffit shown in the drawings. Replace the suspended gypsum board soffit with Linear Metal Ceiling as specified at 09 54 23 and as shown on drawings.

2. ADDITIVE ALTERNATE 2: HORIZONTAL LOUVER BLINDS
   
   2.1 Identify as Additive Alternate 2, the cost associated with furnishing the Horizontal Louver Blinds as specified at 12 21 13 and as shown on drawings.

3. ADDITIVE ALTERNATE 3: METAL LOCKERS
   
   3.1 Identify as Additive Alternate 3, the cost associated with furnishing the Metal Lockers as specified at 10 51 13 and as shown on drawings.

4. ADDITIVE ALTERNATE 4: SHOP FABRICATED EXHAUST HOODS AND EXHAUST FANS
   
   4.1 Identify as Additive Alternate 4, the cost associated with furnishing the Shop Fabricated Fume Hoods and Exhaust Fans, complete with all duct work, roof hoods and associated work as specified at 23 34 23 and as shown on drawings.

5. ADDITIVE ALTERNATE 5: LED LIGHT FIXTURES
   
   5.1 To be issued by Addendum.

END OF SECTION 012300

012400 VALUE ANALYSIS

012413 VALUE ENGINEERING
A. Following execution of the contract, the Contractor is encouraged to develop, prepare, and submit value engineering change order proposals (VECOP’s). The Contractor shall share equally in any contract savings realized from accepted VECOP’s.

B. The Contractor shall include the following information in each VECOP:

   1. A description of the difference between the existing contract requirement and that proposed VECOP which includes 1) the requirements of Section 01 25 00.02, 2) the comparative advantages and disadvantages of each, and 3) a justification when an item’s function or characteristics are being altered.
   2. A separate, detailed cost estimate for (a) the affected portions of the original contract requirement and (b) the VECOP. The cost reduction associated with the VECOP shall take into account the Contractor’s overhead and profit.
   3. A statement of the time by which a contract modification accepting the VECOP must be issued in order to maximize cost reduction, and the effect, if any, on the Contract Time.

C. Submission, review, and acceptance or non-acceptance of VECOP’s shall be in accordance with standard change order proposal requirements. Change orders shall be issued for accepted VECOP’s, reducing the Contract Sum by one-half the amount(s) indicated on the VECOP(s).

END OF SECTION

SECTION
012500 SUBSTITUTION PROCEDURES

012500.01 AFTER AWARD

Within 10 days after the award of contract, formal requests will be considered for substitutions of products specified as a minimum standard. After the end of that period, substitution requests will be considered only if the specified product or system has gone out of production, or has been deemed illegal or dangerous subsequent to bidding.

012500.02 SUBMITTING SUBSTITUTION

Submit separate requests for each substitution per 01 33 00. Include, at a minimum, in each request:

A. Complete data substantiating compliance of proposed substitution with contract documents, include:

   1. Product identification, manufacturer’s name and address.
   2. Product specifications and data per 01 33 00.
   3. Samples per 01 33 00 if applicable.

B. Itemized comparison of proposed substitution with specified products, listing all variations, including size and weight.

C. Data relating to changes in the construction schedule.

D. Any effect on in-place construction or other materials and systems to be installed.

E. Cost data comparing proposed substitution with specified products.

F. Designation of availability of maintenance services and sources of replacement materials.

G. Advantages to the owner of accepting the substitutions.
012500.03 SUBSTITUTIONS NOT CONSIDERED

Substitutions will **not** be considered when:

A. They are indicated or implied on submittals without formal request.

B. Acceptance may require revision of contract documents, unless contractor agrees to compensate owner for Architect's additional service.

012500.04 SUBSTITUTE PRODUCT

Substitute products shall not be ordered or installed without written acceptance of Architect.

0125 00.05 SUBSTITUTION DATA

Based on the submitted data, the Architect will determine if the proposed substitution meets the requirements of the contract documents.

END OF SECTION

SECTION

012600 CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

0126 33 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, “Architect’s Supplemental Instructions.”

012646 CONSTRUCTION CHANGE DIRECTIVE


  1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

  1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

01 26 53 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of the proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

  1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the
proposed change.

2. Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

   a. Include a list of quantities of materials, supplies, and equipment (including cost of transportation, whether incorporated or consumed) required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

   b. Include applicable costs of premiums for all bonds and insurance, permit fees, taxes, delivery charges, equipment rental (exclusive of hand tools), and amounts of trade discounts required or eliminated.

   c. Include costs of labor and supervision directly attributable to the change, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers’ compensation insurance required or eliminated.

   d. Include an updated Contractor’s Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

   e. Comply with requirements in Division 1 Section “Product Requirements” if the proposed change requires substitution of one product or system for product or system specified.

   f. For deductive change order proposals, Contractor may add appropriate preparation costs.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect, properly itemized and supported by sufficient substantiating data to permit evaluation, plus a fee; such costs shall be itemized by crafts as defined within the schedule of values and limited to the following items directly attributable to the change in the Work:

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of materials, supplies, and equipment (including cost of transportation, whether incorporated or consumed) required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Include applicable costs of premiums for all bonds and insurance, permit fees, taxes, delivery charges, equipment rental (exclusive of hand tools), and amounts of trade discounts required or eliminated.

4. Include costs of labor and supervision directly attributable to the change, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers’ compensation insurance required or eliminated.

5. Include an updated Contractor’s Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Comply with requirements in Division 1 Section “Product Requirements” if the proposed change requires substitution of one product or system for product or system specified.

7. For deductive change order proposals, Contractor may add appropriate preparation costs.
01 26 57 CHANGE ORDER PROCEDURES

A. On Owner’s approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701. Change Orders may combine more than one Proposal Request.

END OF SECTION

SECTION

012900 APPLICATIONS FOR PAYMENT

01 29 00.01 PAYMENT APPLICATION

Applications for payment must be submitted, in triplicate, to the attention of the Architect for certification and processing. Applications for payment will normally be processed and a check ready within 14 days after receipt of the certified pay application by the Owner. Applications for payment which are not properly submitted will be delayed. Applications for payment mailed to Pima College Accounts Payable are **NOT** properly submitted.

01 29 00.02 PROGRESS PAYMENT PROCEDURES

Contractor shall provide the items listed below with each application for payment. Applications for payment which do not include these items will not be certified.

A. A copy of the Schedule of Values completed for the period of time covered by the application, including the percent of each task complete as shown on the updated project schedule. Use AIA document G703 certificate for payment continuation sheet. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of the Applications for Payment and progress reports. Correlate line items in the Schedule of Values with the Construction Schedule and sub-contractor list.

B. Updated project schedule per section 01 32 16 showing the actual progress for each task during the pay application period.

C. Invoices for materials stored on-site. Payment will not be made for materials stored off-site.

D. Lien Waivers: after the first pay application, the contractor shall submit with each pay application a partial lien release for the work and partial lien releases from each subcontractor and/or for each separate line item on the schedule of values, for the work equal to the amount approved on the last application for payment, less retainage.

E. As-built drawings for completed elements of the Work (indicated as 100% completed on G703).

F. Operation and maintenance manuals for fully-installed and operational equipment (indicated as 100% completed on G703).

012900.03 PROGRESS PAYMENT

Payments on account of this Contract will be made monthly as Work progresses. The Contractor shall submit to the Owner through the Architect, in the manner and form prescribed by the Owner, an application for each payment, and, if required, receipts or other vouchers showing its payments for materials suitably stored at the construction site.
and labor, including applications from and payments to Subcontractors.

012900.04 INVOICE DETAIL

Invoices shall include the following: Contractor’s invoice number; invoice date; official project title; current purchase order number and reference to any change orders for which payment is being requested; number of invoice pages; and dates covered by the invoice. Payment of invoices that do not contain the correct current purchase order may be delayed.

012900.05 RETENTION

Retention: All invoices shall provide a line item indicating retention of 10% of the dollar amount due at the time. Retention will be held until the end of the project. Final Payment of retention will not occur until all punchlist items are completed in a manner acceptable to the Owner.

012900.06 PROMPT PAY

The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor’s portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor’s portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

END OF SECTION

SECTION

013119 PROJECT MEETINGS:

013119.01 PRECONSTRUCTION MEETINGS

A pre-construction conference will be called by the Owner's Representative for the purpose of discussing execution of the work. The Contractor and any subcontractors whose presence is necessary or requested must attend.

013119.02 COORDINATION MEETINGS

Job site Coordination Meetings may be called by Owner as deemed necessary to coordinate, expedite, or schedule the work of this contract.

013119.03 PROGRESS MEETINGS

When construction/installation begins, weekly Progress Meetings will be held at the job site with the Owner’s representative, Architect’s representative, and Contractor’s Project Manager and Site Superintendent. The Contractor will report on the progress of the construction, review "as-built" conditions, provide an update on the schedules, and notify the Architect and/or Owner of any action required on their part prior to the next meeting.

END OF SECTION

SECTION

013200 CONSTRUCTION PROGRESS DOCUMENTATION:

013216 CONSTRUCTION SCHEDULE

A. Work schedule shall be coordinated with the Owner’s Representative.

PCC East Art Studios
NTD Architecture
NTD # 2013-0203-00

GENERAL REQUIREMENTS
Division 01 - 12
B. Prepare the construction schedule as follows:

1. The schedule shall be a Gantt (bar chart) with a horizontal time scale and activities listed vertically or a time scaled network diagram (CPM). Note on the schedule any assumptions made, including but not limited to, request for information (RFI) turnaround times.

2. At a minimum, no task on the schedule shall have duration greater than 15 (calendar) days. All activities shall include tasks for shop drawing review or other submittals, approvals, procurement, fabrication, delivery, installation, start-up and testing as required. The schedule shall clearly indicate the start and completion date of each activity.

C. The schedule shall anticipate the following number of days as normal adverse weather (rain) days: five (5). No extension of the Contract Time will be granted unless the actual adverse weather days exceed the cumulated normal adverse weather days for the duration of the Contract Time and the actual adverse weather days had an effect on the scheduled construction. The number of adverse weather days was determined by using the following number of average days with greater than one quarter (1/4) inch of rain in Tucson:

<table>
<thead>
<tr>
<th>Month</th>
<th>Weather Days</th>
<th>Month</th>
<th>Weather Days</th>
<th>Month</th>
<th>Weather Days</th>
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</thead>
<tbody>
<tr>
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<td>May</td>
<td>0</td>
<td>September</td>
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<td>April</td>
<td>0</td>
<td>August</td>
<td>2</td>
<td>December</td>
<td>2</td>
</tr>
</tbody>
</table>

D. If the architect determines that the start or completion of any activity on the schedule deviates from the schedule by more than seven days, the contractor shall revise and reissue the schedule within seven days of the determination that an activity has deviated by more than seven days.

E. A CPM schedule will be required to request an adjustment in the Contract Time.

END OF SECTION

SECTION
013300 SUBMITTAL PROCEDURES:

013300.01 START-UP SUBMITTALS

Start-up Submittals: Within 10 days after the award of the contract, submit:

A. Three (3) copies of schedule of values per Division 1, Section 01 29 00.02.

B. Three (3) copies of the shop drawing review schedule per Division 1, Section 01 33 23.

C. Three (3) copies of the construction schedule for the work per Division 1, Section 01 32 16.
D. A letter stating which individual within the Contractor’s organization is authorized to sign change orders on behalf of the Contractor.

E. No construction work shall be started and no progress payments made until the above are submitted and accepted.

013300.02 OTHER COMMUNICATIONS

A. Project Communications: Routine written communications between the contractor and the architect shall be in letter, field memo or fax format. Such communication shall not substitute for any other written requirement or submittal.

B. Request for Information (RFI): A request from the Contractor seeking an interpretation or a clarification of some requirement of the contract documents. The contractor shall clearly and concisely set forth the issue for which they seek clarification or interpretation and why a response is needed. The contractor shall, in the written request, set forth their interpretation or understanding of the contract’s requirements along with the reasons why they have reached such an understanding. Responses to the RFI will not change any requirements of the contract documents unless so noted in the Request for Information Response.

C. Drawing/Plan Clarification: An answer from the architect, in response to an inquiry from the contractor, intended to make some requirement(s) of the drawings or plans clearly understood. Drawing clarifications/plan clarifications may be sketches, drawings or in narrative form and will not change any requirements of the drawings or plans.

013300.03 MATERIAL SAFETY DATA SHEETS (MSDS)

A. Provide the Owner with MSDS for all material which may affect the Owner’s students or staff 10 days prior to delivery of material to the job site.

B. Contractor shall maintain binder at the job site with MSDS for all materials used in the work.

013323 SHOP DRAWINGS AND MANUFACTURER’S DATA

A. Review Times: the shop drawing review schedule shall include 10 working days for review of submittals by the architect. Revise shop drawing review schedule and resubmit when progress deviates from previous schedule by 7 days. The shop drawing review tasks must be included with the construction schedule. (See section 01 32 16)

B. Submit four (4) copies of shop drawings (owner will retain one set). Provide drawing scale large enough to clearly show all elements of the work. Show how adjacent work relates. Reference to sheet, detail and/or schedule.

C. Submit four (4) copies of manufacturer’s standard product data. Include reference standards and warranty information. Provide references to sheet, detail, schedule, and/or specification section. Show dimensions and clearances specific to the work.

D. Submittals without indication of Contractor’s review and approval will be returned without Architect’s review.

END OF SECTION
SECTION 014100 REGULATORY REQUIREMENTS:

014100.01 STANDARDS, CODES, AND LAWS:

A. Project shall be completed in accordance with federal, state, and local codes, laws, regulations, and rules that govern such operations, including fire codes.

B. Material and products are specified for their appropriateness in the completed work. The contractor is responsible for: Providing training and education to the Contractor's employees and obtaining and distributing information regarding the potential dangers and appropriate safety measures for material and products during the work as required by the Occupational Safety and Health Administration, Hazard Communication Standard and the State of Arizona.

014100.02 PERMITS AND LICENSES:

The Owner shall make all document submittals and secure all required permits, paying all fees in that regard. The Contractor shall arrange for inspections as required, and secure necessary approvals. [No City or County permits except dust control are required for College work.]

END OF SECTION

SECTION 015000 TEMPORARY FACILITIES AND CONTROLS:

SECTION 015100 TEMPORARY UTILITIES:

A. Prior to start of ANY trenching or excavation, Contractor shall employ a specialist to locate all utilities; including irrigation lines, in areas not under the jurisdiction of Bluestake, and shall include expense of such work in Bid. Contractor shall call for Bluestake, review As-Built drawings and other information supplied by the Owner, as well as information provided by utility location specialist, prior to submitting the initial Construction Schedule. Any down time for utilities that may be required due to the location of utility lines found, shall be shown on the initial Construction Schedule. See Section 01 32 16.

B. Owner will furnish temporary water and electricity from existing points of connection. Temporary extensions shall be the responsibility of the Contractor and shall be made and maintained in a safe and secure condition. Any meters, backflow preventers, or temporary use permits shall be the responsibility of the Contractor.

END OF SECTION

SECTION 015200 CONSTRUCTION FACILITIES:

015213 FIELD OFFICES AND SHEDS:

A. Field Office will not be required.

B. Contractor's superintendent shall have, as a minimum, a cellular telephone and shall provide the telephone number to the owner and architect.

015219 SANITARY FACILITIES:

A. The contractor shall not use College rest rooms for any construction purpose. Arrangements may be made to use existing toilet facilities for non-construction
purposes. Provide portable toilets for contractor personnel.

SECTION 015500 VEHICULAR ACCESS AND PARKING

015500.01 TEMPORARY ACCESS ROADS AND PARKING:

A. General Access to the site shall be coordinated with Facilities and Campus.

B. Parking arrangement for Contractor's crew to be made during pre-construction conference. Contractor will be responsible for restricting employees', sub-contractors' and suppliers' vehicles to the designated area.

SECTION 015600 TEMPORARY BARRIERS AND ENCLOSURES

015616 TEMPORARY DUST BARRIERS:

Controlling construction-related dust and preventing the spread of flying particles is the Contractor's responsibility. HVAC return air paths must be sealed to prevent dust and odors from spreading to occupied parts of the building.

015623 TEMPORARY BARRICADES AND WARNING SIGNS:

A. Contractor shall furnish, erect, and maintain barricades, barriers, and warning signs, etc., required for protection of persons and property in compliance with applicable statutes, **at a minimum a chain link fence enclosing construction area (from Campus) will be required.**

015636 TEMPORARY SECURITY ENCLOSURES:

A. **Contractor is responsible for:** providing appropriate safety and warning signs; securing materials stored on site to prevent theft; and securing the work in-place to prevent vandalism.

B. The contractor will be issued a set of keys for access to existing Owner facilities if required. The contractor will be responsible for loss or theft of keys issued and will be liable for the cost of re-keying all or a portion of the Owner’s existing facilities.

SECTION 016000 PRODUCT REQUIREMENTS

016000.01 PRODUCT OPTIONS

**ANY BRAND NAMES OR NAMES OF MANUFACTURERS LISTED IN THE CONTRACT DOCUMENTS ARE ONLY PROVIDED AS GUIDELINES FOR THE PURPOSE OF ESTABLISHING MINIMUM ACCEPTABLE STANDARDS, UNLESS SPECIFICALLY IDENTIFIED AS SOLE SOURCE ITEMS.**
SECTION 016500 PRODUCT DELIVERY REQUIREMENTS

016500.01 DELIVERY & STORAGE
A. Deliveries may be made directly to job site, however, it shall be the sole responsibility of the Contractor to receive, handle, and store such items in a safe and secure manner.
B. Materials required for this project shall be stored on-site at locations and in a manner mutually acceptable to Owner and Contractor. Store materials per the manufacturer's written instructions.

016500.02 MAINTENANCE OF IN-PLACE MATERIALS AND CONSTRUCTION
A. Provide maintenance per manufacturer's written instructions and recommendations, and industry recommendations until substantial completion.
B. Maintenance required elsewhere in the contract documents shall continue after substantial completion if specified.

016500.03 INSTALLATION INSTRUCTIONS
A. Materials and equipment incorporated into the work shall be installed or applied per the manufacturer's written instructions, specifications (including guide specifications), and recommendations; unless specifically modified by written instruction from the manufacturer. Submit any modifications to Architect as product data.

016500.04 ITEMS OF THE SAME KIND ARE TO BE BY THE SAME MANUFACTURER.

SECTION 017329 CUTTING AND PATCHING

017329.10 GENERAL

017329.11 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

017329.12 SUMMARY
A. This Section includes procedural requirements for cutting and patching.
B. Related Sections include the following:

1. Division 1 Section "Selective Demolition" for demolition of
selected portions of the building.

2. Divisions 2 through 48 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

017329.13 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

017329.14 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or those results in increased maintenance or decreased operational life or safety. Operating elements include the following:

1. Primary operational systems and equipment.
2. Fire-suppression systems.
3. Mechanical systems piping and ducts.
4. Control systems.
5. Communication systems.
6. Electrical wiring systems.

C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

017329.20 PRODUCTS

017329.21 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

SECTION

017329.30 EXECUTION

017329.31 EXAMINATION
A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.

   2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

017329.32 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

017329.33 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
   a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
   b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend from one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance.
   a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or re-hang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION
017700 CLOSEOUT PROCEDURES:

017700.01 INITIATE SUBSTANTIAL COMPLETION

Initiate Substantial Completion procedures a minimum of [15] days prior to the date for substantial completion.

01700.02 PRIOR TO SUBSTANTIAL COMPLETION
Prior to substantial completion complete the following

A. Contractor prepared punchlist of all incomplete items and corrections to be made.

B. Punchlist: When the Contractor considers that the Work is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected. By submitting a request for substantial completion inspection the Contractor thereby certifies that the Work, or the designated portion, is functionally ready for Occupancy by the Owner and that the remaining incomplete or defective work required by the Contract Documents shall be completed within 30 days. The Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on the list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents.

C. Schedule punchlist inspection with the Owner’s Representative in order to exhibit the completeness of the work. Owner’s Representative will not participate in an inspection unless a full punchlist is submitted 5 days prior to inspection.

D. Remove all temporary facilities and controls.

E. Complete final cleanup requirements, including touchup painting.

017700.03 PUNCHLIST:

A. If the Architect’s inspection discloses an item, whether or not included on the Contractor’s Punchlist, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct the item upon notification by the Architect to determine Substantial Completion. When the Work or designated portion is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish responsibilities of the Owner and Contractor for maintenance, damage to the Work, insurance, and the Final Punchlist and shall fix the time within which the Contractor shall finish all items on the Final Punchlist accompanying the Certificate. Satisfactory completion of all items on the Final Punchlist shall be final completion of the work. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion unless otherwise provided in the Certificate of Substantial Completion. The Project shall not be deemed substantially complete until the Certificate is issued.

B. Neither Final Payment nor any remaining retainage or substituted securities shall become due until the Contractor submits to the Owner:

1. an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work have been paid or otherwise satisfied,
2. consent of surety to final payment or release of substituted securities and other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract.

C. Acceptance of final payment by the Contractor, Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Invoice.

D. The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the contract documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The contractor shall bear costs of correcting such rejected work, including additional testing and inspections and compensation for the Architect’s
services and expenses made necessary thereby.
E. If the Contractor fails to correct nonconforming Work within a reasonable Time, the Owner may correct it. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and store the salvageable materials at the Contractor’s expense.

017700.04 RECORD DRAWINGS AS-BUILTS:
A. Maintain a clean, undamaged set of blue or black line white-prints of Contract Documents and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Tape or paste addenda, architect’s supplemental instructions, proposal requests and other information onto the appropriate sheet to provide a complete record of the work.
B. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
C. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings
D. Note related Change Order numbers where applicable.
E. Organize record Shop Drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set. Upon completion of the work, submit complete sets to the Architect.
F. Upon completion of the work, the Contractor shall deliver to the Architect these record drawings “as-builts”. These record drawing “as-builts” shall be transferred to electronic media by the owner.

017700.05 MAINTENANCE MANUALS:
Provide four (4) hard copies and one electronic copy (pdf) of the closeout submittals in three ring notebooks with section tabs, organized in CSI format:
A. Updated subcontractor list with names and phone numbers.
B. From each subcontractor and material and equipment supplier, provide the following:
   1. Guarantees and Two (2) year Warranties.
   2. Operation and Maintenance data, including:
      a. Emergency instructions
      b. Spare Parts list
      c. Wiring diagrams
      d. Recommended “turn around” cycles
      e. Inspection procedures
      f. Shop Drawings and Product Data
      g. Special inspection documentation
   3. Testing Reports.
017700.06 PRIOR TO FINAL PAYMENT

Prior to Final Payment complete the following:

A. Schedule a time with the Architect and Owner to inspect the work following the completion by the Contractor of the final punchlist.

B. Provide a letter documenting that the project has been completed in accordance with Contract Documents and Warranting materials and work.

B. Provide Operations and Maintenance instructions
   1. Maintenance Manuals
   2. Record Documents
   3. Cleaning
   4. Warranties and Bonds.

C. Certificate of occupancy. (If applicable)

D. Submit a final Liquidated Damages or Early Completion Bonus settlement statement.

017700.07 CLEANING:

A. Final Cleaning:
   1. Thoroughly clean the interior and exterior of the project areas, removing misplaced mastic, paint, and other finishes. Remove dust, dirt, and stains from new and existing materials.
   2. Sweep all exterior paving areas, remove debris and stains. Remove debris from landscaping areas. Rake and/or remove debris from all other areas affected by the work.

END OF SECTION

SECTION

017836 WARRANTIES:

017836.01 WARRANTY PERIOD

Unless noted otherwise as extended, standard warranty period shall be two (2) years from the date of Substantial Completion.

017836.02 EXCLUSIONS

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage.

017836.03 CONTRACTOR GUARANTEE
Neither the final payment nor any provision in the Contract Documents shall constitute an acceptance of the Work not done in accordance with the Contract Documents or relieve the Contractor or its sureties of liability with respect to any warranties or responsibility for faulty materials and workmanship. The Contractor guarantees that the Work will conform to the Contract Documents.

017836.04 FAILURE TO REMEDY DEFECTS

If the Contractor fails to remedy any defects or damage, the Owner may correct the Work or repair the damages, and the cost and expense incurred in such event shall be paid by or be recoverable from the Contractor or Surety, or offset against any amounts owing the Contractor.

017836.05 TIME OF WARRANTY SUBMISSION

Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

017836.06 WARRANTY SUBMISSION

Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

A. Bind warranties and bonds in 3-ring, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 ½ x 11.
B. Provide dividers with plastic-covered tabs for each separate warranty. Mark tab to identify product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address and telephone number of the installer.
C. Identify each binder on the front and spine with the typed or printed title “WARRANTIES,” Project name, and name of Contractor.

017836.07 ADDITIONAL COPIES

Provide additional copies of each warranty to include in operation and maintenance manuals.

END OF SECTION

SECTION
018930 SELECTIVE DEMOLITION

018930.10 GENERAL

018930.11 SUMMARY

A. This Section includes the following:
1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.

018930.12 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 Salvage: Detach items from existing construction and
deliver them to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. 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.

018930.13 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

018930.14 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. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. 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.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

018930.20 PRODUCTS (Not Used)

018930.30 EXECUTION

018930.31 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate
and measure the nature and extent of conflict. Promptly submit a written report to Architect.

018930.32 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.

2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

018930.33 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.

018930.34 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

5. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

018930.35 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner’s property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

B. Disposal: Transport demolished materials off Owner’s property and legally dispose of them.

018930.36 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 018930
END OF DIVISION 1
SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.

1.3 INFORMATIONAL SUBMITTALS

A. Material certificates.

B. Material test reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.5 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1.

1. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M).
PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
   1. ACI 301 (ACI 301M).
   2. ACI 117 (ACI 117M).

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.
C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.4 CONCRETE MATERIALS

A. Cementitious Materials:
   1. Portland Cement: ASTM C 150/C 150M, Type I/II.
   2. Fly Ash: ASTM C 618, Class F.
B. Normal-Weight Aggregates: ASTM C 33/C 33M, graded.
   1. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.
   2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
C. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A, except with maximum perm rating of 0.01. Include manufacturer’s recommended adhesive or pressure-sensitive tape.
   1. Stego Industries, LLC (15 mil).
   2. Raven Industries (15 mil).

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
   1. BASF Construction Materials
   2. Dayton superior
   3. L&M Construction Chemicals, Inc.
   4. The Euclid Company, an RPM Company

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, non-dissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.7 RELATED MATERIALS


2.8 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 (ACI 301M).

B. Admixtures: Use admixtures according to manufacturer’s written instructions.
   1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
2.9 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Normal-Weight Concrete:

1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.

3. Slump Limit: 4 inches (100 mm), 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).

B. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
3.4 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI’s "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-third of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).

3.7 FINISHING FORMED SURFACES

A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated, exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.

2. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm).

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 (ACI 301M) for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
3.11 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION
1. **PART 1 - GENERAL**

1.1. **SECTION INCLUDE**

1.1.1. Miscellaneous fabricated ferrous metal items, galvanized, plated, and prime painted.

1.1.2. Miscellaneous fabricated structural connectors and clips

1.1.3. Fabricated fences and gates

1.2. **PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION**

1.2.1. Section 03 30 10 - Cast-In-Place Concrete.

1.3. **REFERENCES**

1.3.1. ASTM A36 - Structural Steel.

1.3.2. ASTM A53 - Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless.

1.3.3. ASTM A123 - Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.

1.3.4. ASTM A283 – Low and Intermediate Tensile Strength Carbon Steel Plates.

1.3.5. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

1.3.6. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

1.3.7. ASTM A 653, Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron-Alloy Coated (Galvannealed) by the Hot-Dip Process.

1.3.8. AWS A2.0 - Standard Welding Symbols.

1.3.9. AWS D1.1 - Structural Welding Code.

1.3.10. SSPC - Steel Structures Painting Council.

1.4. **SUBMITTALS**

1.4.1. Submit under provisions of Section 01 33 00.

1.4.2. Product Data: Provide data on material, finishes and attachment.

1.4.3. Manufacturer's Installation Instructions: Submit criteria for preparation and application.
1.4.4. Samples: Accompanying materials list, submit three samples of each fence type, showing panel connection to post. Grind and seal all edges.

1.4.5. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1.4.5.1. Ornamental fence gate manufacturer shall be responsible for gate hinge engineering and anchorage. Provide shop drawings and calculations for gate assemblies.


1.5. QUALITY ASSURANCE

1.5.1. Manufacturer: Manufacturer shall have produced the specified system or products for a period of one (1) year prior to beginning work of this section, and shall have the capability to produce the specified products to the delivery and quantity criteria of the project.

1.5.2. Staff:

1.5.2.1. Use only personnel who are thoroughly trained and experienced in the skills required and have installed similar applications of the specified products within one year prior to beginning work of this section.

1.5.2.2. Use only staff who are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

1.5.3. Welders' Certificates: Submit under provisions of Section 01 33 00, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.6. FIELD MEASUREMENTS

1.6.1. Verify that field measurements are as indicated on shop drawings.

******************************************************************************
** ****BUILD WARRANTY AND GUARANTY CRITERIA APPROPRIATE TO THE PROJECT**
******************************************************************************

1.7. WARRANTY AND GUARANTEE

1.7.1. Manufacturers Warranty:

1.7.1.1. Provide, in Architect approved form, the Owner with manufacturers standard warranty against coating and fence system failure.
1.7.2. Contractors Guarantee:

1.7.2.1. Provide, in Architect approved form, the Owner with a guarantee against the following specific defects or failures for a period of three (3) years after Notice of Substantial Completion:

1.7.2.1.1. Panel failure not resulting from anchorage and attachments.

1.7.2.1.2. Rusting and coating failure resulting from field installation.

1.7.2.1.3. Settlement and alignment resulting from footing embedment and earthwork failure.

2. PART 2 – PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2. MATERIALS


2.2.2. Plates and Bars: ASTM A283, Grade D or approved equal.

2.2.3. Fabricated Fencing and Gate Pickets: Steel, shape as shown on drawings, solid stock, per ASTM A 322, finished in accordance with ASTM A 108 or approved equal.

2.2.4. Pipe: ASTM A53, Grade B Schedule 40, (pressure test not required), unless noted otherwise.

2.2.5. Tube: ASTM A 500, Grade B.

2.2.6. Sheet Steel: ASTM A 653, gage and profile indicated, galvanized to G90 finish in accordance with ASTM A 653.


2.2.8. Welding Materials: AWS D1.1; type required for materials being welded.

2.2.9. Shop and Touch-Up Primer: VOC approved primer.

2.2.9.1. Primer VOC to comply with Section 01 35 44 LEED Requirements.

2.2.10. Touch-Up Primer for Galvanized Surfaces: Zinc rich Type.

2.2.11. Copper: ASTM B370, temper H00 (cold rolled) or 060 (soft), 16 ounce unless noted otherwise.
2.2.12. Solder: 50% pig lead and 50% block tin.

2.2.13. Flux: Rosin, muriatic acid neutralized with zinc or an approved soldering paste.

2.2.14. Fastening Devices for Copper: Hard copper, brass or bronze. Screws shall be round headed with lead washers.

2.3. FABRICATION

2.3.1. Fit and shop assemble in each item in largest practical sections, for delivery to site.

2.3.2. Fabricate items with joints tightly fitted and secured.

2.3.3. Continuously seal joined members by continuous welds.

2.3.4. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

2.3.5. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

2.3.6. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3.7. Fabricate radiused components by cold-rolled process, using equipment and techniques resulting in crimp free surfaces. Verify component wall thickness is suitable for rolling without flattening or crimping.

2.3.8. In addition to above criteria, fabricate railing, trellis and fencing components for exposed architectural appearance conditions.

2.3.8.1. Remove all weld splatter, grind and sand all weld joints uniformly smooth, without visible scratches, gouges, or patch marks. Conform to Finish #2 of National Ornamental and Miscellaneous Metals Association “Joint Finish Guidelines.”

2.3.8.2. All visible welds shall be continuous; bead or spot welding not acceptable.

2.3.8.3. Provide tube closures at all tube and pipe components.

2.3.8.4. Grind edges of all bent and fabricated components smooth to a 1/4 inch radius.

2.4. FINISHES

2.4.1. Galvanize all exterior components, after fabrication, in accordance with ASTM A123 or A386. Provide minimum 2.00 oz/sq ft galvanized coating. Fill vent holes after galvanizing.
2.4.1.1. Where steel is designated as painted in finished project, do not water quench or apply chromate conversion coatings as a part of the galvanizing process. Contractor shall notify steel galvanizing fabricator of all steel designated as painted.

2.4.2. Prime paint interior items with one coat rust inhibitive VOC approved primer compatible with finish specified in Section 09 91 00.

2.4.2.1. Prepare surfaces to be primed in accordance with SSPC SP 2.

2.4.2.2. Do not prime surfaces in direct contact with concrete or where field welding is required.

2.5. MISCELLANEOUS METAL FABRICATIONS AND ACCESSORIES

2.5.1. Unistrut: Provide Unistrut assemblies as shown on drawings.

2.6. STEEL ORNAMENTAL FENCE SYSTEM -


2.6.2. Series: Montage II ATF Welded Ornamental Steel, MATCH EXISTING.

2.6.3. Material:

2.6.3.1. Fence Panels and posts: Steel, complying with ASTM A 653, with a minimum yield strength of 45,000 psi and a minimum zinc (hot-dip galvanized) coating weight of 0.90 oz/ft2, Coating Designation G-90.

2.6.3.2. Picket and rail assembly: Provide 3/4 inch square x 14 Gage tubing at pickets, with steel channel rails, 1.5 inch x 1.5 inch x 0.105 inch thickness. Picket holes in the rail shall match existing.

2.6.3.3. Fence posts and gate posts: Provide posts complying with minimum size requirements of Table 1.
## Table 1 – Minimum Sizes for Montage II Posts

<table>
<thead>
<tr>
<th>Fence Posts</th>
<th>Panel Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1/2 inch x 12 Ga.</td>
<td>Up to and Including 6 foot Height</td>
</tr>
<tr>
<td>3 inch x 12 Ga.</td>
<td>Over 6 foot, Up to and Including 8 foot Height</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gate Leaf</th>
<th>Gate Height</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to and Including 4 foot</td>
</tr>
<tr>
<td>Up to 4 foot</td>
<td>2-1/2 inch x 12 Gage.</td>
</tr>
<tr>
<td>4 foot 1 inch to 6 foot</td>
<td>3 inch x 12 Gage.</td>
</tr>
<tr>
<td>6 foot 1 inch to 8 foot</td>
<td>3 inch x 12 Gage.</td>
</tr>
<tr>
<td>8 foot 1 inch to 10 foot</td>
<td>4 inch x 11 Gage.</td>
</tr>
<tr>
<td>10 foot 1 inch to 12 foot</td>
<td>4 inch x 11 Gage.</td>
</tr>
<tr>
<td>12 foot 1 inch to 14 foot</td>
<td>4 inch x 11 Gage.</td>
</tr>
<tr>
<td>14 foot 1 inch to 16 foot</td>
<td>6 inch x 3/16 inch</td>
</tr>
</tbody>
</table>

### 2.6.4. Swing Gates:

#### 2.6.4.1. Components:

Components: Provide 1.75 inch x 14 gage Forerunner double channel rail, 2 inch square x 11 gage gate ends, and 1 inch square x 14 gage pickets.

#### 2.6.4.2. Provide:

Provide 1.75 inch sq. x 14 ga. intermediate upright at gates 6 foot and greater in width.

#### 2.6.4.3. Provide:

Provide cable kit at all gates leaves over 6 foot.

### 2.6.5. Fence Panel Fabrication:

#### 2.6.5.1. Pre-cut:

Pre-cut pickets, rails and posts cut to specified lengths. Pre-punch rails to accept pickets.

#### 2.6.5.2. Insert:

Insert and accurately align pickets into the pre-punched holes.

#### 2.6.5.3. Weld:

Weld pickets and rails at each picket-to-rail intersection, producing seamless and spatter-free appearance.

#### 2.6.5.4. Finish:

Finish: Provide multi-stage zinc-phosphate pretreatment/wash, followed by a duplex application of epoxy primer and acrylic topcoat.

#### 2.6.5.4.1. Coating Thickness:

Coating Thickness: Minimum 2 mils (0.058 mm).

#### 2.6.5.4.2. Color:

Color: Match Existing
2.6.5.4. Performance: Comply with minimum coating performance criteria of ASTM F 2408.

2.6.5.5. Load capability: Comply with vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F 2408.

2.6.5.6. Swing Gate Fabrication:

2.6.5.6.1. Weld all rail and upright intersections, as well as all picket and rail intersections.

2.6.5.6.2. Weld gusset plates at each upright to rail intersection.

2.6.5.6.3. Weld end clips to frame at all cable kits.

2.6.5.6.4. Provide stop on strike side of gate preventing gate from swinging in direction opposite of exit path.

2.6.5.6.5. Mount hardware at minimum 30 inches, maximum 44 inches above grade.

2.6.5.6.6. Pedestrian egress gates on the path of travel shall be readily openable without the use of a key or special knowledge or effort.

2.6.5.6.7. Provide manufacturer’s accessible gate hardware. Provide spring hinges as required for gate to be self-closing, push plate, pull, and keyed deadbolt lock that can be locked/unlocked from either side. Handles, pulls, latches, locks, and other operating devices, where required to be accessible, shall not require tight grasping, tight pinching or twisting of the wrist to operate in compliance with the provisions of IBC Section 11 Door Operations.

2.6.5.6.8. Gates used as a component in a means of egress shall conform to the applicable requirements for doors per IBC Section 1008.2 Gates.

2.6.5.6.9. Kick Panel: Provide steel plate full width of pedestrian swing gate on each side, 10 inches high x 1/4 inch thick, welded to gate pickets. Ease all edges.

2.7. OTHER MATERIALS

2.7.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the Contractor and subject to the approval of the Architect.
3. **PART 3 - EXECUTION**

3.1. **SURFACE CONDITIONS**

3.1.1. **Inspection**

3.1.1.1. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. **PREPARATION**

3.2.1. Clean and strip primed steel items to bare metal where site welding is required.

3.2.2. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.

3.3. **INSTALLATION**

3.3.1. Install items plumb and level, accurately fitted, free from distortion or defects.

3.3.2. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

3.3.3. Perform field welding in accordance with AWS D1.1.

3.3.4. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.3.4.1. Use primer as specified in above for interior steel fabrications.

3.3.4.2. Use Galvalloy galvanizing coating in accordance with manufacturer’s instructions for exterior steel fabrications.

3.3.5. Install all railing and guardrail in accordance with applicable codes and regulations. Maintain all required clearances and dimensions, including the following:

3.3.5.1. Maintain continuous 1-1/2 inch clear dimension between handrail and adjacent wall.

3.3.5.2. Maintain railing, guardrail, and adjacent surface configuration so that a sphere 4 inches in diameter cannot pass through any opening or gap created.
3.3.5.3. Do not permit railing fabrication and installation to extend into required exit dimension at stairway.

3.4. INSTALLATION OF ORNAMENTAL FENCE SYSTEM

3.4.1. Fence Installation:

3.4.1.1. Space posts in compliance with Table 3, plus or minus 1/2 inch, measured along the line/slope of the grade.

3.4.1.2. Anchor panels to posts with manufacturer provided brackets.

3.4.1.3. Set posts in concrete footings, minimum depth of 36 inches, in accordance with Section 03 30 10.

TABLE 3

<table>
<thead>
<tr>
<th>Span</th>
<th>Post Size 2-1/2&quot;</th>
<th>3&quot;</th>
<th>2-1/2&quot;</th>
<th>3&quot;</th>
<th>2-1/2&quot;</th>
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</thead>
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<tr>
<td>Bracket Type</td>
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<td>Industrial Universal (BB303)</td>
<td>Industrial Flat Mount (BB301)</td>
<td>Industrial Swivel (BB304)*</td>
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<td></td>
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<tr>
<td></td>
<td>96&quot;</td>
<td>96-1/2&quot;</td>
<td>96&quot;</td>
<td>96-1/2&quot;</td>
<td>&quot;96&quot;</td>
<td>&quot;96-1/2&quot;</td>
</tr>
</tbody>
</table>

3.4.2. Coating Repair

3.4.2.1. Seal penetrations of factory finish.

3.4.2.2. Remove all metal shavings from cut area

3.4.2.3. Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole

3.4.2.4. Apply 2 coats of manufacturers custom finish paint matching fence color.

3.4.3. Swing Gate Installation:

3.4.3.1. Install gate posts based on manufacturers’ shop drawings.

3.4.3.2. Install gate hinge type, number and capacity as engineered by gate manufacturer and as shown on manufacturers shop drawings.

3.5. ERECTION TOLERANCES

3.5.1. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

3.5.2. Maximum Offset From True Alignment: 1/4 inch.

3.6. SCHEDULED FABRICATION

3.6.1. The following is a list of principal items only. Refer to Drawing details for items not specifically scheduled.
3.6.2. Railing, fencing: Fabricate as shown on drawings, with steel mounting brackets and attachments; prime paint at interior locations; galvanized finish for exterior locations.

3.6.3. Miscellaneous Anchorages: Anchor bolts, machine bolts, eye bolts, dowels, threaded rods, plates, inters, and other fastenings to be installed in concrete or masonry; provide as detailed or indicated.

END OF SECTION
SECTION 06 41 00
ARCHITECTURAL WOOD CASEWORK

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Custom fabricated cabinet units.

1.1.2. Cabinet preparation for utilities.

1.2. REFERENCES


1.2.5. ASTM E 84- Surface Burning Characteristics of Building Materials.

1.2.6. National Electrical Manufacturers Association (NEMA) LD.3 High Pressure Decorative Laminates.

1.3. SUBMITTALS

1.3.1. Provide submittals under provisions of Section 01 33 00.

1.3.2. Product and Material Data

1.3.2.1. Include materials, component profiles, fastening methods, assembly methods, joint details, accessory listings, and schedule of finishes. Include seaming plan of all countertop materials.

1.3.2.2. Provide written certification of current approval of fabrication and anchorage method where deviation from contract documents is proposed.

1.3.2.3. Submit written certification of compliance with specified particleboard or fiberboard product criteria.

1.3.3. Provide Woodwork Institute (AWS) Certified Compliance documents as specified.

1.3.3.1. Provide AWS Certified Compliance label on shop drawings.

1.3.3.2. Provide AWS Certified Compliance Certificate prior to delivery to job site.
1.3.3. Provide AWS Certified Compliance Label on all casework and countertops.

1.3.4. After completion, issue written certification, on Contractors letterhead, and signed by Contractor and casework subcontractor, that all that casework materials, fabrication and installation fully meet all the requirements of the AWS Grade specified.

1.3.5. Samples:

1.3.5.1. Prior to fabricating mock-up, provide complete color chip/sample ring of laminated plastic, PVC edging and prefinished panel colors for Architects color selection.

1.3.5.2. Prior to fabricating mock-up, provide hinge, handle and lock samples for Architects review.

1.3.5.3. Incorporate all selections in mock-up.

1.4. QUALITY ASSURANCE

1.4.1. The Owner reserves the right to obtain an AWS inspection of completed casework installation.

1.4.1.1. Where such inspection determines the installed casework is not in compliance with specified standards, correct or replace as directed by Architect at no additional cost to Owner.

1.4.1.2. In the event the installed casework is not in compliance with specified standards, payment for inspection cost will be backcharged to the Contractor.

1.4.2. After completion, issue written certification, on Contractors letterhead, and signed by Contractor and casework subcontractor, that all that casework materials, fabrication and installation fully meet all the requirements of the AWS Grade specified.

1.4.3. Perform work in accordance with AWS Architectural Woodwork Standards (AWS), Section 10 Casework, Section 11 Countertops, and as required by this Section.

1.4.3.1. Where more restrictive than referenced standards, comply with requirements of this Section.

1.4.4. Issue a AWS Certified Compliance Certificate prior to delivery certifying that products fully meet all the requirements of the AWS Grade specified.

1.4.5. After completion, issue a AWS Certified Compliance Certificate for Installation certifying that products fully meet all the requirements of the AWS Grade specified.

1.5. MOCKUP

1.5.1. Prepare mockup under provisions of Section 01 45 00.

1.5.2. Provide full size base cabinet, upper cabinet, and each counter type indicated, in specified finish with hardware installed.
1.5.3. Units will be examined to ascertain quality and conformity to AWS standards.
1.5.4. Units will establish a minimum standard of quality for this work.
1.5.5. Approved units may be used as part of the Work.

1.6. DELIVERY, STORAGE, AND HANDLING

1.6.1. Deliver work in this section only at such time as the work is ready and suitable for installation.
1.6.2. Comply with requirements of AWS Section 2 requirements for care and storage of millwork.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2. PLASTIC COVERED CASEWORK

2.2.1. Type: Flush Overlay, Style A Frameless

2.2.1.1. Provide casework conforming to AWS Premium grade, modified as specified in this Section, and in accordance with approved fabrication methods.

2.2.2. Construction Type: Type I

2.2.3. Construction:

2.2.3.1. Casework Cores: Provide SierraPine Medite II or equal, phone (503)-773-2522, Medium Density Fiberboard (MDF), Type MD, per ANSI A 208.2, latest edition and NEMA LD3-85.

2.2.3.2. Cabinet Door Cores: Provide SierraPine Medite II or equal, phone (503)-773-2522, Medium Density Fiberboard (MDF), Type MD, per ANSI A 208.2, latest edition and NEMA LD3-85.

2.2.3.2.1. Provide Scientific Certification Systems certification that product is manufactured from 100 percent recovered and recycled wood fiber content and contains no added formaldehyde.

2.2.3.3. Drawer bottoms, sides, backs, and sub-fronts: MDF as specified in this Section.

2.2.3.4. Casework Cores: Particleboard, Grade 1-M-2 per ANSI A 208.1.
2.2.3.4.1. Comply with formaldehyde emission limit of 0.3 ppm at 0.13 SF/CF loading ratio per NPA 9-87.

2.2.3.5. Casework Core Visible Edges: Unless noted otherwise, high pressure laminate, minimum 0.028 inches thickness, color to match laminated plastic.

2.2.3.6. Shelving: Provide MDF core as specified in this Section, 3/4 inch thick minimum, thickness as required for 50 pound per square foot loading per AWS Section 10 and AWS Appendix B.

2.2.3.6.1. Provide 1 inch thick shelving at all spans in excess of 36 inches.

2.2.3.7. Hardboard: ANSI/AHA A135.4-82, oil tempered both sides.

2.2.3.8. Countertop Cores: Provide SierraPine Medex or equal, phone (503)-773-2522, Medium Density Fiberboard (MDF), Type MD - Exterior, per ANSI A 208.2, latest edition and NEMA LD3-85, 3/4 inch thick minimum, formed as shown on drawings for specific edge.

2.2.3.8.1. Provide Scientific Certification Systems certification that product is manufactured from 100 percent recovered and recycled wood fiber content and contains no added formaldehyde.

2.2.3.9. Casework core air quality regulation compliance: Comply with CARB ATCM Rule 93120, Phase I and Phase II emission levels limiting formaldehyde emissions from all MDF composite cores.

2.2.4. Surface Finish Criteria:

2.2.4.1. Exposed portions: Finish exposed portions with high pressure laminate as specified in this Section. For purposes of this specification, definition of exposed portions requiring high pressure laminate includes:

2.2.4.1.1. Interior surfaces of knee space or recesses provided for movable equipment.

2.2.4.1.2. Tops of cabinets with more than 18 inches clear between ceiling and cabinet.

2.2.4.1.3. Bottoms of all wall hung cabinets

2.2.4.1.4. All cabinet door surfaces, including edges.

2.2.4.1.5. Exposed exterior surface of all cabinet backs.

2.2.4.1.6. All fixed and adjustable shelving surfaces, including all 4 edges.
2.2.4.2. All door and drawer edges, and all fixed and adjustable shelving edges: Provide 3 mm PVC edging, hot adhesive bonded, color as selected by Architect at all door and drawer edges. Provide 1 mm PVC edging at shelving, including all 4 edges of adjustable shelving.

2.2.4.3. Semi-exposed Portions - As specified in this section.

2.2.4.4. Concealed Portions: As defined in AWS Section 10, as modified in this section.

2.2.4.5. Filler panels: Provide filler panels as required to accommodate door and drawer function and allow for scribing cabinet to adjoining surfaces. Unless noted otherwise, provide 2 inch dimension at wall conditions, and 4 inch dimension at inside, cabinet to cabinet corner conditions.

2.2.4.6. Glass Panels and Doors: Clear tempered glass per Section 08 81 00, with eased edges at sliding panels.

2.3. PLASTIC LAMINATE AND FINISH MATERIALS

2.3.1. High Pressure Laminated Plastic:

2.3.1.1. Manufacturer: Provide manufacturer as specified for color. If alternate manufacturer is proposed, Architect shall be sole judge if color and finish are acceptable.

2.3.1.2. Manufacturer: Provide WilsonArt or equal.

2.3.1.3. High Pressure Laminated Plastic Series/Type: Provide grades as follows:

2.3.1.3.1. Provide Type HGS per NEMA LD-3, 0.048 inches, at vertical surfaces designated to receive high pressure laminated plastic.

2.3.1.3.2. Provide Type HGS per NEMA LD-3, 0.048 inches, at horizontal surfaces designated to receive high pressure laminated plastic, including shelving.

2.3.1.4. High Pressure Laminated Plastic Countertop:

2.3.1.4.1. Abrasion Resistant Countertop: Provide Type HGS at all laminated plastic countertop and splash assemblies, unless otherwise specified. Provide Type HGP at postformed designs.

2.3.2. Low Pressure Finishes for semi-exposed surfaces:

2.3.2.1. Unless specified otherwise, provide AWS listed low pressure thermosetting coating.

2.3.3. Backing Sheet: AWS Listed material.

2.3.4. Color/Finish:
2.3.4.1. PL 1: To be selected by architect
2.3.4.2. PL 2: To be selected by architect
2.3.4.3. Semi-Exposed Surfaces: maximum of one color will be selected by
Architect from full color and finish line for semi-exposed surfaces with
low pressure finish.

2.4. ACCESSORIES

2.4.1. Adhesive: Water based type recommended by laminate manufacturer to suit
application. Solvent based contact and urea resin adhesives are not permitted.

2.4.2. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application;
stainless steel or cadmium plated steel.

2.4.3. Sleepers and toe kicks: Douglas fir, pressure treated when in direct contact with
concrete slab-on-grade.

2.4.4. Uses not otherwise specified: Hardwood or softwood; grade in accordance with
Section 3 and 4, AWS as required for use.

2.5. HARDWARE

2.5.1. Provide in accordance with Resource Guide Appendix to AWS except as noted
below.

2.5.2. Provide Hettich HT 1-005-767 shelf support and lateral restraint pin, with HT1 – 005
– 082 vertical securing stud.

2.5.3. Drawer and Door Pulls: Trimco or equal, loop handle, 4 inch center to center, No.
562-4 inches x US 26D.

2.5.4. Hinges: Provide Hafele Aximat 300 Series, BHMA Grade 1, color as selected by
Architect from complete line.

2.5.5. Drawer Guides: Unless noted otherwise, provide Accuride Full Extension Model 4034
at drawers less than 24 inches wide, Model 4032 at drawers 24 inches and wider.

2.5.5.1. Bottom Drawers: Provide Accuride Full Extension Model 3640 at all
bottom drawers.

2.5.6. Locks:

2.5.6.1. Manufacturer: CompX/National, www.compx.com or equal.

2.5.6.2. Type: Provide specified design, with front loaded removable cylinder
permitting rekeying without total lock disassembly.

2.5.6.2.1. Drawer and door Lock Series: C 8178 series, deadbolt
pin tumbler design, suitable for Owners standard cabinet
keyway, with bar strike. Comply with ANSI A156.11
Grade 1 cycle testing criteria.
2.5.6.2.2. Cam Lock Series: C 8102 series, with retainer staple.

2.5.6.3. Finish: US 26D.

2.5.6.4. Keying: Key to Owners standard cabinet keyway. Key alike all locks within each room, and key each room differently.

2.5.6.5. Accessory: Provide Ives IV2A or equal elbow catch at inactive cabinet door leaf.

2.5.7. Magnetic catches: Provide magnetic catches at all cabinet doors, with maximum 5 pounds holding power.

2.6. FABRICATION

2.6.1. Construct casework conforming to AWS Premium grade, modified as specified in this Section.

2.6.1.1. Provide white bumpers.

2.6.1.2. Provide white anchor screw covers/caps.

2.6.1.3. Provide corbels matching countertop material as necessary to support counter screens.

2.6.1.4. Fabricate all drawers full depth of cabinet.

2.6.1.9. Provide cabinet locks at the following locations:

2.6.1.9.1. As shown on drawings.

2.6.2. Shop assemble casework for delivery to site. Do not glue any materials on site without prior approval.

2.6.3. Fit shelves, doors, drawer fronts, and other exposed edges with matching materials. Use full length pieces only. Provide edging at all edges of adjustable shelves.

2.6.3.1. Where laminated plastic is used with a pattern or design, such as wood grains, vertically match and align pattern across face of door and drawer fronts.

2.6.4. Plough drawer bottoms into sides, fronts, or sub fronts, and backs. Surface attachment of bottoms is not acceptable.

2.6.5. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Prime paint or seal contact surfaces of cut edges.

2.6.6. Install door and drawer handle horizontally, spaced as shown on drawings. Do not center drawer handles in drawer face. Space same distance from top edge of drawer as at doors.
2.7. OTHER MATERIALS

2.7.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify adequacy of backing and support framing.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. INSTALLATION

3.2.1. Set and secure casework in accordance with AWS Premium Grade. Provide AWS Certified Compliance Certificate for Installation.

3.2.2. Install separate anchor strips behind cabinet back. Cabinet back shall not be used for anchorage.

3.2.2.1. Unless shown otherwise on drawings, provide one anchor strip top and bottom for wall hung cabinets and base cabinets less than four feet high. Provide three strips for base cabinets over four feet high.

3.2.2.2. Secure anchor strips in compliance with load resistance criteria defined in this Section.

3.2.3. Scribe cabinets in accordance with AWS standards, Premium Grade, except that use of cellulose sponge is not acceptable.

3.2.4. Screw each shelf support clip to each adjustable shelf.

3.3. ADJUSTING AND CLEANING

3.3.1. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.

3.3.1.1. Adjust doors with mechanical and magnetic catches to limit opening force to maximum 5 pounds force.
3.3.2. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF SECTION
SECTION 07 21 00
THERMAL AND ACOUSTICAL INSULATION

1. PART 1 - GENERAL
1.1. SECTION INCLUDES
1.1.1. Batt acoustical insulation for interior wall and ceiling construction.
1.1.2. Batt thermal insulation for exterior ceiling construction.

1.2. REFERENCES
1.2.1. ASTM C 177 - Standard Test Method For Steady-State Heat Flux Measurements And Thermal Transmission Properties By Means Of The Guarded-Hot-Plate Apparatus
1.2.2. ASTM C 518 - Standard Test Method For Steady-State Thermal Transmission Properties By Means Of The Heat Flow Meter Apparatus
1.2.3. ASTM C 578 - Standard Specification For Rigid, Cellular Polystyrene Thermal Insulation
1.2.4. ASTM C 612 - Standard Specification For Mineral Fiber Block And Board Thermal Insulation.
1.2.5. ASTM C 665 - Standard Specification For Mineral-Fiber Blanket Thermal Insulation For Light Frame Construction And Manufactured Housing.
1.2.6. ASTM E 84 - Standard Test Method For Surface Burning Characteristics Of Building Materials

1.3. SUBMITTALS
1.3.1. Materials List:
1.3.1.1. Submit materials list in accordance with Section 01 33 00.
1.3.1.2. Prepare complete materials list identifying specific insulation types and applications.
1.3.1.3. Provide agency approval documentation, including ICBO ES reports, State Fire Marshal Listing, or other approvals.

1.4. REGULATORY REQUIREMENTS
1.4.1. Comply with IBC, Chapter 7, fire resistivity ratings.

1.5. DELIVERY, STORAGE, AND HANDLING
1.5.1. Protection:
1.5.1.1. Deliver, store and handle all products in a manner to prevent damage and deterioration.

1.5.1.2. Use all means necessary to protect the installed work and materials of all other trades.

1.5.1.3. Deliver all materials in unopened bundles, labeled with date of manufacturer and testing agency approval.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. The Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2. ACOUSTICAL INSULATION: BATT

2.2.1. Manufacturer: Manville, www.jm.com, or equal.

2.2.2. Type: Glass fiber batt, friction fit, unfaced.

2.2.3. Construction:

2.2.3.1. Blanket: Glass Fiber, Type 1 per ASTM C 665

2.2.3.1.1. Provide formaldehyde free insulation with acrylic binder.

2.2.3.1.2. Provide minimum 25 percent total recycled content, with minimum 18 percent post-consumer recycled content.

2.2.3.2. Facing: None.

2.2.3.3. Thickness: 4 inch.

2.2.4. Fire/Habitability Criteria:

2.2.4.1. Flame Spread Classification: Maximum 25 per ASTM E 84

2.2.4.2. Smoke Developed Classification: Maximum of 50 per ASTM E 84

2.2.4.3. Thermal Resistance: Minimum R-11 per ASTM C 177 or C 518.

2.3. THERMAL INSULATION: ROOF ASSEMBLY

2.3.1. Manufacturer: Manville, www.jm.com, or equal.

2.3.2. Type: Glass fiber batt, faced.

2.3.3. Construction:

2.3.3.1. Blanket: Glass Fiber per ASTM C 665.
2.3.3.1.1. Provide formaldehyde free insulation with acrylic binder.

2.3.3.1.2. Provide minimum 25 percent total recycled content, with minimum 18 percent post-consumer recycled content.

2.3.3.2. Exposed Facer: Provide reinforced foil facing, with stapling flange, with maximum 25 flame spread classification and maximum 450 smoke contributed classification where facer is not in substantial contact with the unexposed surface of the ceiling finish.

2.3.4. Fire/Habitability Criteria:

2.3.4.1. Flame Spread Classification (Batt): Maximum 25 per ASTM E 84

2.3.4.2. Smoke Developed Classification (Batt): Maximum of 50 per ASTM E 84

2.3.4.3. Thermal Resistance: R-38 value per ASTM C 177 or C 518.

2.3.4.4. Perm Rating (Foil facer): Maximum 0.02 grains/hr/sf/in Hg per ASTM C 665.

2.3.5. Accessory Products:

2.3.5.1. Wire Lacing: 18 gage prestretched steel wire, with approved anchor system.

2.3.5.2. Insulation Tape: As recommended by manufacturer, maximum flame spread value of 25.

2.4. INSULATION STICK PINS

2.4.1. Provide Midwest or equal stick pin type insulation hangers of proper length to accommodate insulation thickness, with 2 inch diameter insulation washers with dome cap finish

2.4.2. Adhesive: Provide manufacturers recommended epoxy adhesive. Self adhesive pins are not acceptable.

2.5. OTHER MATERIALS

2.5.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection:

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. INSTALLATION

3.2.1. Install insulation in accordance with insulation manufacturer's instructions and as specified.

3.2.2. Install faced insulation with facing to occupied room side. Install non-rated facing in contact with unexposed surface of finish materials.

3.2.3. Do not install insulation over recessed light fixtures.

3.2.4. Trim insulation neatly to fit spaces. Fit insulation into crevices, spaces at outlet boxes and similar penetrations.

3.2.5. Maintain continuous foil faced vapor barrier. Provide fire resistive tape at all edges or penetrations of foil faced insulation, including batt ends.

3.2.6. Where wall insulation cavity exceeds 8 feet high, provide blocking or other approved support at 8 feet on center.

3.2.7. Wire Lacing Support Method:

3.2.7.1. Provide wire lacing method at floor and roof insulation where spacing of framing members exceeds batt width.

3.2.7.2. Provide wire lacing diagonally at bottom of joist cavity, fastened 16 inches on center, staggered, and fastened to each joist in an approved manner.

3.2.7.3. Adjust lacing as necessary to provide taut and consistent support for insulation batts.

3.2.7.4. Install insulation on lacing supports. Provide additional wire lacing at unsupported ends of batts.

3.2.7.5. Tape all batt ends and penetrations.

3.2.8. Staple Flange Application:

3.2.8.1. Staple batt through flange at wood framing.

3.2.8.2. Keep facer taut and without buckles.

3.2.8.3. Tape all batt ends and penetrations.

3.2.9. Stick Pin Application:
3.2.9.1. Install insulation in accordance with insulation manufacturer’s instructions and as specified.

3.2.9.2. Space stick pins at 12 inches on center each way with approved adhesive.

3.2.9.3. Install curtain wall insulation over stick pins. Cover all areas. Install with foil facing to occupied room side. Install washer at all clips.

3.2.9.4. Tape all insulation batt joints with specified foil backed tape.

END OF SECTION
1. **PART 1 - GENERAL**

1.1. **SECTION INCLUDES**

1.1.1. Exterior insulation finish system (EIFS), consisting of acrylic finish over extruded polystyrene insulation substrate.

1.2. **REFERENCES**


1.2.2. ASTM D 2842 - Standard Test Method For Water Absorption Of Rigid Cellular Plastics.

1.2.3. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.

1.2.4. EIMA (Exterior Insulation Manufacturers Association) - Guideline Specification For Exterior Insulation and Finish Systems, Class PB and Class PM.

1.2.5. ICBO Evaluation Service Report No. 3906.

1.2.6. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.

1.2.7. SFM Listing No. 2100-1089-100.


1.3. **SUBMITTALS**

1.3.1. Submit product data under provisions of Section 01 33 00.

1.3.2. Product Data: Provide product data on all EIFS materials, including characteristics and limitations of products specified.

1.3.3. Samples: Provide four 8 x 12 inch samples of each EIFS system. Provide samples illustrating sequential stages of complete assembly, including insulation, ground coat, mesh and finish.

1.3.4. Mock-Up: Prior to beginning EIFS operations, construct on site a movable 4 foot x 8 foot high mock-up to enable the Architect to review and adjust EIFS texture.

1.3.4.1. Based on initial review of mock-up, modify texture as directed by Architect. All subsequent installation shall reflect approved mock-up.

1.4. QUALITY ASSURANCE

1.4.1. Manufacturer:

1.4.1.1. Manufacturer shall have produced exterior insulation finish systems (EIFS) of specified type for a period of five (5) years prior to beginning work of this section, and shall have obtained Office of Statewide Health Planning and Development approval of systems within one year of contract award.

1.4.1.2. Manufacturer shall provide initial on-site review of substrate preparation and installation of in-place portion of the work to evaluate capability and performance of installer. Manufacturer shall provide written acceptance of installers performance.

1.4.2. Staff:

1.4.2.1. Applicator shall use only personnel thoroughly trained and experienced in the skills required, who have installed similar applications of similar products within one year prior to beginning work of this section, and who are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

1.4.2.2. Applicator shall be currently approved by EIFS manufacturer for application of specified system.

1.5. REGULATORY REQUIREMENTS

1.5.1. Comply with requirements of State Fire Marshal listing.

1.5.2. Comply with requirements of ICC Evaluation Service Report No. 1748.

1.6. ENVIRONMENTAL REQUIREMENTS

1.6.1. Do not apply EIFS when substrate or ambient air temperature is less than 45 degrees F.

1.6.2. Maintain minimum ambient temperature of 45 degrees F during EIFS drying period.

1.6.3. Protect EIFS materials from exposure to rain and freezing during drying period.

1.6.4. Take all precautions necessary to prevent moisture from penetrating systems, including providing protective covers, until all accessory products, copings and sealants are installed.

1.7. GUARANTEE

1.7.1. Contractor's Guarantee:

1.7.1.1. Provide Owner with written Guarantee on Contractor's letterhead, and signed by General Contractor and EIFS system subcontractor.

1.7.1.2. Provide guarantee for a time period of five years, commencing from the date of final acceptance of the project.
1.7.1.3. Make inspections and emergency repairs to defects or leaks in the system within twenty-four (24) hours of receipt of notice from the Owner.

1.7.1.4. Restore the affected areas to the standard of the original specifications as soon as weather permits.

1.7.2. Manufacturer’s Guarantee:

1.7.2.1. Provide Owner with EIFS manufacturers written guarantee complying with the following criteria:

1.7.2.1.1. Type: Unlimited dollar amount of recovery for labor and material necessary to maintain EIFS in a watertight condition.

1.7.2.1.2. Term: Ten (10) years minimum.

1.7.2.1.3. Scope of coverage: All finish coats, insulation, and assembly components.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific EIFS products and systems manufactured by Sto Industries (www.stocorp.com) are indicated to establish required level of quality, appearance, and performance. Provide Air/Moisture Barrier, EIF System and accessories from single source manufacturer or approved supplier. The Architect will consider comparable products by alternate manufacturers listed in this Section, and requests for substitutions, under the provisions of Section 01 25 00.


2.2. EXTERIOR INSULATION AND FINISH SYSTEM – COLUMNS

2.2.1. Series: StoTherm Next - Ultra High Impact.

2.3. AIR/MOISTURE BARRIER

2.3.1. StoGuard

2.3.1.1. Joint Compound: Sto Gold Fill—ready mixed acrylic based flexible joint compound for rough opening protection and joint treatment of wall sheathing.

2.3.1.2. Waterproof Coating: Sto Gold Coat—ready mixed acrylic based waterproof coating for wall sheathing.

2.3.2. Characteristics - Insulation:

2.3.2.1. Type: Expanded polystyrene complying with ASTM C 587, Type 1, and ASTM E 2430, with use of re-grind material prohibited.
2.3.2.2. Density: Minimum 1 pound per cubic foot per ASTM C 303.

2.3.2.3. Thickness: Minimum 1 inch.

2.3.2.4. Thermal Resistance: R value of 3.6 at 75 degrees F per 1 inch of thickness per ASTM C 177.

2.3.2.5. Fire Resistance: Maximum flame spread of 25 and smoke contributed less than 450 per ASTM E 84.

2.3.2.6. Size: Maximum size limited to two x four feet, with dimensional tolerance of plus or minus 1/16 inch in thickness.

2.3.2.7. Marking: Provide insulation board manufacturer, packaged and marked by Sto approved manufacturer.

2.4. ADHESIVE

2.4.1. Cementitious Adhesives: Sto BTS Plus—one-component, polymer-modified, cement based high build adhesive.

2.4.2. Characteristics - Finish Coat:

2.4.2.1. Stolit 1.5 Medium Sand acrylic based textured wall coating.

2.4.2.2. Color: Custom color, as selected by Architect.

2.4.3. Characteristics - Reinforcing Mesh:

2.4.3.1. Application: Unless noted otherwise, provide STO-Mesh at all applications.

2.4.3.1.1. Provide STO-Armor-Mat at column applications.

2.4.3.2. Corners: Provide STO-Corner Mat at all exterior corner applications.

2.4.4. Characteristics - Ground Coat:

2.4.4.1. Sto BTS Plus—one-component polymer modified cement based high build base coat with less than 33 percent Portland cement content by weight and capable of achieving minimum 1/16 inch (1.6 mm) thickness in one pass.

2.4.5. Fire/Life Safety Characteristics:

2.4.5.1. Provide systems with current State Fire Marshal Listing.

2.4.5.2. Fire Rating: Provide non-combustible assembly per ICBO Report 1748, including all applicable fastening and coating application methods.

2.4.5.3. Large Scale Vertical Fire Spread: No significant smoke or flame spread per ASTM E 108, report number ES-7913.
2.4.5.4. Flame Spread: Maximum flame spread value of 0 per ASTM E 84, with maximum smoke developed value of 5.

2.4.6. Habitability Characteristics:

2.4.6.1. Accelerated Weathering: No deterioration, cracking, chalking or yellowing at 4,000 hours per ASTM G 153.

2.4.6.2. Flexural Strength: 131 psi per ASTM C 203.

2.4.6.3. Salt Fog Resistance: No deterioration or cracking at 500 hours per ASTM B 117.

2.4.6.4. Abrasion Resistance: Pass at 1057 quarts per ASTM D 968.

2.4.6.5. Mildew Resistance: No mildew growth after 42 days per ASTM D 3273.

2.4.6.6. Water Vapor Transmission: 7.1 perms per ASTM E 96 Method B.

2.4.6.7. Water Penetration: No water penetration or deterioration at 1-1/2 hours at 60 PSF sustained pressure per ASTM E 514.

2.4.6.8. Water Resistance: No deterioration, delamination or signs of damage at 2 weeks per ASTM D 2247.

2.4.6.9. Windload Resistance: Approximately 131 psi per ASTM E 72 and E 330.

2.4.6.10. Impact Resistance: 101 pounds per ASTM D 1037, based on 1 layer of STO Mesh.

2.5. ACCESSORIES

2.5.1. Primer: Provide manufacturer’s recommended primer as required by assembly type.

2.5.2. Conditioner: Provide manufacturer’s recommended surface conditioner where required by assembly type.

2.5.3. Expansion and Edge Accessories:

2.5.3.1. Manufacturer: Provide manufacturer as indicated or approved equal.

2.5.3.1.1. Aluminum Accessories: Section based on products manufactured by Fry Reglet Corporation, Phone (818) 289-4744.

2.5.3.1.2. Brake Metal Accessories: Unless noted otherwise, Section based on products manufactured by Superior Metal Trim, phone (800) 892-8673.

2.6. EIFS MIX DESIGN

2.6.1. Mix and proportion base and finish coatings in accordance with manufacturers recommendations and per referenced approvals.
2.6.2. Protect mixtures from frost, contamination, and evaporation.

2.7. GYPSUM SHEATHING

2.7.1. Per Section 09 21 16.

2.8. SEALANTS

2.8.1. Per Section 07 90 00.

2.9. OTHER MATERIALS

2.9.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection:

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify surface is level and free of irregularities exceeding 1/8 inch in 4 feet, non-cumulative.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. PREPARATION

3.2.1. Protect surfaces near the work of this Section from damage or disfiguration.

3.2.2. Where gypsum sheathing surface exceeds specified tolerance apply leveling coat as required.

3.2.3. Prepare hairline cracks and non-moving joints by manufacturers approved methods.

3.3. EIFS INSTALLATION AT FRAMED WALL APPLICATIONS

3.3.1. Apply EIFS in accordance with manufacturers published recommendations and per approved submittals.

3.3.2. Apply mesh starter strip at all exposed insulation edges requiring “backwrap” technique.
3.3.3. Install insulation board in accordance with manufacturers published recommendations and per approved submittals

3.3.3.1. Apply adhesive system with ribbons running horizontal with the long dimension of the board.

3.3.3.2. Immediately install insulation board, with staggered joints butted tightly together. Interlock outside and inside corners.

3.3.3.3. Bridge gypsum board joints a minimum of 8 inches.

3.3.3.4. Prevent adhesive from extruding into board joints.

3.3.3.5. Fill all open insulation joints or gaps with small cut-to-fit insulation pieces.

3.3.3.6. Do not use any mechanical fastening devices at insulation installation.

3.3.3.7. Terminate insulation minimum 3/8 maximum 1/2 inch from window/door frames, dissimilar materials transitions and similar conditions. Provide backwrap termination and sealant joint per this Section.

3.3.3.8. Provide reveals and joint lines at insulation surface as shown on drawings. Maintain minimum 4 inch separation between board joint and reveal.

3.3.3.9. Cut all window corners from a single board. Maintain minimum 12 inches from window edge to board joint.

3.3.3.10. Provide reveals and joint lines at insulation surface as shown on drawings. Maintain minimum 4 inch separation between board edge and reveal.

3.3.4. Prior to application of coatings, rasp entire insulation board surface to provide smooth even substrate.

3.3.5. Install specified ground coat in accordance with the manufacturers recommendations and using approved methods.

3.3.5.1. Apply minimum 1/8 inch thickness, applied in two coats.

3.3.6. Immediately apply specified mesh in wet ground coat in accordance with the manufacturers recommendations, followed by second coat to fully embed mesh.

3.3.6.1. Apply 8 x 16 inch diagonal mesh reinforcing at all re-entrant corner conditions.

3.3.6.2. Apply second layer of mesh reinforcing at all window and punched opening edges in foam, extending 4 inches past edge.

3.3.6.3. Apply Armor mat at meeting room column application. Butt joints with maximum 1/8 inch gap. Coat with second layer of ground coat and STO mesh. Feather out all seams and edges.
3.3.6.4. Double wrap all corners and overlap minimum 2-1/2 inches at all mesh joints.

3.3.6.5. Remove all wrinkles or ridges in mesh.

3.3.7. Allow ground coat to cure and dry.

3.3.8. Apply specified primer over surface and allow to dry.

3.3.9. Apply specified finish coat over properly cured ground coat.

3.3.9.1. Avoid application in direct sunlight.

3.3.9.2. Provide crisp and consistent line between separate colors and at joints and reveals.

3.3.9.3. Do not install finish coating from separate batches side by side.

3.3.10. Seal all joints per Section 07 90 00.

3.4. TOLERANCES

3.4.1. Finished coating: Maximum variation from true plane limited to 1/4 inch plus or minus, in 10 feet, non-cumulative.

3.5. CLEANING AND PROTECTION

3.5.1. Protect all aluminum frames, glass and thresholds from coating application with complete waterproof protective sheeting.

3.5.1.1. Verify tape compatibility with all prefinished coatings.

3.5.1.2. Do not allow tape or protection sheeting to contact glass.

3.5.1.3. Remove all covering and tape within two weeks of system completion in any one area.

3.5.2. During application, provide plywood or other approved protection at all roofing, walkways, and concrete paving.

3.5.3. Remove all traces of spilled or splashed coatings from surfaces and landscaping.

END OF SECTION
SECTION 07 90 00
JOINT PROTECTION

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Sealants and joint treatment necessary to provide a positive barrier against passage of moisture and air.

1.1.2. Sealants at material joints necessary to provide closure for ease of cleaning and maintenance.

1.1.3. Sealants at all penetrations of sound rated walls and floors.

1.2. SUBMITTALS

1.2.1. Materials List/Product Data: Submit complete materials list, including catalogue data, of all materials, equipment, and products.

1.2.2. Samples: Accompanying Materials List, submit two (2) samples of each type of specified sealant, including color range available.

1.2.3. Test Data:

1.2.3.1. Staining: Provide test data, performed on concrete, demonstrating no staining or discoloration of adjacent substrate from sealant or primer.

1.2.4. Certifications: As a condition of acceptance, submit certification stating that sealants and joint treatments are installed per submittal and are complete and ready for intended function.

1.3. QUALITY ASSURANCE

1.3.1. Qualifications: Provide adequate numbers of skilled staff, thoroughly trained and experienced in the necessary craft and installation methods associated with the specified products.

1.4. COORDINATION

1.4.1. Coordination: Sequence all work to assure an orderly progress in the project, without removal of previously installed work, and so as to prevent damage to finishes and products.

1.5. DELIVERY, STORAGE, AND HANDLING

1.5.1. Protection: Use all means necessary to protect work in this Section before, during and after installation and to protect the installed work and materials of all other trades.
1.5.2. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.5.3. Product Storage: Do not retain on site any material which has exceeded the shelf life recommended by the manufacturer.

1.6. GUARANTEE

1.6.1. Contractor's Guarantee:

1.6.1.1. Provide Owner with written Guarantee per Section 00 65 36 on Contractor's letterhead, and signed by General Contractor and sealant system subcontractor.

1.6.1.2. Provide guarantee for a time period of five years, commencing from the date of final acceptance of the project, against the following defects:

1.6.1.2.1. Adhesive or cohesive sealant joint failure.

1.6.1.2.2. Pin holes or blistering of sealant joint.

1.6.1.2.3. Staining of adjacent substrate or surrounding material.

1.6.1.2.4. Chalking or color change exceeding manufacturers published data.

1.6.1.3. Make inspections and emergency repairs to defects or leaks in the sealant system within twenty-four (24) hours of receipt of notice from the Owner.

1.6.1.4. Restore the affected areas to the standard of the original specifications as soon as weather permits.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. The Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2. SEALANTS

2.2.1. General:

2.2.1.1. All sealants for any one Type shall be the product of a single manufacturer, suitable for the intended use, and per the following product characteristics.

2.2.1.2. Unless noted otherwise, use sealants in application as defined below.
2.2.1.3. For other applications provide products especially formulated for the proposed use and approved in advance by the Architect.

2.2.2. Product Characteristics:

2.2.2.1. Type 1: Unless noted otherwise, at exterior openings, joints, material transitions, bedding, and other conditions where anticipated joint movement will be plus/minus 25% or less.

2.2.2.1.1. Products: Dow Corning 795, Pecora 895, Tremco Tremsil 600, or equal.

2.2.2.2. Type 2: At all exposed metal to metal wall and roof flashing conditions, all exposed prefinished metal roofing and flashing conditions; storefront perimeter conditions, and all other conditions where anticipated joint movement will be plus/minus 25 - 50%.

2.2.2.2.1. Products: Dow Corning 795, GE Silicones Silglaze II, Tremco Spectrum 2, or equal.

2.2.2.3. Type 3: At horizontal concrete paving joints exposed to pedestrian and vehicular traffic, and all joints subject to immersion:

2.2.2.3.1. Products: Pecora DynaTred, Tremco Vulkem 45SSL, Sonneborn NP2, or equal.

2.2.2.4. Type 4: Exterior application in conjunction with wood products:

2.2.2.4.1. Tremco Vulkem 116, Sika Sikaflex-1a, Sonneborn NP1, or equal.

2.2.2.5. Type 5: Pipes and conduits penetrating underground walls:

2.2.2.5.1. Sealant compatible with waterproofing system.

2.2.2.6. Type 6: Interior applications in conjunction with sanitary conditions (non-food use):

2.2.2.6.1. Products: General Electric Silicone Sanitary Sealant 1702, Dow Corning 786, Pecora 898 Sanitary Silicone Sealant, or equal.

2.2.2.7. Type 7: Interior sound control applications.

2.2.2.7.1. Products: USG Sheetrock Acoustical Sealant, Pecora AC-20 FTR, Tremco Acoustical Sealant, or equal.

2.2.2.8. Type 8: Unless noted otherwise, at interior openings, joints, material transitions and bedding, at locations shown on drawings, and other conditions where anticipated joint movement will be 25% or less.

2.2.2.8.1. Products: Pecora 864, Dow Corning 795, Sonneborn Omniseal, or equal.
2.2.2.9. Type 9: At all concealed prefinished metal roofing and flashing conditions, provide butyl sealant as recommended by metal roofing manufacturer.

2.2.2.10. Type 10: At all metal flashing and gutter joints subject to periodic or continuous water immersion:

2.2.2.10.1. Products: Dow Corning 799, Pecora 863, or equal.

2.2.2.11. Type 11: At joints in acoustical laminated glass:

2.2.2.11.1. Products: Dow Corning 795, Pecora 895, Tremco Tremsil 600, or equal.

2.2.2.12. For other applications provide products especially formulated for the proposed use and approved in advance by the Architect.

2.2.3. Colors:

2.2.3.1. Colors for each sealant application will be selected by the Architect from standard colors normally available from the manufacturers complete line of running line colors, including premium and special color lines for each specified product.

2.2.3.2. Should such standard color not be available from the approved manufacturer except at additional charge, provide such colors at no additional cost to the Owner.

2.2.3.3. In concealed installations, and in partially or fully exposed installations where approved by the Architect, use standard gray or black sealant.

2.3. FIRE RATED SEALANTS

2.3.1. Per Section 07 84 00.

2.4. ACCESSORIES

2.4.1. Pre-compressed Joint Filler: Provide Wills Seal 600 or equal, precompressed joint filler material, full width of wall, thickness sized for 20% compression.

2.4.2. Primers: Provide primer as specifically recommended for this installation by the manufacturer of the sealant used and have been tested for staining, adhesion and durability on all applicable surfaces.

2.4.3. Back-Up Materials: Use only those backup materials which are specifically recommended for this installation by the sealant manufacturer, non-absorbent and non-staining.

2.4.4. Masking Tape: For masking around joints, provide an appropriate masking tape which will effectively prevent application of sealant on surfaces not scheduled to receive it, and which is removable without damage to substrate.
2.5. OTHER MATERIALS

2.5.1. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection:

3.1.1.1. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. PREPARATION

3.2.1. Concrete and Masonry Surfaces:

3.2.1.1. Install only on surfaces which are dry, sound, and well brushed, wiping free from dust.

3.2.1.2. At open joints, remove dust by mechanically blown compressed air if so required.

3.2.1.3. To remove oil and grease, use sandblasting or wire brushing.

3.2.1.4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.

3.2.1.5. Remove laitance and mortar from joint cavities.

3.2.2. Steel Surfaces:

3.2.2.1. Unprimed or unfinished steel surfaces in contact with sealant:

3.2.2.2. Sandblast as required to achieve acceptable surface for bond.

3.2.2.3. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale and rust.

3.2.2.4. Use solvent to remove oil and grease, wiping the surfaces with clean white rags only.
3.2.2.5. Remove protective coatings on steel by sandblasting or by using a solvent which leaves no residue.

3.3. INSTALLATION OF ACCESSORY MATERIALS

3.3.1. When using backup of tube or rod stock, avoid lengthwise stretching of material. Do not twist or braid hose or rod backup stock.

3.3.2. Prime joints in accordance with manufacturers recommendations.

3.3.3. Provide an approved bond-breaker where recommended by sealant manufacturer.

3.4. INSTALLATION OF SEALANTS

3.4.1. Prior to start of installation in each joint, verify the joint type according to details on the drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.

3.4.2. Equipment:

3.4.2.1. Apply sealant under pressure with power-actuated hand gun or manually-operated hand gun, or by other appropriate means.

3.4.2.2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.

3.4.2.3. Do not use pourable sealant installation method at hardscape paving joints.

3.4.3. Thoroughly and completely mask joints where the appearance of primer or sealant on adjacent surfaces would be objectionable.

3.4.4. Install the sealant in strict accordance with the manufacturer's recommendations, thoroughly filling joints to the recommended depth.

3.4.4.1. Use of sealant dams contained within the hardscape joint is not permitted. Install sealant without interruption from end to end of joint.

3.4.5. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.

3.4.5.1. Tool joints to a smooth and consistent transition. Do not leave ripples, strings, or surface tooling marks in sealant.

3.4.6. Unless otherwise specified, at all sound rated wall and floor assemblies, seal penetrations and recessed items through the floors and walls with Type 7 sealant. Seal all penetrations such as electrical device cover plates, pipes, fire extinguisher cabinets and similar penetrations in room surfaces.

3.5. CLEANING

3.5.1. Remove masking tape immediately after joints have been tooled.
3.5.2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.

3.5.3. Upon completion of the work of this Section, promptly remove from the job site all debris, containers, and surplus material derived from this portion of the Work.

END OF SECTION
SECTION 08 11 00
METAL DOORS AND FRAMES

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Hollow metal rolled steel door frames, non-rated.

1.2. QUALITY ASSURANCE

1.2.1. Certification of Labeled Construction: After notifying Architect of oversize requirements, furnish inspection certificate certifying component construction conforms to UL rating requirements.

1.2.2. Hollow metal supplier shall be a qualified direct distributor of specified products.

1.2.2.1. Distributor shall employ an A.H.C./C.D.C. or person of equivalent experience who will be available at reasonable times to consult with the architect and owner regarding all matters affecting work of this Section.

1.2.3. Hollow metal supplier shall be a member of the Steel Door Institute or Hollow Metal Manufacturers Association Division of NAAMM.

1.2.4. Perform work in accordance with standards of the Steel Door Institute and as required by this Section.

1.2.4.1. Where more restrictive than referenced standards, comply with requirements of this Section.

1.2.5. Provide written certification all doors conform to Level 'A' criteria of ANSI-A-250.4, including testing to 2,000,000 operating cycles.

1.2.6. Provide written certification all door frames conform to Level 'A' criteria of ANSI-A-250.5, including testing to 1,000,000 operating cycles.

1.3. SUBMITTALS

1.3.1. Submit shop drawings and product data under provisions of Division 01.

1.3.1.1. Provide shop drawings illustrating system and component dimensions, components within assembly, framed opening requirements and tolerances, anchorage and fasteners; glass and infills; and affected related work.

1.3.1.2. Provide, where required, shown or specified, custom modifications to manufacturers or referenced standard, including material gage, anchorage, dimension and fabrication criteria.

1.3.1.3. Provide manufacturer's installation instructions and listing requirements.
1.3.2. Samples:

1.3.2.1. Provide one 12 inch square sample of each type of door, cut at corner, showing edge treatment and core material. Indicate compliance with specified requirements.

1.4. DELIVERY, STORAGE AND PROTECTION

1.4.1. Deliver doors and frames cardboard wrapped, crated, palletized or otherwise protected during transit and site storage.

1.4.2. Inspect doors and frames upon delivery for damage. Minor damage may be repaired provided refinished items are equal in all respects to new work and accepted by the Architect; otherwise remove and replace damaged items.

1.4.3. Store doors and frames at the building site in a dry secure place.

1.4.3.1. Place units on minimum 4 inch high wood blocking.

1.4.3.2. Store in vented shelters.

1.4.3.3. If cardboard wrapper on door becomes wet, remove carton immediately.

1.4.3.4. Provide 1/4 inch spaces between stacked doors to promote air circulation.

1.5. SEQUENCING AND SCHEDULING

1.5.1. Order and deliver all doors and frames so as not to delay progress of work of other Sections.

2. PART 2 - PRODUCTS

2.1. STEEL DOOR FRAMES – HOLLOW METAL

2.1.1. Manufacturer: Characteristics of specific products manufactured by Curries Company, are indicated to establish required level of quality, appearance, and performance. The Architect will consider comparable products by alternate manufacturers listed in this Section, and requests for substitutions, under the provisions of Division 01.

2.1.2. Type: Unless noted otherwise, wrap around, double rabbet, flush frames, fully welded as specified.

2.1.3. Construction:

2.1.3.1. Material: Cold Rolled Steel per ASTM A 653, CS Grade, A 60 galvanized, extra smooth.

2.1.3.2. Face Dimension: 2 inches, unless otherwise shown on drawings.

2.1.3.3. Gage
2.1.3.4. Interior: 16 gage.

2.1.4. Finish:

2.1.4.1. Provide spray applied primer at all interior frames per ANSI A224.1.

2.1.5. Anchors:

2.1.5.1. Provide minimum 18 gage head and jamb anchors suitable for wall condition and in configuration for welded in place installation.

2.2. FABRICATION

2.2.1. General

2.2.1.1. Fabricate all doors and frames in accordance with ANSI 250.8 except where more stringent requirements are specified.

2.2.1.2. Supply only doors and frames manufactured by a single manufacturer.

2.2.2. Frame Construction

2.2.2.1. Fully weld all frame intersections. Weld face trim, tabs and frame soffit with continuous fillet weld. Grind all welds smooth. Repair specified finish.

2.2.2.2. At all openings provide continuous welds at all horizontal to vertical sections, including stop sections and rabbets on exterior side. Weld face trim, tabs, rabbets, and frame soffit with continuous fillet weld.

2.2.2.3. Provide temporary shipping bars for protection from damage during transit and handling.

2.2.2.4. Remove temporary spreaders before setting frames.

2.2.2.5. Prepare door frame for silencers. Provide three single rubber silencers for single doors on strike side, and two single silencers on frame head at double doors without mullions.

2.2.3. Frame Anchors

2.2.3.1. Wall anchors for drywall/frame partitions:

2.2.3.1.1. Provide steel or wood stud anchors sized to accommodate frame jamb depth and face dimension on all welded frames.

2.2.3.2. Provide frame jamb anchors at 30 inches on center (or fractional portion) on each jamb.

2.2.3.3. Floor anchors:
2.2.3.3.1. Where access to back of frame is possible, provide angle clip type, 16 gage minimum, welded to the bottom of each jamb.

2.2.3.3.2. Where stud framed wall occurs at concrete curb, provide additional jamb anchor at each jamb, installed at approximately 7 inches above finish floor.

2.2.4. Hardware Preparation

2.2.4.1. Reinforcement: reinforce components for hardware installation in accord with ANSI A 250.8 and A250.6 and the following criteria.

2.2.4.1.1. Provide 'box' type lock reinforcing, minimum 16 gage.

2.2.4.1.2. Provide minimum 7 gage hinge reinforcing, welded to minimum 12-gage full height channel.

2.2.4.1.3. Provide minimum 12 gage closer reinforcement.

2.2.4.1.4. Provide minimum 12 gage reinforcement at other hardware locations.

2.2.5. Locate factory prepared hardware locations in compliance with “Recommended Locations for Builders’ Hardware for Standard Steel Doors and Frames”, as adopted by The Steel Door Institute.

2.3. OTHER MATERIALS

2.3.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the Contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3.2. INSTALLATION

3.2.1. Set all frames in accord with SDI 105 and as specified.

3.2.1.1. Use of wire tie method is not acceptable.

3.2.2. Set welded frames in position prior to beginning partition work. Brace frames until permanent anchors are set.

3.2.2.1. Use of KD frames not permitted.

3.2.3. Set anchors for frames as work progresses. Install anchors at hinge and strike levels.

3.2.3.1. Where frame is accessible from back, install sill/floor anchors to slab or floor assembly.

3.2.3.2. Install two head anchors per frame with width exceeding 3 feet and less than 6 feet wide. Install three anchors, equally spaced, at wider frames.

3.2.4. Use temporary setting spreaders at all locations. Use intermediate spreaders to assure proper door clearances and header braces for grouted frames.

3.3. ADJUSTMENT AND CLEANING

3.3.1. Remove dirt and excess sealants, mortar, or glazing compounds from exposed surfaces.

3.3.2. Adjust moving parts for smooth operation. Use shims if necessary to allow for proper closing.

3.3.3. Where approved by Architect, fill all dents, holes, and similar defects with epoxy metal filler. Where required by Architect, fill all dents, holes and similar defects with weld material. After filling, grind smooth and flush with adjacent surface. Provide approved zinc rich primer at all galvanized products.

3.3.4. Touch up abrasions with primer.

END OF SECTION
SECTION 08 14 00
WOOD DOORS

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Wood doors, non-rated. REFERENCES

1.2.1. ASTM E152 - Methods of Fire Tests and Door Assemblies.

1.2.2. NFPA 80 - Fire Doors and Windows.

1.2.3. NFPA 252 - Standard Methods for Fire Assemblies.

1.2.4. Underwriters Laboratories, Inc. (UL)

1.2.5. UL 10B and 10C - Fire Tests of Door Assemblies.

1.2.5.1. Doors shall be tested and listed per UL10C. Furnish letter of compliance from each manufacturer in the submittals for each type of rated opening.

1.2.6. WDMA Industry Standard I.S. 1-A-2004

1.2.7. ANSI A115. W Series, Wood Door Hardware Standards.

1.2.8. FSC – Forest Stewardship Council

1.2.9. SCS – Scientific Certification Systems

1.2.10. Architectural Woodwork Standards (AWS), Architectural Woodwork Institute

1.2.11. Intertek Testing Services-Warnock Hersey (ITS-WH)

1.3. QUALITY ASSURANCE

1.3.1. Conform to requirements of WDMA I.S.1-A, Premium grade.

1.3.2. Doors of all types shall be manufactured by a single source.

1.3.3. Door supplier shall be a qualified direct distributor of specified products.

1.3.3.1. Distributor shall employ an A.H.C./C.D.C. or person of equivalent experience who will be available at reasonable times to consult with the Architect and Owner regarding all matters affecting work of this Owner.

1.4. SUBMITTALS

1.4.1. Submit under provisions of Section 01 33 00.
1.4.2. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

1.4.3. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, beveling, blocking for hardware, factory machining criteria, cutouts for openings.

1.4.3.1. Shop drawings shall bear the WI Certified Compliance Label.

1.4.4. Samples:

1.4.4.1. Submit one sample of door construction, 12 inch square in size cut from bottom corner of door.

1.4.4.2. Submit two samples of door veneer, 6 x 11 inch in size illustrating wood grain, stain color, and sheen.

1.5. DELIVERY, STORAGE, AND PROTECTION

1.5.1. Protect products under provisions of General Conditions, this Section and as recommended by manufacturer.

1.5.2. Protect doors with opaque resilient packaging, sealed with heat shrunk plastic. Break seal on site to permit ventilation.

1.5.3. Inspect doors and frames upon delivery for damage. Minor damage may be repaired provided refinished items are equal in all respects to new work and accepted by the Architect; otherwise remove and replace damaged items.

1.5.4. Store doors at the building site in a dry secure place.

1.5.4.1. Place door units flat on minimum 4 inch high wood blocking.

1.5.4.2. Store in humidity and temperature controlled shelter.

1.5.4.3. Provide 1/4 inch spaces between stacked doors to promote air circulation.

1.5.4.4. Seal all edges of non-factory finished doors immediately after delivery to site with sealer compatible with subsequent finish.

1.6. WARRANTY

1.6.1. Provide Life of Installation manufacturer's warranty under provisions of Section 01 77 19.

1.6.2. Submit written warranty on manufacturer's standard form signed by an official of the door manufacturer agreeing to repair or replace defective doors which exhibit the following defects:

1.6.2.1. Delamination in any degree.

1.6.2.2. Warp or twist of 1/4 inch or more in any 3'-6" x 7'-0" plane of door face.
1.6.2.3. Telegraphing of stile, rail or core through face to cause surface variation
in excess of 1/100 inch in any 3 inch span.

1.6.3. Warranty shall include refinishing and reinstallation as required due to repair or
replacement of defective doors.

1.6.4. Warranty Period - Interior Doors: Life of the original installation.

1.6.5. Warranty Period - Exterior Doors: Five (5) years.

1.6.6. Warranty shall not apply to any field finished doors improperly sealed on all edges
and faces.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section,
are indicated to establish required level of quality, appearance, and performance.
Architect will consider requests for substitutions, under the provisions of Section
01 25 00.

2.2. NON RATED WOOD DOORS


2.2.2. Types: Non-rated, flush face, solid core door.

2.2.3. Door Series/Style: DSP-1.

2.2.4. Construction:

2.2.4.1. Standard: WDMA I. S. 1-A Premium Series.

2.2.4.2. Adhesive: AWS Type I, waterproof, formaldehyde free.

2.2.4.3. Core: Mat formed particle board conforming to ANSI A208.1-LD-2, with no added urea formaldehyde
Visible Edge Bands: Hardwood matching veneer species, without finger joints, minimum 3/4
inch thick over hardwood stiles.

2.2.4.5. Visible Edge Bands: Hardwood, species at mill option, without finger
joints.

2.2.4.6. Veneer:

2.2.4.6.1. Grade: Grade 1 per AWI 200, Medium Density Overlay.

2.2.4.6.2. Grade/Species: White Birch, WDMA Grade 1 (Premium)
Grade, Transparent Finish, per WIC section 5.

2.2.4.6.3. Veneer Thickness: 1/50 inch minimum.
2.2.4.6.4. Veneer Cut: Plain Sliced per WDMA IS 1-A.

2.2.4.6.5. Veneer Grain Match: Balance match.

2.2.4.6.6. Use of rain forest products in veneer, crossbands or backs is not acceptable.

2.2.5. Finish:

2.2.5.1. Finish: Factory prefinish all doors at factory in accordance with WDMA I.S.1A or AWS Quality Standards.

2.2.5.2. System: Provide water based stain with ultraviolet (UV) cured polyurethane sealer, complying meet or exceed performance standards of UV cured polyurethane (TR-6 per WDMA) or (System 9 per AWS).

2.2.5.3. Color/gloss: As selected by Architect from manufacturers standard stain color line.

2.3. FABRICATION

2.3.1. General

2.3.1.1. Fabricate all doors in accordance with referenced standards unless more stringent requirements are specified.

2.3.1.2. Supply each door type manufactured by a single manufacturer.

2.3.2. Where required by hardware application and fire rating listing, provide minimum 5-1/2 inch wide top blocking, minimum 10 inch wide intermediate/lock blocking, and minimum 5-1/2 inch wide bottom blocking for hardware backing and reinforcement.

2.3.3. Coordinate with all finish flooring materials as required to provide proper clearance.

2.3.4. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions and with referenced standards. Do not machine for surface hardware. Provide solid blocking for through bolted hardware.

2.3.5. Factory fit doors for frame opening dimensions identified on shop drawings.

2.3.6. Where specified, cut and configure exterior door edge to receive recessed weather stripping devices.

2.3.7. Provide edge clearances to cut outs and hardware preparation in accordance with listing requirements and specified references.

2.3.7.1. Prepare door and all machining in compliance with NFPA 80.

2.3.8. Provide factory applied labels on all rated doors.
2.4. OTHER MATERIALS

2.4.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this Owner, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Owner may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. INSTALLATION

3.2.1. Install doors in accordance with AWS Section 9.

3.2.1.1. Do not field trim doors without prior approval.

3.2.1.2. Trim non-rated door width by cutting equally on both jamb edges.

3.2.1.3. Trim door height by cutting bottom edges to a maximum of 3/4 inch.

3.2.1.4. Machine cut for field applied hardware in compliance with listing.

3.2.1.5. Sand all edges of doors, including top edge, after fabrication and field adjustment to a smooth and uniform surface.

3.2.2. Coordination.

3.2.2.1. Coordinate installation of doors with installation of frames specified in Section 08 11 00 and hardware specified in Section 08 71 00.

3.2.2.2. Coordinate sealer installation at cut-outs and hardware preparation.

3.2.3. Adjust for smooth and balanced door movement.

3.2.4. Before finishing, remove handling marks and exposure markings from all surfaces and edges with a complete block sanding using at least 150 grit sandpaper. Ease all edges. Steam out all scratches before sanding.
END OF SECTION
SECTION 08 41 00
ENTRANCES AND STOREFRONTS

1. PART 1 - GENERAL

1.1. WORK INCLUDED

1.1.1. Aluminum storefront, entrances and entrance frames.

1.1.2. Anchors, brackets, and attachments.

1.1.3. Perimeter sealant.

1.2. WORK INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

1.2.1. Section 08700 - Door Hardware.

1.3. RELATED WORK

1.3.1. Section 07900 - Joint Sealers.

1.3.2. Section 08800 - Glazing.

1.3.3. Section 08920 - Aluminum Curtainwall System.

1.4. REFERENCES

1.4.1. ANSI/ASTM A 36 - Structural Steel.

1.4.2. ASTM A 167 - Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

1.4.3. ASTM A 653 – Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.

1.4.4. ANSI/ASTM B 221 - Aluminum and Aluminum-Alloy Extruded Bar, Rod, Wire, Profiles, and Tube.

1.4.5. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.

1.4.6. ASTM E 283 – Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences Across the Specimen

1.4.7. ASTM E 330 – Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference

1.4.8. ASTM E 331 – Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference

1.4.9. FS TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.
1.5. QUALITY ASSURANCE

1.5.1. Manufacturer

1.5.1.1. Manufacturer shall have produced the specified system or products for a period of one (1) year prior to beginning work of this section, and shall have the capability to produce the specified products to the delivery and quantity criteria of the project.

1.5.2. Staff

1.5.2.1. Use only personnel who are thoroughly trained and experienced in the skills required and have installed similar applications of the specified products within one year prior to beginning work of this section.

1.5.2.2. Use only staff who are completely familiar with the manufacturers’ recommended methods of installation as well as the requirements of this work.

1.6. SUBMITTALS

1.6.1. Submit shop drawings and product data under provisions of Section 01330.

1.6.2. Include system and component dimensions; components within assembly; framed opening requirements and tolerances; anchorage and fasteners; glass and infills; door hardware requirements; and affected related work.

1.6.3. Submit manufacturer’s installation instructions under provisions of Section 01330.

1.6.4. Submit samples under provisions of Section 01330.

1.6.5. Submit four samples, 3 x 5 inches in size, illustrating prefinished aluminum surface.

1.7. DELIVERY, STORAGE, AND HANDLING

1.7.1. Deliver and handle system components under provisions of Section 01600.

1.7.2. Store and protect system components under provisions of Section 01600.

1.7.3. Provide wrapping to protect prefinished aluminum surfaces.

1.8. WARRANTY

1.8.1. Warranty

1.8.1.1. Provide, in Architect approved form, the Owner with a guarantee against the following specific defects or failures for a period of three (3) years after Notice of Substantial Completion:

1.8.1.1.1. Broken, cracked or otherwise damaged glass not resulting from vandalism or glass failure.

1.8.1.1.2. Water intrusion through storefront system.
2. PART 2 - PRODUCTS

2.1. ALUMINUM STOREFRONT SYSTEM

2.1.1. Basis of Design: Characteristics of specific products manufactured by Kawneer Company are indicated to establish required level of quality, appearance, and performance. The Architect will consider comparable products by alternate manufacturers listed in this Section, and requests for substitutions, under the provisions of Section 01610.

2.1.1.1. Acceptable Alternate Manufacturers: EFCO Corp., Traco, or equal.

2.1.1.2. Drawings and specifications indicate sizes, profiles, and dimensional requirements, and are based upon the specific products indicated in this Section. Do not modify intended aesthetic effect, as judged solely by the Architect, except with Architect’s approval and only to the extent needed to comply with performance requirements. Submit comprehensive explanatory data to Architect for review where modifications are proposed.

2.1.2. Type: Centerset, glazed storefront system, glass captured on four sides, with aluminum entrance frames and doors.

2.1.3. Storefront Framing System with thermal break:

2.1.3.1. Series: TriFab 451UT Ultra Thermal.

2.1.3.1.1. Size: Nominal 2 x 4-1/2 inch profile.

2.1.3.2. Performance:

2.1.3.2.1. Base design load on 85 MPH wind speed, (3 second gust) Exposure C, and per Chap. 16 IBC.

2.1.3.2.2. Deflection: Assembly limited to 1/175 at 20 PSF static air load per ASTM E 330.

2.1.3.2.3. Breakage: At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2 percent of their clear spans shall occur.

2.1.3.2.4. Air Infiltration: Assembly limited to 0.06 CFM per square foot at 6.24 PSF in accordance with ASTM E 283.

2.1.3.2.5. Water Resistance: No water penetration of assembly at 8.00 PSF in accordance with ASTM E 331 and AAMA 501.
2.1.3.2.6. Thermal Movement: No damage to system or components resulting from expansion and contraction within system components caused by a cycling temperature range of 170 F degrees.

2.1.3.2.7. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior.

2.1.3.2.8. Finish: Match existing

2.1.3.3. Accessories

2.1.3.3.1. Sill aprons, column covers and other aluminum finish shall be brake formed or extruded, prefinished to match storefront, and attached with concealed fasteners.

2.1.3.3.2. Provide continuous aluminum sill flashing at all storefront sill conditions. Extend sill flange up wall 2 inches at wall terminations.

2.1.3.3.3. Provide all reinforcing and stiffeners, including concealed steel fabrications, required to comply with specified loading criteria and within profiles and design as shown on drawings.

2.1.3.3.4. Provide Min. 6" high head above doors to as necessary to accommodate specified closer.

2.1.3.4. Provide continuous steel insert at all entrance door jambs, with cathodic separation.

2.1.4. Entrance Door System

2.1.4.1. Series: Series AA425 Thermal Entrance Door, modified as specified below.

2.1.4.2. Mounting: Off-set, single acting outward.

2.1.4.3. Head rail Dimension: 4 1/4 inches high, and as necessary to accommodate specified closer.

2.1.4.4. Bottom rail Dimension: 6 1/2 inches high.

2.1.4.5. Glass stops: Square.

2.1.4.6. Finish: Prefinished to match storefront system.

2.1.5. Entrance Door Hardware

2.1.5.1. Weatherstripping: Polyurethane or silicone inserts in locations as shown on drawings.

2.1.5.2. Balance of hardware as specified in Section 08710.
2.2. GLASS
2.2.1. Per Section 08 80 00.

2.3. SEALANTS
2.3.1. Per Section 07 90 00.

2.4. FABRICATION
2.4.1. Fabricate doors and frames allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.
2.4.2. Accurately miter and fit all members to hairline joints. Make joints and connections flush, hairline, and weatherproof.
2.4.3. Rigidly fit and secure joints and corners with screw and spline internal reinforcement. Weld or mechanically fasten along entire line of contact on the unexposed side. No discoloration on face will be permitted after aluminum finishing.
2.4.4. Develop drainage holes with moisture pattern to exterior.
2.4.5. Prepare components to receive anchor devices. Fabricate anchorage items.
2.4.6. Arrange fasteners, attachments, and jointing to ensure concealment from view.
2.4.7. Prepare components with internal reinforcement for all door and window hardware.

2.5. OTHER MATERIALS
2.5.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION
3.1. SURFACE CONDITIONS
3.1.1. Inspection
3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.
3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.
3.1.1.3. In the event of discrepancy, immediately notify the Architect.
3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3.2. INSTALLATION

3.2.1. General

3.2.1.1. Install doors, frames, glazing and hardware in accordance with manufacturer's instructions.

3.2.1.2. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

3.2.1.3. Install all members with adequate provision for settlement, expansion, and contraction to occur without breaking glass.

3.2.1.4. Protection of Contact Surfaces: Aluminum surfaces in contact with dissimilar metals or with incompatible materials such as concrete, masonry, and plaster, shall be painted on contact surfaces with a protective coating of alkali-resistant bituminous paint before installation or, isolated in an approved manner with nonabsorbative tape or gaskets.

3.2.1.5. Expansion and Contraction: Construct and install all aluminum work so as to avoid distortion and/or stress of parts and fastenings resulting from thermal expansion and contraction.

3.2.2. Fitting and anchorage

3.2.2.1. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

3.2.2.2. Provide aluminum or non-magnetic stainless steel screws, bolts, nuts, and other fastening devices. Use manufacturers approved anchorage devices to securely attach frame assembly to structure.

3.2.2.3. Furnish all necessary accessories, including closures, flashings, and backing as indicated and required for a complete installation.

3.2.3. Sealant

3.2.3.1. Thoroughly apply sealant and other waterproofing materials to all joints as required to maintain specified air and water performance values.

3.2.3.2. Install perimeter sealant and backing materials in accordance with Section 07 90 00.

3.2.4. Hardware Installation

3.2.4.1. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.

3.2.4.2. Provide required cutouts, recesses, mortising or milling operations for hardware. Reinforce with backing plates as required to ensure adequate strength of connection.

3.2.4.3. Adjust operating hardware.
3.2.5. Glass Installation

3.2.5.1. Install glass and infill panels in accordance with Section 08 81 00, using manufacturers approved methods.

3.3. TOLERANCES

3.3.1. Variation from Plane: 0.03 inches per foot maximum or 0.25 inches per 30 feet, whichever is less.

3.3.2. Misalignment of Two Adjoining Members Abutting in Plane: 0.015 inches.

3.4. CLEANING

3.4.1. Remove protective material from prefinished aluminum surfaces.

3.4.2. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

3.4.3. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION
SECTION 08 71 00
DOOR HARDWARE

1. PART 1 - GENERAL

1.1. WORK INCLUDED

1.1.1. Door hardware.
1.1.2. Weatherstripping and gasketing.
1.1.3. Thresholds, door stops, and related finish hardware.
1.1.4. Scope of Work in this Section: Provide all finish hardware necessary to complete work.

1.2. WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

1.2.1. Furnish templates to:

1.2.1.1. Section 08 11 00 for door and frame preparation.

1.3. REFERENCES

1.3.1. Builders' Hardware Manufacturers Association (BHMA) standards as specified.
1.3.2. Steel Door Institute (SDI) standards as specified.
1.3.3. Part 2, Title 24, CCR, 2007 edition, including all current amendments.
1.3.4. Americans with Disabilities Act Accessibility Guidelines (ADAAG) criteria as specified.
1.3.5. Underwriters Laboratories Inc. standards as specified.

1.4. QUALITY ASSURANCE

1.4.1. Hardware Supplier: Provide hardware from company specializing in supplying institutional door hardware with 5 years experience and approved by hardware manufacturer. Supplier shall have in its employ a certified Architectural Hardware Consultant (AHC) to prepare submittals required by this Section and who shall be available at reasonable times, during the course of the work, for project hardware consultation to the Owner, Architect, and Contractor. In addition AHC shall certify hardware installation as specified in this Section.

1.4.2. Hardware supplier shall have a maintenance and service facility located within 100 miles of the project site. This facility will stock parts for products supplied and be capable of repairing and replacing hardware items found defective within the warranty period.
1.5. REGULATORY REQUIREMENTS

1.5.1. Hardware shall be tested and listed per UL10C. Furnish letter of compliance from each manufacturer in the submittals for each type of rated opening.

1.5.2. Conform to applicable requirements of the Americans with Disabilities Act Accessibility Guidelines regarding accessibility requirements for door and entrance hardware.

1.6. CERTIFICATIONS

1.6.1. Architectural Hardware Consultant provided by Contractor shall inspect preparation and initial installation of each type of hardware condition.

1.6.2. Architectural Hardware Consultant provided by Contractor shall inspect the completed installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

1.7. SUBMITTALS

1.7.1. Submit schedule and product data under provisions of Section 01 33 00.

1.7.2. Provide seven (7) copies of hardware schedule showing each application, the quantity required, part numbers and finish of each item.

1.7.2.1. Architects review of such schedule does not relieve the Contractor of providing all hardware required for the Work, whether or not such hardware was inadvertently omitted from Submittal. No extra cost will be allowed for changes or corrections necessary to facilitate the proper installation of hardware.

1.7.3. Accompanying schedules, provide two (2) manufacturer's brochures of each item specified and scheduled, indicating function, finish, dimensions, and related features. No hardware schedules will be accepted for review without submission of such brochure package.

1.7.4. When alternate manufacturers are proposed by contractor, provide two brochures of originally specified item, marked to identify original specified item.

1.7.5. Submit only manufacturers specified as approved alternates.

1.7.6. Provide samples indicating hardware design and finish when required by Architect.

1.7.7. Provide shop drawings showing all boxes, wiring and/or other support components of hardware assemblies enclosed or embedded in construction.

1.8. COORDINATION

1.8.1. Coordinate work of this Section with other directly affected Sections involving manufacturer of any internal reinforcement for door hardware.

1.8.1.1. In particular, coordinate door preparation in accordance with applicable regulatory and trade standards specified.
1.8.2. Review all details and conditions prior to ordering hardware. If door hand is changed during construction, coordinate and change all hardware as necessary at no cost to the Owner.

1.9. OPERATION AND MAINTENANCE DATA

1.9.1. Submit operation and maintenance data under provisions of Section 01.

1.9.2. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.10. DELIVERY, STORAGE, AND HANDLING

1.10.1. Deliver products to site under provisions of Section 01 65 00.

1.10.2. Store and protect products under provisions of Section 01 65 00.

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

1.11. MAINTENANCE MATERIALS

1.11.1. Provide special wrenches and tools applicable to each different or special hardware component.

1.11.2. Provide maintenance tools and accessories supplied by hardware component manufacturer.

1.12. WARRANTY AND GUARANTY

1.12.1. Provide warranty from hardware supplier against all defects on all hardware, including electrical components, as follows:

1.12.1.1. Closers: Thirty years, except electronic closers shall be warranted for two years.

1.12.1.2. Exit Devices: Five years.

1.12.1.3. Hinges: Life of the building.

1.12.1.4. All other hardware: Two years.

1.12.2. CONTRACTORS GUARANTEE

1.12.2.1. Provide, in Architect approved form, the Owner with a guarantee against the following specific defects or failures for a period of a minimum of two (2) years after Notice of Substantial Completion:

1.12.2.1.1. Loose or misaligned components, resulting in the inability for the hardware assembly to function as intended or in compliance with applicable regulations.

1.12.2.1.2. Finish failure, including rust, pitting, flaking and other finish appearance defects.
2. **PART 2 - PRODUCTS**

2.1. **MANUFACTURERS**

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section and Hardware Schedule, are indicated to establish required level of quality, appearance, and performance. The Architect will consider comparable products by alternate manufacturers where listed, and requests for substitutions, under the provisions of Section 01 25 00

2.1.2. Obtain each kind of hardware (latch and locksets, exit devices, hinges, and closers) from one manufacturer.

2.2. **DOOR HARDWARE CRITERIA**

2.2.1. Manufacturers:

2.2.1.1. Hinges: Ives (IVE).

2.2.1.1.1. Approved Alternate: Stanley or Lawrence.

2.2.1.2. Locks and Latchsets: Schlage (SCH).

2.2.1.2.1. Approved Alternate: None – Owners Standard.

2.2.1.3. Cylinders: ASSA ABLOY Provide by PCC Lock Shop – (non removable core).

2.2.1.4. Exit Devices: Von Duprin (VON).

2.2.1.5. Approved Alternate: None – Owners Standard

2.2.1.6. Closer: LCN (LCN).

2.2.1.6.1. Approved Alternate: Norton.

2.2.1.7. Miscellaneous hardware, including pulls and kick plates: Ives (IVE).

2.2.1.7.1. Approved Alternate: Trimco.

2.2.1.8. Stop, Anchors and Door Bumpers: Ives (IVE).

2.2.1.8.1. Approved Alternate: Trimco.

2.2.1.9. Seals, Door Bottoms: Zero (ZER).

2.2.1.9.1. Approved Alternate: Pemko, Reese, NGP.

2.2.1.10. Lock Guards: Ives (IVE).

2.2.1.10.1. Approved Alternate: Trimco

2.2.2. Finishes
2.2.2.1. Finishes are identified in Schedule at end of this Section.

2.2.2.2. Where finish not shown, match finish of lockset.

2.2.2.3. Provide black colored seals unless specified otherwise.

2.2.2.4. Provide fasteners matching in finish, base material and color.

2.2.3. Door Closers:

2.2.3.1. Secure closer base or shoe to door with sex bolt fasteners, painted to match closer finish.

2.2.3.2. Provide parallel arm design, mounted on door, push side, unless noted otherwise.

2.2.3.3. Provide all required shoes, drop brackets, extension and long arms as required to install in designated location.

2.2.3.4. Provide fire retardant fluid in closers for rated openings in compliance with UL 10C.

2.2.3.5. Where door is indicated as having fire resistance rating, provide UL Listed and labeled hardware.

2.2.4. Door Butts:

2.2.4.1. Unless noted otherwise, provide steel or stainless steel hinges, sheradized, with finish as shown in schedule. Provide pre-finish equivalent to Stanley "K" at all exterior doors.

2.2.4.2. Unless noted otherwise, provide hinges in accordance with following schedule.

2.2.4.2.1. Doors up to 4 feet 0 inches high: 2 hinges.

2.2.4.2.2. Doors 4 feet 0 inches to 7 feet 5 inches high: 3 hinges minimum.

2.2.4.2.3. Doors greater than 7 feet 5 inches high: 4 hinges minimum.

2.2.4.2.4. Provide extra heavy weight hinges on doors over 3 feet 5 inches wide.

2.2.4.3. Unless otherwise noted or required, provide full mortise hinges, with non-rising loose pins, ball bearing or oilite bearings, and hospital tips.

2.2.4.4. Provide set screw (NRP) type at exterior outswinging doors to prevent pin removal when door is in closed position.

2.2.4.5. Where necessary to maintain door clearance at jamb trim, frame conditions, door reveals and similar conditions, furnish wide throw hinges as approved by the Architect.
2.2.4.6. Where door is indicated as having fire resistance rating, provide UL Listed and labeled hardware.

2.2.5. Locksets, Latchsets and Strikes

2.2.5.1. Unless noted otherwise in schedule, all locksets, latchsets, cylinders and component parts shall be the products of a single manufacturer.

2.2.5.2. Provide strikes at all locks with curved lip of sufficient length to protect trim and jamb. Each strike shall include wrought strike box. Provide 7/8 inch lip strikes at pairs of doors.

2.2.5.3. Unless noted otherwise, provide lever handles at all locks, latches, and other door hardware. Provide lever design with maximum of 1/2 inch handle return, measured from door face.

2.2.5.4. Unless noted otherwise, provide 2-3/4 inch backset. Provide minimum 3/4 inch throw, two piece latch bolt with dogging assistance, on all latchsets and locksets.

2.2.6. Fasteners

2.2.6.1. Unless noted otherwise, provide countersunk, full thread, flat head Phillips screw fasteners. Provide machine screws at metal substrates and wood screws at wood substrate.

2.2.6.2. Provide lead shields or similar anchor devices for items fastened to concrete or masonry.

2.2.7. Thresholds

2.2.7.1. Unless noted otherwise, provide aluminum finish thresholds, with proper anchor, insert and fastener.

2.2.7.2. Unless shown otherwise, provide thresholds as indicated in Hardware sets.

2.2.7.3. All thresholds shall comply with Section 1008.1.6 and 1133B.2.4.1.

2.2.8. Kickplates and Accessories

2.2.8.1. Unless noted otherwise, provide stainless steel kickplates, 18 gauge, B4E finish. Provide 10 inches high, 2 inches less than door width on single doors, 1 inch less than door width on pair of doors, with beveled/eased edges.

2.2.8.2. Floor mounted door stops are prohibited where located in the path of travel. Where provided, install maximum 4 inches from wall surface parallel to the direction of travel.

2.2.9. Seals

2.2.9.1. Unless noted otherwise, provide seals complete with retainers, fasteners and trim.
2.2.9.2. Provide UL Listed seals at all rated openings.

2.2.9.3. Unless noted otherwise, provide brush, silicone or polyurethane seals at all door jamb and head conditions. Use of vinyl seals prohibited.

2.3. KEYING

2.3.1. In order to match established Masterkey system, furnish Schlage "F" keyways to match keyway of record for each cylinder and lock.

2.3.2. Stamp master keys and grand master keys with a registry number. Do not stamp "Master" or letter "M". Provide three of each, GGM Keys, GM Keys, Master Keys, and Control Keys.

2.3.3. Stamp individual room keys with plain identification number. Do not indicate key cut. Provide four keys per cylinder.

2.3.4. Factory cut all keys and stamp "DO NOT DUPLICATE".

2.3.5. All locksets and cylinders shall be construction keyed with brass cores. Provide plug and extractor or construction control keys, ten each, for the system for final keyway. The Contractor, after Owner’s approval, shall remove the construction cores and assist the Owner inserting the permanent cylinders.

2.3.6. Contractor and hardware supplier shall meet with the Owners Representative and Architect to establish the keying schedule and to provide the correct grand, master, pass and change key groups to properly operate all locking devices. Provide a keying submittal for review and acceptance. Provide a bitting list with keying nomenclature and location for each core and cylinder.

2.3.6.1. Owner’s representative: Verify current Locksmith.

2.3.7. Provide record and registration system as directed by Architect.

2.3.8. All locksets and cylinders shall be keyed, masterkeyed, and grand masterkeyed at the factory.

2.3.9. Contractor shall be responsible for completion of keying schedule and ordering all construction and permanent keys.

2.3.10. Deliver keys directly to Owner by registered security shipment direct from hardware manufacturer. Hardware supplier shall not cut keys.

2.4. OTHER MATERIALS

2.4.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection
3.1.1.1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify that power supply of proper voltage and type is available to power operated devices.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. INSTALLATION

3.2.1. Install hardware in accordance with manufacturer's instructions and requirements of SDI, ANSI/NFPA 80, AWS, and BHMA. Select applicable standard based on door function, type and regulatory criteria.

3.2.2. Renovation of existing hardware assembly.

3.2.2.1. Inspect all existing hardware.

3.2.2.2. Where door is designated as receiving new hardware, remove, package and label hardware type and function, and deliver to Owner.

3.2.2.3. Renovate hardware designated to remain with new fasteners, adjustment and alignment as necessary.

3.2.3. Install hardware using templates provided by hardware item manufacturer.

3.2.3.1. Prior to finishing door, fit hardware to door, utilizing fasteners and templates as specified.

3.2.3.2. Remove hardware, carefully label and store. Where door is existing and designated to receive new finish, remove all existing hardware.

3.2.3.3. Re-install after door finish is complete.

3.2.4. Unless noted otherwise or shown on drawings, mount hardware in accordance with the following criteria:

3.2.4.1. Hinges:

3.2.4.1.1. Top and Bottom Hinge: 9-5/8 inches to center of hinge.

3.2.4.1.2. Intermediate Hinge(s): Equally spaced between top and bottom hinge center line

3.2.4.2. Latchset and lockset handle: *Mount latchset's operating at 40 5/16" above the finish floor.* Verify manufacturers template with door design.
3.2.4.3. Dead Locks: *Mount lockset’s operating hardware at 48 inches above the finish floor.*

3.2.4.4. Panic Devices: *Mount lockset’s operating hardware at 38 inches above the finish floor.* Verify manufacturers template with door design.

3.2.4.5. Push Plate: 40 inches, cut for cylinders or turn pieces if necessary.

3.2.4.6. Door Pulls: 40 inches, cut for cylinders or turn pieces if necessary.

3.2.5. Install thresholds in full bed of sealant at front and side edges.

3.3. DOOR HARDWARE SCHEDULE.

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HW SET: 06

EACH TO HAVE:

RELOCATED EXISTING DOOR, FRAME AND HARDWARE.

END OF SECTION
SECTION 08 81 00
GLASS AND GLAZING

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Glass and glazing for windows and doors.

1.2. REFERENCES

1.2.1. ASTM C-1036 - Standard Specification for Flat Glass.

1.2.2. ASTM C-1048 - Standard Specification for Heat-Treated Flat Glass - Kind FT Coated and Uncoated Glass.

1.2.3. Glass Association of North America (GANA) (formerly FGMA) - Glazing Manual.

1.3. QUALITY ASSURANCE

1.3.1. Conform to GANA Glazing Manual for glazing installation methods.

1.3.2. Manufacturer: Manufacturer shall have produced the specified system or products for a period of one (1) year prior to beginning work of this section, and shall have the capability to produce the specified products to the delivery and quantity criteria of the project.

1.3.3. Staff:

1.3.3.1. Use only personnel who are thoroughly trained and experienced in the skills required and have installed similar applications of the specified products within one year prior to beginning work of this section.

1.3.3.2. Use only staff who are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

1.4. SUBMITTALS

1.4.1. Submit in accordance with the provisions of Section 01 33 00.

1.4.2. Materials List: Provide complete list of all proposed materials and accessories, including product data on performance criteria.

1.4.3. Samples: Accompanying materials list, submit three 12 inch square samples of each glass type. Grind and seal all edges.

1.4.4. Shop Drawings: Provide complete shop drawings indicating glass type, installation method, and materials used.
1.5. DELIVERY, STORAGE, AND PROTECTION

1.5.1. Deliver products to site under provisions of the General Conditions.

1.5.2. Store and protect products under provisions of the General Conditions.

1.6. WARRANTY

1.6.1. Warranty:

1.6.1.1. Provide, in Architect approved form, the Owner with a guarantee against the following specific defects or failures for a period of three (3) years after Notice of Substantial Completion:

1.6.1.1.1. Broken, cracked or otherwise damaged glass not resulting from vandalism.

1.6.1.1.2. Water intrusion through sealant/glass joint.

1.6.1.1.3. Sealant failure.

1.6.1.1.4. Fogging or delamination at laminated glass.

1.6.2. Insulating Glass Warranty:

1.6.2.1. Provide, in Architect approved form, the Owner with manufacturers warranty against the following specific defects or failures for a period of ten (10) years after Notice of Substantial Completion:

1.6.2.1.1. No material obstruction of vision through glass caused by accumulation of dust, moisture or film on the internal surface of glass caused by insulating seal failure.

1.6.2.1.2. Water intrusion through sealant/glass joint.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2. SPANDREL GLASS:


2.2.2. Type: Type 4: Opaque, fully tempered, spandrel application.

2.2.3. Characteristics:
2.2.3.1. Series/Type: Dual glazed glass units, fully tempered.
  2.2.3.1.1. Solarban 70XL(2) Solarbronze + Clear with spandrel on surface (4)
  2.2.3.2. Total Thickness: One inch, and as required by code, with 1/2 inch air space.
  2.2.3.3. Characteristics: Type 4 Opaque
        2.2.3.3.1. Strength: Each lite fully Tempered (Kind FT) per ASTM C 1048 and ASTM C 1036. Permanently label all tempered glass. SHGC: 0.25.
            2.2.3.3.1.1. Shading Coefficient: 0.24
            2.2.3.3.1.2. U-value – Summer Daytime: 0.26.
            2.2.3.3.1.3. U-value – Winter Night: 0.28.
        2.2.3.3.2. Type: Type 1 - transparent, Class 1 - clear, q3 quality - glazing select, float glass.
        2.2.3.3.3. Light Transmission: Opaque.
        2.2.3.3.4. Spandrel Opacifier: Provide polyester film with solvent based adhesive, color as selected from manufacturers dark brown/gray line.
        2.2.3.3.5. Safety Standards: Comply with Chapter 24 IBC safety glazing requirements.

2.3. INSULATING GLASS UNIT, FULLY TEMPERED – GL-1
  2.3.2. Series/Type: Dual glazed glass units, fully tempered.
        2.3.2.1. Exterior Lite: 6mm Solarban 70XL (2) on Solarbronze.
        2.3.2.2. Interior Lite: 6mm Sungate 500 (3) on Clear.
  2.3.3. Total Thickness: One inch, and as required by code, with 1/2 inch air space.
  2.3.4. Characteristics:
        2.3.4.1. Strength: Each lite fully Tempered (Kind FT) per ASTM C 1048 and ASTM C 1036. Permanently label all tempered glass.
        2.3.4.2. SHGC: 0.21.
        2.3.4.3. Visible Light Transmission: 37 percent.
        2.3.4.4. Shading Coefficient: 0.24
2.3.4.5. U-value – Summer Daytime: 0.26.

2.3.4.6. U-value – Winter Night: 0.28.

2.3.4.7. Safety Standards: Comply with IBC Chapter 24, safety glazing requirements.

2.3.4.8. Seal Classification: Class CBA per ASTM E 773/774, with third party validation required.

2.3.5. Accessories:

2.3.5.1. Capillary Tubes: Provide capillary tubes at units as recommended by manufacturer for installed altitude conditions.

2.3.5.2. Safety/Habitability Characteristics:

2.3.5.2.1. Safety Standards: Comply with Chapter 24, IBC safety glazing requirements.

2.4. GLASS DESIGN CRITERIA

2.4.1. Provide glass thickness, edge support, "bite," and other engineering criteria per referenced standards and IBC Chapter 24.

2.4.2. Provide glass that has been produced, fabricated, and installed to withstand normal thermal movement and wind loading, without failure, including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects in the work.

2.4.2.1. Normal thermal movement is defined as that resulting from a consequent temperature range of +10 degrees F to +180 degrees F within glass and glass framing members.

2.4.3. Provide glass thickness in minimum thickness specified and as required by IBC Chapter 16 and the following criteria:

2.4.3.1. Wind Speed: 85 MPH wind speed, (3 second gust)

2.4.3.2. Exposure: Exposure C.

2.4.4. Provide safety glazing complying with at all locations as required by IBC, Chapter 24.

2.4.4.1. Provide permanent etched or ceramic fired label on all safety glazing, visible after installation.

2.5. GLAZING ACCESSORIES

2.5.1. Setting Blocks: Neoprene or EPDM with a Shore A Durometer value of 85 +\_ 5.

2.5.2. Spacer Shims: Neoprene with a Shore A Durometer value of 50.

2.5.3. Foam Glazing Tapes / Beads: Provide manufacturers recommended system, UV Stabilized, black color.
2.5.4. Glazing putty/sealant: Provide DOW or equal, Series 795 structural silicone sealant for repair of existing window system glazing. Color as selected by Architect from standard color line.

2.6. OTHER MATERIALS

2.6.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify surfaces of glazing channels or recesses are clean and free of obstructions.

3.1.1.2.2. Verify insulating glass unit sealant is compatible with window system glazing methods specified in Section 08520.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. GLASS INSTALLATION

3.2.1. General

3.2.1.1. Install all glass at proper ambient temperatures.

3.2.1.2. Do not glaze assemblies when damp or wet due to rain, dew, condensation, or other moisture sources.

3.2.1.3. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners.

3.2.1.4. Do not impact glass with metal framing.

3.2.1.5. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar.
3.2.1.6. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening.

3.2.1.7. Remove from project and dispose of glass units with edge damage or other imperfections of the type that, when installed, weaken glass and impair performance and appearance.

3.2.1.8. Install all glass within ambient temperature limits established by glass manufacturer.

3.2.1.9. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

3.2.2. Install all glass products in accordance with referenced codes, standards, and approved submittals. Install per recommendations of manufacturer, and as specified in related sections.

3.2.3. Install in accordance with Listing and labeling requirements.

3.2.3.1. Install wire glass with mesh pattern aligned vertically and horizontally.

3.2.4. Rest glass on setting blocks per referenced standard.

3.2.4.1. Install neoprene or EPDM setting blocks. No lead setting blocks permitted.

3.2.4.2. Provide minimum 4 inch long setting block, and as required by glass manufacturer. Install at quarter points unless otherwise approved.

3.2.4.3. Provide setting block width 1/16 to 1/8 inch less than the width of the glazing pocket, and a minimum of 1/8 inch wider than glass thickness.

3.2.4.4. Provide edge blocking at all jamb conditions of captured pocket glazing.

3.2.5. Repair of existing glazing system.

3.2.5.1. Where shown on drawings, repair existing glazing assemblies.

3.2.5.2. Remove all existing putty or sealant by approved means, providing satisfactory surface for sealant installation.

3.2.5.3. Install glass on approved setting blocks with specified sealant. Install in accordance with sealant manufacturers recommendations.

3.3. PROTECTION AND CLEANING

3.3.1. Protect glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply tape or marking of any kind to glass surface. Remove non-code required and non-permanent labels.

3.3.2. Remove tape after work is completed.
3.3.3. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.

3.3.4. Examine glass surfaces adjacent to or below exterior plaster, concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer. Remove tape after work is completed.

3.3.5. Do not store materials or any kind against interior or exterior surfaces of glass or glass frame. Remove tape after work is completed.

3.3.6. Immediately prior to completion of the Work, clean all glass using manufacturers approved methods.

3.4. REPLACEMENT

3.4.1. Immediately remove all glass delivered to site with manufacturing or fabrication defects.

3.4.2. Remove and replace all glass broken, cracked, abraded or damaged in any other way during construction period due to construction, vandalism, natural occurrences or other causes.

3.4.3. Remove and replace all glass broken, cracked, abraded or damaged in any other way during construction period due to construction, vandalism, natural occurrences or other causes.

3.4.3.1. Comply with scratch tolerances specified below for all glass.

3.4.4. Immediately remove all glass delivered to site with manufacturing or fabrication defects defined as follows:

3.4.4.1. Based on inspection from a distance of 6 feet, pinholes exceeding 1/16 inch in diameter are not acceptable.

3.4.4.2. Based on inspection from a distance of 6 feet, clusters of pinholes less than 1/16 inch in diameter shall not occur in the central 80 percent of the glass.

3.4.4.3. Based on inspection from a distance of 10 feet, scratches exceeding 2 inches are not acceptable, except scratches up to 3 inches in length will be acceptable if located a maximum of 3 inches of glass edge.

3.4.4.4. Concentrated scratched or abraded areas are not acceptable at any part of glass panel.

END OF SECTION
SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Gypsum board.

1.1.2. Joint treatment and surface finishes.

1.1.3. Metal support and furring systems.

1.1.4. Cementitious backer board for ceramic tile.

1.1.5. Exterior gypsum sheathing for EIFS assemblies.

1.1.6. Metal suspension system for drywall ceiling assemblies.

1.2. REFERENCES

1.2.1. ASTM C 36 - Gypsum Wallboard.

1.2.2. ASTM C 442 - Specification for Gypsum Backing Board and Coreboard.

1.2.3. ASTM C 630 - Water Resistant Gypsum Backing Board.

1.2.4. ASTM C 645 – Nonstructural Steel Framing Members

1.2.5. ASTM C 1002 - Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases.

1.2.6. ASTM C 1177 – Glass Mat Gypsum Substrate for Use as Sheathing.


1.2.9. Gypsum Association, "Levels of Gypsum Board Finish"

1.2.10. ASTM C 36 - Gypsum Wallboard.

1.3. REGULATORY REQUIREMENTS

1.3.1. Conform to IBC Chapter 7 for fire rated assemblies.

1.3.2. Conform to IBC Chapter 25 for finish materials installation.
1.4. SUBMITTALS

1.4.1. Provide submittals under provisions of Division 01.

1.4.2. Submit product data indicating materials, joint toppings and finish materials, and accessories.

1.4.3. Submit manufacturer’s installation instructions.

1.5. QUALITY ASSURANCE

1.5.1. Manufacturer: Provide company who has produced the specified products for a period of 5 years prior to beginning work of this Section and maintains the capability to provide the specified products in compliance with the delivery and quantity criteria for the Project.

1.5.2. Installer: For installation of work, use only personnel who are thoroughly trained and experienced in the skills required, have installed similar applications of the specified products within one year prior to beginning work of this Section, and who are completely familiar with the manufacturers’ recommended methods of installation as well as the requirements of this work.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2. GYPSUM BOARD

2.2.1. Manufacturer: United States Gypsum (USG), www.usg.com, Georgia-Pacific (G-P) www.gpgypsum.com or equal.

2.2.2. Board Type:

2.2.2.1. Fire Rated: USG FireCode Core (Type X) per ASTM C36.

2.2.2.1.1. Edge: SW Tapered.

2.2.2.1.2. Thickness: 5/8 inch and 1/2” as noted on plans

2.2.2.2. Exterior Sheathing: Georgia-Pacific DensGlass Exterior Sheathing Fireguard Type X or USG Securock Glass-Mat Sheathing Firecode Core per ASTM C1177 and ASTM D3273

2.2.2.2.1. Edge: Square.

2.2.2.2.2. Thickness: 5/8 inch.
2.2.2.3. Moisture and mold resistant treated core and coated fiberglass mat on face, back and long edges with 12-month warranty against in-place weather exposure damage.

2.2.2.4. When tested for mold growth per ASTM D3273, product shall score the highest possible rating: 10.

2.2.3. Exterior Gypsum Ceiling Board: Firecode (Type X) per ASTM 1396
2.2.3.1. Edge: Square.
2.2.3.2. Thickness: 5/8 inch.

2.3. ACCESSORIES
2.3.1. Acoustical Sealant: USG, Non-hardening, non-skinning, conforming to ASTM C557 and C919, for use in conjunction with non-rated gypsum board assemblies.

2.3.2. Drywall Joint and Edge Accessories:
2.3.2.1. Corner Bead: USG or approved alternate, paper faced metal.
2.3.2.2. Edge Trim: USG or approved alternate, paper faced metal.
2.3.2.3. Drywall Reveal: Fry, DRM Series, reveal dimension as shown on drawings.

2.3.3. Joint and Finishing Systems:
2.3.3.1. Provide systems produced by same manufacturer as boards.
2.3.3.2. Joint Systems: USG Ready Mixed Compounds, complying with ASTM C475, vinyl based, certified asbestos free.
2.3.3.3. Finishing System Materials: USG Multi-Purpose or approved alternate, complying with ASTM C475, non-aggregate, vinyl based, certified asbestos free.
2.3.3.4. Primer: Manufacturer’s approved primer, compatible with finishes specified in other Sections.

2.3.4. Fasteners:
2.3.4.1. Gypsum board screws: type and length as required by installation and UL Listing criteria.
2.3.4.2. Gypsum board nails: type and length as required by installation and UL Listing criteria. Nails not permitted at interior gypsum board applications.
2.3.4.3. Cementitious Backer Unit screws: corrosion resistant, type and length as required by manufacturer, installation and UL Listing criteria. Nails not permitted.
2.3.5. **Adhesive:** Manufacturer's approved adhesive for attachment to concrete surfaces.

2.3.6. **Underlayment Membrane:** Membrane complying with ANSI A 108.2-3.8.

2.3.7. **Metal Furring Components:**

2.3.7.1. **Resilient Channels:** USG, Series RC-1, 1/2 inch depth.

2.3.7.2. **Wall Furring Channels:** Provide USG Metal Furring Channel, 20 gage, corrosion resistant steel.

2.4. **CEMENTITIOUS BACKER UNIT (CBU)**

2.4.1. **Manufacturer:** USG or equal.

2.4.2. **Series:** USG Durock Cement Board.

2.4.2.1. **Characteristics:**

2.4.2.1.1. **Edge:** Smooth wrapped edge.

2.4.2.1.2. **Thickness:** 5/8 inch or as indicated.

2.4.2.1.3. **Indentation Resistance:** 2300 psi, 1 inch disc at 0.02 inch indentation per ASTM D2394.

2.4.2.1.4. **Water Absorption:** 10 percent maximum at 24 hours per ASTM C473.

2.4.2.1.5. **Flexural Strength:** 750 psi per ASTM C947.

2.4.2.2. **Fire and Life Safety Criteria:**

2.4.2.2.1. **Surface Burning/Smoke contributed:** Maximum values of 5/0 per ASTM E84.

2.4.2.2.2. **Listing:** UL Listed as a component in rated wall and floor assemblies per ASTM E119.

2.5. **METAL SUSPENSION SYSTEM FOR DRYWALL CEILING ASSEMBLIES**

2.5.1. **Manufacturer:** USG or equal.

2.5.2. **Type:** Runner and furring channel grid system.

2.5.3. **Components:**

2.5.3.1. **Main Runner:** Provide hot rolled channels, complying with IBC, Chapter 25, galvanized.

2.5.3.2. **Cross-Furring:** Provide galvanized hat channels, complying with IBC, Chapter 25.

2.5.3.3. **Vertical Hanger Wire:** Prestretched steel wire, Number 8, galvanized.
2.6. OTHER MATERIALS

2.6.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify framing members are properly installed and will comply with specified tolerances.

3.1.1.2.2. Verify that openings, curbs, pipes, sleeves, ducts, and vents are solidly set, and blocking and backing is in place.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. PREPARATION

3.2.1. Insulation Coordination:

3.2.1.1. Verify insulation is fitted tightly within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and to items passing through partitions.

3.2.2. Metal Suspension System:
3.2.2.1. Install metal suspension system for drywall ceiling surfaces in accordance with USG AC 3152.

3.3. **GYPSUM BOARD INSTALLATION**

3.3.1. Install gypsum board in accordance with manufacturer's instructions and designated system number for fire rated assemblies.

3.3.1.1. Unless noted otherwise, utilize water resistant type for wall surfaces within four feet of the outermost edge of any plumbing fixture or moisture generating equipment. Extend water resistant gypsum board full height.

3.3.1.2. Do not use water resistant gypsum board on ceiling applications.

3.3.2. Where gypsum board extends across concrete curbs, install with specified adhesive, consisting of vertical beads placed at 4 inches on center full height. Bond to curb with rollers exerting sufficient pressure to assure full contact and surface alignment with board at framing above.

3.3.3. Use screws of proper length when fastening gypsum board to framing, spaced at 8 inches on center maximum at each support.

3.3.4. Double Layer Applications: Place second layer parallel to first layer. Offset joints of second layer from joints of first layer a minimum of one stud spacing, and as required by referenced test standard.

3.3.5. **Edge and Trim Installation:**

3.3.5.1. Install corner beads at all external corners. Use longest practical length.

3.3.5.2. Install corner beads at all conditions where gypsum board abuts dissimilar materials.

3.3.5.3. Install angle reinforcement at interior corners.

3.3.5.4. Tape and finish joint reinforcement as specified.

3.3.6. Install acoustical sealant at wall perimeter, including floor edge, and at all penetrations where fire stopping is not required.

3.3.7. **Cementitious Backer Unit Installation:**

3.3.7.1. Install backer board in accordance with manufacturer's recommendations, including USG Systems Folder SA-934.

3.3.7.2. Apply specified underlayment membrane to framing with approved adhesive or tape. Lap membrane 4 inches in shingle fashion at all joints.

3.3.7.3. Install backer board with joints over supports. Space ends and edges 1/8 inch apart.

3.3.7.4. Install backer board using screws at maximum 8 inches on center at each support.
3.3.7.5. Prefill all joints with approved latex fortified mortar meeting ANSI 118.4. Tape all joints and level.

3.3.8. Exterior Gypsum Sheathing Installation at EIFS Application:

3.3.8.1. Install gypsum sheathing in accordance with manufacturer's recommendations, including EIFS manufacturer's requirements. Install boards with correct side to exterior.

3.3.8.2. Install approved weather barrier over framing members per manufacturer's recommendations.

3.3.8.3. Install board with joints over supports. Space ends and edges 1/8 inch apart.

3.3.8.4. Install board using approved fasteners at maximum 8 inches on center at each support.

3.3.8.5. Apply approved sealant at sheathing edges and penetrations. Coordinate joint treatment with specified air and or water barrier.

3.3.8.6. Entire face of gypsum sheathing shall be covered with synthetic fiber wrap weather barrier.

3.4. GYPSUM BOARD FINISH AND JOINT TREATMENT

3.4.1. Comply with descriptions and Finish Levels as specified and in accordance with referenced standard.

3.4.2. LEVEL 2 Finish: Gypsum board located above ceiling areas, plenums, and similar surfaces not visible in completed construction:

3.4.2.1. Embed tape at all joints and interior angles in joint compound.

3.4.2.2. Apply one separate coat of joint compound over all joints, angles, fastener heads, and accessories.

3.4.2.3. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

3.4.3. LEVEL 5 Finish - match existing: Gypsum board surfaces receiving eggshell, semigloss or gloss paint finish.

3.4.3.1. Embed tape at all joints and interior angles in joint compound.

3.4.3.2. Apply three separate coats of joint compound over all joints, angles, fastener heads, and accessories. Apply uniform coat of approved primer over entire surface with roller.

3.4.3.3. Apply texture coating over entire surface. Finish in "Orange Peel" texture as illustrated in USG Construction Handbook. Surface shall be smooth and free of tool marks and ridges.

3.4.3.4. Apply uniform coat of approved primer over entire surface with roller.
3.5. TOLERANCES

3.5.1. Comply with the following tolerances for level, plumb and flat. Where substrate framing will not comply with specified tolerances, correct deficiencies as required.

3.5.1.1. Level and Plumb: Plus or minus 1/4 inch in 10 feet, non-cumulative.

3.5.1.2. Flatness: No gaps exceeding 1/8 inch at any point under a 10 foot straight edge placed on surface in any orientation.

END OF SECTION
SECTION 09 22 16
NON-STRUCTURAL METAL STUD FRAMING

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Steel non-structural light gage wall and horizontal framing for interior non-structural applications.

1.1.2. Steel furring systems.

1.1.3. Framing accessories.

1.2. REFERENCES

1.2.1. ASTM A 653, Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron-Alloy Coated (Galvannealed) by the Hot-Dip Process.

1.2.2. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

1.2.3. C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness

1.2.4. ASTM C 955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases

1.2.5. ASTM C 1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.

1.2.6. ASTM A 1011 - Structural Steel, Sheet and Strip, Carbon, Hot-Rolled.


1.3. QUALITY ASSURANCE

1.3.1. Provide full time quality control over fabrication and erection complying with applicable codes, ordinances, rules and regulations of government agencies having jurisdiction.
1.3.2. Provide fire-resistance-rated assemblies with materials and construction approved in assembly as tested by ASTM E 119 by an independent testing agency. Products used in the assembly shall carry a classification label from a testing laboratory acceptable to authority having jurisdiction.

1.3.3. Provide sound rated assemblies with materials and construction approved in assembly as tested by ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

1.4. QUALIFICATIONS

1.4.1. Manufacturer:

1.4.1.1. Manufacturer with a demonstrated history of producing the specified products for a period of five (5) years prior to beginning work of this section, and with the capability to produce the specified products to the delivery and quantity criteria of the project.

1.4.1.2. Current member of SSMA with current Quality Assurance Program.

1.4.2. Installing Contractor Qualifications

1.4.2.1. Company specializing in installation of work of this Section, with minimum 5 years documented experience in installation of projects of similar scale and scope.

1.4.2.2. Company has installed similar applications of the specified products within one year prior to beginning work of this section.

1.4.2.3. Welders shall be certified for welding with light gauge metals in compliance with all applicable AWS requirements.

1.4.2.4. Installing Foreman: Individual specializing in installation of work of this Section, with minimum 5 years documented experience in installation of projects of similar scale and scope.

1.4.2.5. Use only staff who are completely familiar with the manufacturers’ recommended methods of installation as well as the requirements of this work.

1.5. SUBMITTALS

1.5.1. Submit product data under provisions of Section 01 33 00.

1.5.2. Product Data:

1.5.2.1. Submit a complete list of all materials proposed to be furnished and installed under this portion of the work.

1.5.2.2. Provide current ICC ES report showing compliance with specified references.

1.5.2.3. Provide framing member materials, dimensions, structural properties and finishes.
1.5.2.4. Provide fastener and anchor data, including type, size, corrosion resistance and load capacity.

1.5.3. Manufacturers' Recommendations: Accompanying the materials list, submit two copies of the manufacturer's current recommended method of installation for each item.

1.5.4. Shop Drawings

1.5.4.1. Accompanying materials list, submit complete shop drawings for all metal framing applications.

1.5.4.2. Detail all connections, including sill/stud track and top runner/stud track.

1.5.4.3. Detail framing assembly for all openings, bracing and transitions in direction or plane of framing.

1.6. FIELD MEASUREMENTS

1.6.1. Verify field measurements are as shown on shop drawings.

1.7. DELIVERY, STORAGE AND HANDLING

1.7.1. Deliver and store on site under the provisions of Section 01 60 00.

1.7.2. Store materials above ground, protected from dirt, grease, corrosion and other damage.

1.7.3. Store all other materials in a waterproof manner.

1.7.4. Provide original packaged welding electrodes, clearly marked as to type and rating.

1.7.5. Do not store materials on structure in a manner causing potential distortion or damage to members, surfaces, or supporting structures.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products manufactured by Cemco Steel Framing Systems, www.cemcosteel.com, are indicated to establish required level of quality and performance. The Architect will consider comparable products by alternate manufacturers listed in this Section, and requests for substitutions, under the provisions of Section 01 25 00.

2.1.1.1. Acceptable Alternate Manufacturers: Dietrich, Clark-Western, or equal.

2.2. MATERIALS/DESIGN CRITERIA

2.2.1. Base Metal Thickness Criteria: All metal framing materials provided as work of this Section shall comply with the following minimum thickness criteria for uncoated sheet steel. Thicknesses indicated are the minimum acceptable thickness for materials delivered to jobsite.
2.2.1.1. Members designated as 20 gage (33 mil): 0.0329-inch

2.2.1.2. Members designated as 16 gage (54 mil): 0.0538-inch

2.3. WALL STUDS / VERTICAL SURFACE FRAMING MATERIALS

2.3.1. Type: Punched "C" studs, screwable, per ASTM C 955.

2.3.2. Series: CS Series

2.3.3. Characteristics:

2.3.3.1. Size: Depth as shown on drawings, 1-5/8 inch flange with 1/2 inch return, unless noted otherwise.

2.3.3.2. Base Metal:

2.3.3.2.1. 20 gage members: ASTM A 653 Grade 33 sheet steel, Fy = 33,000 psi, galvanized to G60 coating class per ASTM A 653.

2.3.3.2.2. 16 gage members: ASTM A 653 Grade 50 sheet steel, Fy = 50,000 psi, galvanized to G60 coating class per ASTM A 653.

2.3.3.3. Top and bottom Track: Same gage and material as wall framing or 20 gage, whichever is more restrictive, 1-1/2 inch leg unless noted otherwise, width to suit stud width.

2.3.3.4. Deflection Track: provide Cemco Deflection Track, or a comparable product.

2.3.3.5. Bracing: 20 gage, unless otherwise indicated.

2.3.3.6. Stud Punch-Outs: minimum 10 inches between end of member and near edge of web punch-out and 24 inches on center thereafter, per ASTM C 955.

2.4. WALL FURRING MATERIALS

2.4.1. Manufacturer: Cemco or equal.

2.4.2. Type: Hat channel, screwable, ASTM C 645.

2.4.2.1. Series: 20 gage (33 mil).

2.4.2.2. Size: 7/8 inch OR 1-1/2 inch depth, 1 1/2 inch nominal screw face width.

2.4.2.3. Base Metal: ASTM A 653 Grade 33 sheet steel, galvanized to G40 coating class per ASTM A 653.

2.4.3. Type: Z furring Channel, screwable, per ASTM C 645.
2.4.3.1. Series: 20 gage (33 mil).

2.4.3.2. Size: as shown on drawings for condition shown. minimum 7/8 inch leg.

2.4.3.3. Base Metal: ASTM A 653 Grade 33 sheet steel, galvanized to G40 coating class per ASTM A 653.

2.5. HORIZONTAL JOIST AND SOFFIT FRAMING MATERIALS

2.5.1. Type: Punched "C" studs, screwable, per ASTM C 955.

2.5.2. Series: CS Series

2.5.3. Characteristics:

2.5.3.1. Size: Depth as shown on drawings, 1-5/8 inch flange with 1/2 inch return, unless noted otherwise.

2.5.3.2. Base Metal:

2.5.3.2.1. 20 gage members: ASTM A 653 Grade 33 sheet steel, F_y = 33,000 psi, galvanized to G60 coating class per ASTM A 653.

2.5.3.2.2. 16 gage members: ASTM A 653 Grade 50 sheet steel, F_y = 50,000 psi, galvanized to G60 coating class per ASTM A 653.

2.5.3.3. Track, bracing and closures: Same gage and material as framing or 20 gage, whichever is more restrictive, 1-1/2 inch leg unless noted otherwise, width as required for transition.

2.6. ACCESSORIES


2.6.2. Metal Backing: 16 gage galvanized steel, as indicated on drawings, for attachment of wall mounted fixtures, equipment, cabinets, shelving, grab bars and handrails and other items not considered finish materials.

2.6.3. Anchorage Devices:

2.6.3.1. Expansion anchors: Galvanized steel, size as indicated on drawings.

2.6.3.2. Concrete screw anchors: Galvanized steel, size as indicated on drawings.

2.6.3.3. Powder Actuated Fasteners: Size and type as indicated on drawings.

2.6.4. Acoustic Sealant: As specified in Section 09 21 16.

2.6.5. Primer: FS TT-P-645, for touch-up of galvanized surfaces.
2.7. FABRICATION

2.7.1. Fabricate assemblies of framed sections to sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.

2.7.2. Fit and assemble in largest practical sections for delivery to site, ready for installation.

2.8. SOURCE QUALITY CONTROL AND TESTS

2.8.1. Sample and test under the provision of Section 01 45 29.

2.9. OTHER MATERIALS

2.9.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. PREPARATION

3.2.1. Where offset anchor plates are required, provide continuous plates fastened to building structure as shown on drawings.

3.2.2. Coordination and layout

3.2.2.1. Verify stud spacing as required for compliance with all pertinent regulations to give proper support for the covering material, and as indicated on drawings.

3.2.2.2. Carefully coordinate all requirements for backing support of items to be mounted on finished covering.

3.2.2.3. Carefully coordinate all requirements for pipes and other items located within wall system, including punched opening dimension and alignment.
3.3. ERECTION

3.3.1. General

3.3.1.1. Comply with ASTM C 754. In addition, comply with requirements defined in ASTM C 840 as applicable to steel framing application.

3.3.1.2. Coordinate and provide bucks, blocking, blocking and backing plates as required for support of architectural, electrical, and mechanical work placed in or behind stud framing.

3.3.1.3. Coordinate placement of insulation in multiple stud spaces made inaccessible after stud framing erection.

3.3.1.4. Connect members with mechanical fasteners as shown on drawings, with screws penetrating joined members by not less than three exposed screw threads. Wire tying of framing members is not permitted.

3.3.2. Studs

3.3.2.1. Connect studs to tracks using method called for on the drawings and as specified.

3.3.2.2. Install studs so flanges within framing system point in same direction. Stud splicing is not acceptable.

3.3.2.3. Construct corners using minimum three studs.

3.3.2.4. Brace framing system and make rigid.

3.3.2.5. Coordinate erection of studs with requirements of door and window frame supports and attachments.

3.3.2.6. Align stud punched web openings.

3.3.2.7. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated. Install partitions continuous from floor to underside of solid structure unless otherwise shown.

3.3.2.8. Provide fire rated top-of-wall assembly at all rated walls to maintain continuity of fire-resistance-rated assembly.

3.3.2.9. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

3.3.2.10. Door Openings: Install two studs at each jamb, unless otherwise indicated. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3.3.2.11. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
3.3.3. Tracks

3.3.3.1. Align and secure top and bottom wall tracks to structure as shown on drawings.

3.3.3.2. Fit tracks under and above openings; secure intermediate studs at spacing of wall studs.

3.3.3.3. Maintain clearance under structural building members to avoid deflection transfer to studs.

3.4. TOLERANCES

3.4.1. Tolerances

3.4.1.1. Align all partition and wall assemblies to a tolerance of 1/8 inch in 10 feet deviation from line or plumb. Tolerances are not cumulative.

3.4.1.2. All corners and angles shall be as shown on plans to a tolerance of 1/8 inch in 2 feet-0 inches deviation from square or angle shown.

3.5. FIELD QUALITY CONTROL

3.5.1. Perform field inspection and testing under the provisions of Section 01 45 00.

3.5.1.1. Expansion Anchors: Provide pullout testing per testing schedule on Drawings.

END OF SECTION
SECTION 09 30 13
CERAMIC TILE

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Ceramic tile.

1.1.2. Grout, and setting materials.

1.1.3. Waterproof membranes.

1.1.4. Sealers.

1.2. REFERENCES

1.2.1. TCA (Tile Council of America) - Handbook for Ceramic Tile Installation.

1.3. SUBMITTALS

1.3.1. Samples

1.3.1.1. Submit four samples of specified colors and patterns of each tile, grout, and accessory units of the specified items.

1.3.1.2. Submit as an assembly in 24 inch square sample.

1.3.2. Materials List/Details: Accompanying samples, submit complete list of all proposed materials, including details of all joints between tile and adjoining materials.

1.3.3. Certification

1.3.3.1. Prior to installation of tile in any one area, submit written certification to Architect certifying that surfaces are properly prepared for specified installation.

1.4. QUALITY ASSURANCE

1.4.1. Conform to ANSI A137.1.

1.4.2. Conform to Tile Council of North America (TCNA) Handbook for Ceramic Tile Installation methods as defined in this Section.

1.5. QUALIFICATIONS

1.5.1. Manufacturer:
1.5.1.1. Manufacturer shall have produced tile products of similar type for a period of five (5) years prior to beginning work of this section, and shall have the capability to produce the specified products to the delivery and quantity criteria of the project.

1.5.2. Staff

1.5.2.1. Use only personnel thoroughly trained and experienced in the skills required, have installed similar applications of the specified products within one year prior to beginning work of this section, and are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

1.5.2.2. Staff installing specified grout shall have attended manufacturer's training sessions and have installed specified grout within the past 12 months prior to beginning work.

1.6. DELIVERY, STORAGE, AND HANDLING

1.6.1. Deliver products to site under provisions of Section 01 60 00.

1.6.2. Store and protect products under provisions of Section 01 60 00.

1.7. ENVIRONMENTAL REQUIREMENTS

1.7.1. Do not install adhesives in a closed, unventilated environment.

1.7.2. Maintain 50 degrees F during installation of mortar materials.

1.8. EXTRA STOCK

1.8.1. Provide sufficient field tile of each type and color to cover five square feet.

1.8.2. Package in clearly labeled containers, store as necessary until delivered to Owner.

2. PART 2 - PRODUCTS

2.1. CERAMIC TILE

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider comparable products by alternate manufacturers where listed, and requests for substitutions, under the provisions of Section 01 25 00.

2.1.1.1. All tile for like applications shall be the product of a single manufacturer as indicated below.

2.1.2. Product Characteristics: Interior Wall Tile (CT-1)

2.1.2.1. Manufacturer: Dal-Tile

2.1.2.1.1. Series: Matte

2.1.2.1.2. Size: 6 x 6
2.1.2.1.3. Color: To be selected by architect from manufacturer's full line

2.1.2.1.4. Finish: Glazed

2.2. PORTLAND CEMENT BOND COAT

2.2.1. Mapei Ultra/Flex II [www.mapei.com](http://www.mapei.com) or equal, polymer-modified one-step mortar per ANSI A108.5 and A118.4.

2.3. GROUT

2.3.1. All grouts shall be produced by same manufacturer.

2.3.2. UnSanded Grouts: Mapei Keracolor Wall or equal, with Mapei Plastijoints acrylic grout additive per ANSI A118.6. Two separate colors as selected by Architect from Classic or Designer Series color line.

2.4. SEALERS AND FINISHES

2.4.1. Grout Sealer: Miracle Sealants 511 Impregnator, phone (800)-350-1901.

2.5. ACCESSORIES

2.5.1. Sealants:

2.5.1.1. Interior sealants: Unless noted otherwise, provide sealants as manufactured by grout manufacturer.

2.6. WATERPROOFING AND CRACK ISOLATION MEMBRANES

2.6.1. Thin-set Waterproofing Applications (Interior): NobleSeal TS, Dal-Seal TS, or equal preformed sheet CPE membrane, 30 mil thickness, with facing. Provide preformed corners and all manufacturers recommended accessories.

2.7. MORTAR AND GROUT MIXES

2.7.1. Mix and proportion cementitious materials for mortar and grout mixes in accordance with manufacturers requirements.

2.7.1.1. Do not mix more bond coat than can be used within one hour.

2.7.1.2. If bond coat mixture begins to skin, discard and make new batch.

2.8. OTHER MATERIALS

2.8.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.
3. **PART 3 - EXECUTION**

3.1. **SURFACE CONDITIONS**

3.1.1. Inspection:

3.1.1.1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. **MEMBRANE INSTALLATION**

3.2.1. Waterproofing Membrane Installation:

3.2.1.1. Apply waterproofing membrane per manufacturers recommendations.

3.2.1.1.1. Apply thinset waterproofing membrane using approved latex modified mortar system.

3.2.1.2. Provide preformed corners. Seal all penetrations with specified sealant.

3.2.1.3. Detail all joints as required by manufacturer and approved submittal.

3.2.1.4. Extend membrane up wall surface as shown on drawings. Coordinate with wall underlayment.

3.2.1.5. At expansion joints, continue sheet material in looped fashion through joint to accommodate anticipated joint movement.

3.2.1.6. Allow sufficient time for all seams, transitions and setting beds to cure before installing subsequent materials. Do not install tile over waterproofing until waterproofing has been tested to determine that it is watertight.

3.3. **TILE INSTALLATION**

3.3.1. Install tile and grout in accordance with manufacturer's instructions and TCNA Handbook methods as specified.

3.3.2. Spread bond coat over area of installation using a notched trowel. Do NOT spread more bond coat than can be covered with tile within manufacturer's recommended time periods.
3.3.3. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Utilize bullnose trim shapes where tile terminates at dissimilar material in the same wall plane.

3.3.3.1. Use saw to cut tile fitting against curved surfaces or edges. Do not use nippers.

3.3.3.2. Use drill for all pipe or conduit penetrations. Do not split tile.

3.3.4. Place tile joints in uniform width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

3.3.5. Sound tile after setting. Replace hollow sounding units.

3.3.5.1. Back-butter all exterior tile installations.

3.3.6. Allow tile to set for a minimum of 48 hours prior to grouting, or as recommended by mortar manufacturer.

3.3.7. Grout tile joints. Do not allow grout to harden on face of tile.

3.3.8. Install sealant under the provisions of Section 07 90 00 and as specified.

3.3.9. Interior Tile Installation:

3.3.9.1. Install wall tile at cementitious backer board per TCNA Method W244C, and per ANSI A108.5.

3.3.9.1.1. Provide portland cement leveling coat as required to provide surface complying with 1/8 inch in 8 feet tolerance.

3.4. CLEANING

3.4.1. Clean work under provisions of Section 01 77 19.

3.4.2. Clean tile surfaces in accordance with the tile and grout manufacturer's instructions; remove all traces of grout scum.

3.4.3. Do not use muriatic acid compounds.

3.4.4. Do not allow traffic on tile for a minimum of 72 hours after installation.

3.4.5. Provide damp cure of all installations per manufacturer's recommendations and per ANSI A108.

3.4.5.1. Do not damp cure latex modified grout systems unless recommended by manufacturer.

3.4.6. Sealing

3.4.6.1. Seal all wall ceramic tile applications.

3.4.6.2. Seal per manufacturer's recommendations.
3.5. PROTECTION

3.5.1. Protect finished installation under provisions of Section 01 50 00.

3.5.2. Remove and replace any products that are cracked, scraped, or otherwise damaged after installation and before acceptance by Owner.

3.6. FIELD QUALITY CONTROL

3.6.1. Tolerances


3.6.1.2. Row and column alignment: 1/8" in 10 feet deviation.

3.6.1.3. Alignment with adjacent tile: 1/16" +/-.

3.6.1.4. Level, plane and/or vertical: 1/8" in 10 feet deviation.

END OF SECTION
SECTION 09 51 00
ACOUSTICAL CEILINGS

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Suspended metal grid ceiling system.

1.1.2. Acoustical panels.

1.2. REFERENCES


1.2.2. ASTM E 580 Installation of Ceiling Suspension Systems for Acoustical tile and Lay-in Panels in areas Subject to Earthquake Ground Motions

1.2.3. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

1.2.4. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.

1.2.5. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

1.2.6. ASTM E 1264 Classification for Acoustical Ceiling Products.

1.3. SYSTEM DESCRIPTION

1.3.1. Installed System: Conform to ASTM C635 and C636.

1.4. QUALITY ASSURANCE

1.4.1. Installer: Company with three years minimum documented experience with projects.

1.5. SUBMITTALS

1.5.1. Provide submittals under provisions of Section 01 33 00.

1.5.2. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

1.5.3. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.
1.5.4. Shop Drawings: Indicate on shop drawings, grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system, and complete suspension system details. Layout and details of acoustical ceilings. Show items coordinated with, or supported by the ceilings.

1.5.5. Certifications: Provide manufacturer's certification of compliance with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

1.6. ENVIRONMENTAL REQUIREMENTS

1.6.1. Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy.

1.6.2. Building areas to receive ceilings shall be free of construction dust and debris

1.7. SEQUENCING/SCHEDULING

1.7.1. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

1.7.2. Schedule installation of acoustic units after interior wet work is dry.

1.8. WARRANTY

1.8.1. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:

1.8.1.1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.

1.8.1.2. Grid System: Rusting and manufacturer's defects

1.8.1.3. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems exhibiting growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.

1.8.2. Warranty Period:

1.8.2.1. Acoustical panels: Ten (10) year from date of substantial completion.

1.8.2.2. Grid: Ten years from date of substantial completion.

1.9. EXTRA STOCK

1.9.1. Provide extra quantity of acoustic units under provisions of Section 01 77 19.
1.9.2. Acoustical Panel: Provide five (5) unopened boxes of each type of acoustical panel.

1.9.3. Acoustically Reflective Panel: Provide five (5) of each type of panel.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2. CEILING SUSPENSION SYSTEM


2.2.2. Series: Prelude XL

2.2.2.1. Main Runner: 7301

2.2.2.2. Cross Runners: As required for condition and seismic compliance.

2.2.2.3. Face Dimension: 15/16 inches.

2.2.2.4. Edge moldings: "L" shaped,

2.2.2.5. Edge moldings: "Shadowline" custom 1/2-inch wide reveal molding as shown on drawings, with prefabricated inside and outside corner caps.

2.2.3. Duty Rating: Heavy Duty per ASTM C635.

2.2.3.1. Support/Fastening System: Components of size and type as shown in the drawings as required to rigidly secure acoustic ceiling system with maximum deflection of 1/360. Use perimeter attachment clips as required to allow 3/4 inch movement and retain the panel in place.

2.2.4. Code Compliance: Comply with applicable portions of Chapter 16 IBC, and modifications to ASCE 7, Section 13.5.6.

2.2.5. Fire Resistance Rating: Non-rated assembly.

2.2.6. Color: Painted finish, as selected from standard line.

2.3. ACOUSTIC PANELS: ACP-1


2.3.1.1. Series: Cortega 769A

2.3.1.2. Edge: Tegular

2.3.1.3. Size: 24 x 48 x 5/8 inch.
2.3.2. Fire/Habitability Criteria:

2.3.2.1. Fire Resistance Rating: Class A per ASTM E1264, maximum Flame Spread of 25, maximum smoke contributed of 450, UL Labeled.

2.3.3. Finish: Factory applied paint

2.3.4. Color: White

2.4. OTHER MATERIALS

2.4.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the Contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify hanger layout will not interfere with other work.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. CEILING GRID INSTALLATION

3.2.1. Install system in accordance with ASTM C635 and C636 as modified by, including required vertical compression struts.

3.2.2. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.

3.2.3. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.

3.2.4. Crimp or tightly twist wire ends around wire support. Do not leave ends angled away from line of wire support.

3.2.5. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
3.2.6. Where ducts or other equipment prevent the regular spacing of hangers, install independent framing below ductwork or equipment from which hangers may be attached. Hangers are prohibited from being attached to any non structural building element.

3.2.7. Locate system on room axis leaving equal border units according to reflected ceiling plan.

3.2.8. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions. Where round obstructions occur, provide preformed closers to match edge molding.

3.3. ACOUSTIC UNIT INSTALLATION

3.3.1. Install acoustic units level, in uniform plane, and free from twist, warp and dents.

3.3.2. Install panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.

3.3.3. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.3.4. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces. Field paint field cut edges exposed to view.

3.4. ADJUSTING AND CLEANING

3.4.1. Replace damaged and broken panels.

3.4.2. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.

3.4.2.1. Where approved by Architect, touch up paint may be used to hide minor scratches and nicks in the surface.

3.4.3. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.5. TOLERANCES

3.5.1. Variation from Flat and Level Surface: 1/8 inch in 10 feet.

END OF SECTION
SECTION 09 54 23
LINEAR METAL CEILINGS

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. This Section includes strip, decorative, linear metal ceilings.

1.2. SYSTEM DESCRIPTION

1.2.1. Provide interior linear metal ceilings capable of withstanding the effects of gravity loads and stresses without showing permanent deformation of ceiling system components, including panels and suspension system; noise or metal fatigue caused by vibration, deflection, and displacement of ceiling units; and permanent damage to fasteners and anchors.

1.2.2. Thermal Movements: Provide linear metal ceilings that allow for thermal movements resulting from a 100 degree F maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.3. QUALITY ASSURANCE

1.3.1. Installer Qualifications: An experienced installer who has completed linear metal ceilings similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1.3.2. Source Limitations for Linear Metal Ceilings: Obtain linear metal ceilings from one source with resources to provide products of consistent quality in appearance and physical properties.

1.3.3. Fire-Test-Response Characteristics: Provide linear metal ceilings with the following surface-burning characteristics as determined by testing identical assemblies per ASTM E 84 by UL or another testing and inspecting agency acceptable to the Architect. Identify ceiling units with appropriate markings of applicable testing and inspecting agency.

1.3.3.1. Flame Spread: 25 or less.

1.3.3.2. Smoke Developed: 50 or less.

1.4. SUBMITTALS

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

1.4.2. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
1.4.2.1. Linear pattern.

1.4.2.2. Joint pattern.

1.4.2.3. Ceiling suspension members.

1.4.2.4. Method of attaching suspension system hangers to building structure.

1.4.2.5. Ceiling-mounted items including lighting fixtures; air outlets and inlets; speakers; sprinklers; access panels; and special moldings at walls, column penetrations, and other junctures of linear metal ceilings with adjoining construction.

1.4.3. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

1.4.4. Samples for Verification: For each type of exposed finish required, prepared on samples of size indicated below and of same thickness and material indicated for the Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.

1.4.4.1. Set of 12-inch long samples of each linear metal panel, exposed molding and trim, suspension system members, filler strips and end cap.

1.4.5. Product Test Reports: From a qualified testing agency indicating linear metal ceilings comply with requirements, based on comprehensive testing of current products.

1.5. PROJECT CONDITIONS

1.5.1. Environmental Limitations: Do not install linear metal ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.6. COORDINATION

1.6.1. Coordinate layout and installation of linear metal panels and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

1.7. EXTRA STOCK

1.7.1. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.7.1.1. Panels, Exposed Moldings, and Clips: Furnish quantity of full-size units equal to 5 percent of amount installed.
2. PART 2 – PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

2.1.1. For purpose of establishing required level of quality, this lists products from Hunter Douglas Architectural Products, Inc. Requests for substitutions will be considered under provisions of Section 01 25 00.

2.2. LINEAR METAL CEILING PANELS


2.2.2. Series: 300C Linear plank with Perforation pattern 160. Min % open area 23%.

2.2.3. Color: As selected by Architect from manufacturer's full line.

2.2.4. Characteristics: Provide sheet metal selected for surface flatness, smoothness, and freedom from surface blemishes where exposed to view in the finished unit. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled metal sheet, stains, discolorations, or other imperfections.

2.2.4.1. Aluminum Sheet: Roll-formed aluminum sheet, complying with ASTM B209; alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

2.2.5. Panel Fabrication: Die-form linear metal panels from metal indicated. Manufacturer's standard units of size and profile indicated, formed to snap on and be securely retained on carriers without separate fasteners, and finished to comply with requirements indicated.

2.2.6. Panel Splices: Construction same as panels, in lengths 8 to 12 inches, with manufacturer's standard finish.

2.2.7. End Caps: Construction same as panels. Finish of exposed portion to match panel.

2.2.8. Moldings and Trim: Provide manufacturer's standard moldings and trim for exposed members, and as indicated or required, for edges and penetrations of ceiling, around fixtures, at changes in ceiling height, and for other conditions, of same metal and finish as linear metal ceiling panels.

2.2.8.1. Provide reveal edge trim at perimeter.

2.3. METAL SUSPENSION SYSTEMS

2.3.1. Metal Suspension System Standard: Provide ceiling manufacturer's standard metal suspension system of materials and finishes indicated that comply with applicable ASTM C635 requirements. Provide system that is complete with carriers, splice sections, connector clips, alignment clips, hangers, trim, seismic and wind-load clips, seismic and wind-load struts, and other suspension components required to support ceiling units and other ceiling-supported construction.

2.3.2. Attachment Devices: Size for five times the design load indicated in ASTM C635, Table 1, Direct Hung, unless otherwise indicated.
2.3.2.1. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B633, Class Fe/Zn 5 (0.005 mm) for Class SC service condition (mild).

2.3.3. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

2.3.3.1. Zinc-Coated Carbon-Steel Wire: ASTM A641, Class 1 zinc coating, soft temper.

2.3.3.2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C635, Table 1, Direct Hung) will be less than the yield stress of wire, but provide not less than 0.106-inch diameter wire.

2.3.4. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

2.3.5. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

2.3.6. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed from 0.04-inch thick, galvanized steel sheet complying with ASTM A653, G90 coating designation; with bolted connections and 5/16-inch diameter bolts.

2.3.7. Carriers as standard with ceiling system manufacturer.

2.3.8. Carrier Splice: Same metal, configuration, and finish as indicated for carriers.

2.3.9. Stabilizer Tees and Bars: Manufacturer's standard component for stabilizing type of main carriers and light fixtures indicated, spaced as standard with manufacturer for use indicated, and factory finished with matte-black baked finish.

2.3.10. Seismic Clips: Where indicated, provide manufacturer's standard seismic clip designed and spaced to secure panels for seismic installations.

2.4. ACCESSORIES

2.4.1. Edge Moldings and Trim: Metal or extruded plastic of type and profile indicated or, if not indicated, molding for edges and penetrations of ceiling that fits with type of edge detail and suspension system indicated.

2.4.1.1. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.4.2. Access Panels: For access at locations indicated or required, provide door hinge assembly, retainer clip, and retainer bar. Assembled with ceiling panels and carrier sections into access doors of required size, permitting upward or downward opening.

2.5. FINISHES, GENERAL

2.5.1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.5.2. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.
2.5.3. Appearance of Finished Work: Noticeable variations in the same piece or abutting or adjacent pieces are not acceptable. Variations in appearance are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

2.6. ALUMINUM FINISHES

2.6.1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

2.6.2. Baked-Enamel Finish: AA-C12C42R1x. Apply panel manufacturer’s standard baked enamel complying with paint manufacturer’s specifications for cleaning, conversion coating, and painting.

2.6.2.1. Organic Coating: Manufacturer’s standard thermosetting polyester enamel primer/topcoat system.

3. PART 3 – EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify hanger layout will not interfere with other work.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. PREPARATION

3.2.1. Measure each ceiling area and establish layout of linear metal panel units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half-width units at borders, and comply with layout shown on reflected ceiling plans.

3.3. INSTALLATION

3.3.1. General: Install linear metal ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

3.3.1.1. Standard for Ceiling Suspension System Installations: Comply with ASTM C636.


3.3.2. Suspend ceiling hangers from building's structural members and as follows:

3.3.2.1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system.

3.3.2.2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3.3.2.3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

3.3.2.4. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for structure to which hangers are attached and for type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

3.3.2.5. Do not attach hangers to steel deck tabs.

3.3.2.6. Do not attach hangers to steel roof deck. Attach hangers to structural members.

3.3.2.7. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated.

3.3.3. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to steel deck, or steel deck tabs.

3.3.4. Install edge moldings and trim of type indicated at perimeter of each linear metal ceiling area and where necessary to conceal edges of units.

3.3.4.1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, level with ceiling system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

3.3.4.2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

3.3.5. Install suspension system carriers so they are aligned and securely interlocked with one another. Remove and replace dented, deformed, or kinked members.
3.3.6. Scribe and cut linear metal panel units for accurate fit at borders and at interruptions and penetrations, by other work, through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.

3.3.7. Install linear metal panel units in coordination with suspension system and exposed moldings and trim.

3.3.7.1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise indicated.

3.3.7.2. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.

3.3.7.3. Install panels with butt joints using internal panel splices and in random joint configuration.

3.3.7.4. Install panels in directions indicated.

3.3.7.5. Where pan ends are visible, install end caps, unless trim is indicated.

3.4. CLEANING

3.4.1. Clean exposed surfaces of linear metal ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and deformed units.

END OF SECTION
SECTION 09 62 00
CONCRETE SLAB SEAL COATING

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Concrete seal coating at art rooms, and storage areas.

1.2. QUALITY ASSURANCE

1.2.1. Coating Systems Manufacturer: Company specializing in VOC approved coating systems with five years minimum experience.

1.2.2. Applicator: Company specializing in application of the type of specified coating, with three years minimum documented experience.

1.3. SUBMITTALS

1.3.1. Provide submittals under provisions of Section 01 33 00.

1.3.2. Product data:

1.3.2.1. Include details of product description, tests performed, limitations to coating, cautionary procedures required during application, and chemical properties, including percentage of solids.

1.3.2.2. Submit manufacturer's installation instructions.

1.3.3. Certification

1.3.3.1. Prior to installation of coating in any one area, submit written certification to Architect certifying that surfaces are properly prepared for specified installation.

1.4. ENVIRONMENTAL REQUIREMENTS

1.4.1. Apply in accordance with manufacturer's recommendations.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.
2.2. CONCRETE SEAL COATING - CS-1

2.2.1. Manufacturer: Atlas (www.atlastechproducts.com) or equal.

2.2.2. Type: Abrasion resistant Sealer.

2.2.3. Series: Elite-HS

2.2.4. Characteristics:

2.2.4.1. Coats: Two

2.2.4.2. Strength Improvement: Minimum 12 percent increase in compressive strength per ASTM C-140.

2.2.4.3. Absorption: Maximum 3.5 percent water absorption per ASTM C-642.

2.2.4.4. Color: Clear

2.2.4.5. Air Quality Regulations: Comply with applicable air quality and VOC regulations.

2.2.4.6. Gloss: Matte/Low Sheen.

2.3. OTHER MATERIALS

2.3.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify surfaces are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of coating.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3.2. PREPARATION

3.2.1. Remove dust, curing compound, dirt and other contaminants from slab surface.

3.2.2. At smooth troweled slab surfaces, shotblast or abrade to provide slip resistant surface.

3.2.3. Remove oil or foreign substance using methods that will not affect coating. Apply neutralizing solution if required by manufacturer.

3.2.4. Scrub and rinse surfaces with water and let dry.

3.2.5. Protect adjacent surfaces not scheduled to receive coating.

3.2.6. Remove loose particles and foreign matter.

3.2.7. If applied on unscheduled surfaces, remove immediately, by approved method.

3.3. APPLICATION

3.3.1. Apply coating in accordance with manufacturer's instructions.

3.3.2. Coordinate application with other work.

3.4. CLEANING AND PROTECTION

3.4.1. Protect from foot traffic as required to allow finish time to cure.

3.4.2. Clean surface of residue and curing films where occur in accordance with manufacturers instructions.

END OF SECTION
SECTION 09 65 00
RESILIENT FLOORING

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Resilient tile flooring.

1.1.2. Resilient base.

1.2. REFERENCES

1.2.1. ASTM D 2047 - Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine


1.2.3. ASTM E 84 - Surface Burning Characteristics of Building Materials.


1.2.5. ASTM E 648 – Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

1.2.6. ASTM E 662 – Specific Optical Density of Smoke Generated by Solid Materials

1.2.7. ASTM F 1861– Standard Specification for Resilient Wall Base

1.2.8. ASTM F 710-05 – Practice for Preparing Concrete Floors to Receive Resilient Flooring.

1.2.9. ASTM F 1869-04 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.3. QUALIFICATIONS

1.3.1. Applicator: Company specializing in flooring systems with 5 years documented experience, trained and approved by the flooring system manufacturer.

1.4. SUBMITTALS

1.4.1. Provide submittals under provisions of Section 01 33 00.

1.4.2. Product data

1.4.2.1. Submit product data for flooring materials and accessories.

1.4.2.2. Submit manufacturer's installation instructions.
1.4.3. Shop drawings.

1.4.3.1. Submit shop drawings indicating layout and dimensions for all seams and penetrations, including details of flooring termination and transitions.

1.4.3.2. Provide typical detail of inside/outside corner installation of resilient base.

1.4.4. Samples:

1.4.4.1. Submit four samples, 8x11 inches in size, illustrating color and pattern for each floor material specified.

1.4.4.2. Submit four 11 inch long samples of base material for each color specified.

1.4.4.3. Submit three samples, 6 inches long by height as required, showing resilient flooring flash cove and termination method.

1.4.5. Submit factory representative's report regarding substrate review and initial installation methods, stating manufacturers approval of substrate and methods.

1.4.6. Submit moisture test results on concrete substrate, including location mapping coordinated with floor plan and room designations.

1.5. OPERATION AND MAINTENANCE DATA

1.5.1. Submit cleaning and maintenance data under provisions of Section 01 77 19.

1.6. ENVIRONMENTAL REQUIREMENTS

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

1.6.2. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.7. EXTRA STOCK

1.7.1. Flooring: Provide one box of each color and style of selected flooring in unopened box, from same run as installation.

1.7.2. Base: Provide 20 linear feet of base, in each color and style selected, with 2 each matching outside and inside corners, from same run as installation.

2. PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.
2.2. RESILIENT TILE


2.2.2. Series: Standard Excelon.

2.2.3. Size/Gage: 12 inch square, 1/8 inch gage.

2.2.4. Fire Resistivity/Habitability Criteria:

2.2.4.1. Critical Radiant Flux: Minimum 0.45 watts/cm² per ASTM E648.

2.2.4.2. NBS Smoke Rating: maximum 450 per ASTM E662.

2.2.4.3. Slip Resistance: Greater than 0.60 per ASTM D2047.

2.2.5. Color: As selected by Architect.

2.3. RESILIENT BASE MATERIALS:


2.3.2. Type: thermoset, extruded, vulcanized rubber.

2.3.2.1. Material Standard: Comply with ASTM F 1861, Type TP, Group 1 (Solid).

2.3.3. Series: Traditional

2.3.3.1. Coved Toe.

2.3.3.2. Accessories: Provide premolded inside and outside corners matching base profile.

2.3.4. Size: 6 inch high x coil stock lengths.

2.3.5. Fire Resistivity/Habitability Criteria:

2.3.5.1. Fire Resistivity Rating: Class A per ASTM E84.

2.3.5.2. Smoke Density Rating: maximum 450 per ASTM E84.

2.3.6. Color: Two Colors As Selected By Architect

2.4. ACCESSORY MATERIALS


2.4.2. Adhesives shall be approved by the flooring manufacturer prior to Product DATA submittal
2.4.3. Adhesive: Provide W.F. Taylor [http://www.wftaylor.com/] or equal, Envirotec, (800)986-3888, low VOC adhesive, Series as recommended by manufacturer. Adhesive VOC emissions shall not exceed maximum 0.60 mg/square meter/hour after 24 hours per EPA D.E.C. Testing method. Confirm adhesive compatibility with resilient flooring manufacturer prior to installation.

2.5. OTHER MATERIALS

2.5.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the Contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify that surfaces comply with specified tolerances.

3.1.1.2.2. Verify concrete floors comply with specified moisture content criteria acceptable to the flooring manufacturer, and do not exhibit negative alkalinity, carbonization, or dusting.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. PREPARATION

3.2.1. Moisture and alkalinity testing

3.2.1.1. Conduct alkalinity and anhydrous calcium chloride testing using prepackaged kit systems approved by flooring manufacturer.

3.2.1.2. Provide test at coverage rate required by flooring manufacturer, with minimum of 3 tests/first 1,000 square feet and 1 test per each 1,000 square feet after. Distribute uniformly throughout building. Prepare map or diagram of test locations in each building.

3.2.1.3. Conduct one set of tests 60 days prior to scheduled flooring installation. Submit test results to Architect within 48 hours of test receipt.
3.2.1.4. Conduct second set of tests 14 days prior to scheduled flooring installation. Submit test results to Architect within 48 hours of test receipt.

3.2.2. Alkalinity Testing

3.2.2.1. Conduct alkalinity testing of slab surface immediately following removal of calcium chloride test kit, in accordance with ASTM F 710 procedure.

3.2.3. Submit testing data, including test location mapping, to Architect prior to beginning flooring installation.

3.2.4. Evaluate existing floor surface. Prepare surface and apply underlayment to all floor surfaces exhibiting the following characteristics:

3.2.4.1. Cracks, gouges or holes exceeding 1/16 inch in any dimension.
3.2.4.2. Cracks with adjacent surfaces exceeding 1/16 inch in height.
3.2.4.3. All expansion, weakened plane or construction joints.
3.2.4.4. All surfaces exhibiting rough or abraded texture exceeding 1/16 inch amplitude.
3.2.4.5. All surfaces with gap exceeding 3/16 inch under 10 foot metal straight edge.

3.2.5. Prepare existing concrete substrate as recommended by manufacturer, including mechanical shot-blasting or equivalent.

3.2.6. Acid etching is not acceptable.

3.2.7. Prepare existing cracks in substrate as recommended by manufacturer.

3.2.8. Apply filler and trowel to leave a smooth, flat, hard surface.

3.2.9. Prohibit traffic from area until filler is cured. Vacuum clean substrate.

3.3. INSTALLATION – RESILIENT TILE FLOORING MATERIALS

3.3.1. Install in accordance with manufacturers' instructions and recommendations.

3.3.2. Spread only enough adhesive to permit installation of materials before initial set.

3.3.3. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.3.4. Install reducer strips at exposed edges or where flooring material changes to another type. Trim reducer width as required to achieve proper thickness at edges of abutting flooring.

3.3.5. Install tile to square grid pattern with all joints aligned.
3.3.6. Unless otherwise directed by manufacturer, lay in step or fan pattern from center grid. Do not allow tile "run-off".

3.3.7. Provide minimum 1/2 full size tile width at room or area perimeter.

3.3.8. Align tile with tile joints in adjacent room.

3.4. INSTALLATION - BASE MATERIAL

3.4.1. Install in complete lengths, fit joints tight and vertical. Do not piece. Maintain minimum measurement of 18 inches between joints.

3.4.2. Use premolded units at all outside and inside corners.

3.4.3. Install base on solid backing. Bond tight to wall and floor surfaces.

3.4.4. Scribe and fit to door frames and other interruptions.

3.4.5. Install using a constant level line at top of base.

3.5. PROTECTION AND CLEANING

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

3.5.2. Remove excess adhesive from floor, base, and wall surfaces without damage.

3.5.3. Clean floor and base surfaces and buff floor without use of waxes or sealers in accordance with manufacturer's instructions.

END OF SECTION
SECTION 09 91 00
PAINTING

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Surface preparation.

1.1.2. Surface paint and stain finishes as scheduled.

1.1.3. Renovation and re-finishing of existing finishes.

1.2. REFERENCES

1.2.1. ASTM B 117 – Practice for Operating Salt Spray (Fog) Apparatus.

1.2.2. ASTM D 16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

1.2.3. ASTM D 3359 – Test Method for Measuring Adhesion by Tape Test.

1.2.4. ASTM D 4060 – Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.


1.2.6. ASTM G 154 - Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials.

1.3. REGULATORY REQUIREMENTS

1.3.1. Submit manufacturer’s certification of compliance with local criteria regarding VOC limits for all applied paints and coatings.

1.4. QUALITY ASSURANCE

1.4.1. Applicator: Company specializing in commercial painting and finishing with 5 years documented experience.

1.4.1.1. Installing Foreman: Individual specializing in applying specified systems with minimum 10 years documented experience.

1.4.2. Pre-installation conference: Convene a pre-installation conference two weeks prior to commencing work of this Section. Provide minimum 2 weeks advance notice to Owner and Architect of scheduled date. Comply with provisions of Section 01 31 13. Attendance by paint and coating material manufacturer’s representative is mandatory. At pre-installation conference, review installation procedures, inspection/testing procedures and coordination required with related work.
1.5. SUBMITTALS

1.5.1. Provide submittals under provisions of Section 01 33 00.

1.5.2. Product Data: Submit product data of all proposed products, identifying product series, material composition, performance characteristics and sheen.

1.5.2.1. Submit manufacturer's certificate that products comply with current safety and environmental regulations, including hazardous materials labeling and air quality/VOC regulations

1.5.2.2. Submit manufacturer's certificate that products are physically and chemically compatible with each other and meet listed ASTM or Federal Specifications.

1.5.2.3. Where applicable, provide manufacturer's written evaluation of existing paint/coating systems, including directions as to surface preparation and primers compatible with existing systems.

1.5.3. Submit manufacturer's application instructions for each painting system, including surface preparation.

1.5.4. Color Selection procedure:

1.5.4.1. Provide Architect with samples of complete color and sheen range available for submitted products.

1.5.4.2. Based on submitted samples and specified color criteria, Architect will prepare preliminary color schedule for all field applied coatings.

1.5.4.3. Based on preliminary color schedule, submit samples of all coatings, applied on specified substrate. Submit three samples, approximately 8 x 10 inch in size, illustrating each color and sheen scheduled.

1.5.4.4. After review of preliminary color schedule samples, Architect will prepare final color schedule. Where different from preliminary schedule, submit three samples, approximately 8 x 10 inch in size, illustrating revised color and sheen.

1.6. DELIVERY, STORAGE, AND HANDLING

1.6.1. Deliver products to site under provisions of Section 01 60 00.

1.6.2. Store and protect products under provisions of Section 01 60 00.

1.6.3. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.

1.6.4. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
1.6.5. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in an enclosed metal storage container located outside of building, unless required otherwise by manufacturer's instructions.

1.6.6. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.7. ENVIRONMENTAL REQUIREMENTS

1.7.1. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 65 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

1.7.2. Prior to beginning preparation and coating application, provide lighting level of 80 foot candles measured on substrate surface. Where natural lighting does not provide such levels, provide temporary lighting.

1.8. EXTRA STOCK:

1.8.1.1. Provide an unopened five gallon container of each color and sheen to Owner.

1.8.1.2. Label each container with color, sheen, and room locations, in addition to the manufacturer's label.

2. PART 2 - PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

2.1.1. Basis of Design: Specific products listed on Schedule in Part 3 of this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions under the provisions of Section 01 25 00.

2.2. MATERIALS

2.2.1. Coatings: Ready mixed, except field catalyzed coatings.

2.2.2. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks or sags.

2.2.3. Accessory Materials: Provide all admixtures, thinners, flow agents and other materials not specifically indicated but required to achieve the finishes specified.

2.3. FINISHES/COLOR

2.3.1. Refer to schedule at end of Section for type of surface finish.

2.3.2. Colors shall be selected by Architect as specified.

2.3.3. Each coat shall be a perceptibly different tint.

2.3.4. Where no color range is specified, provide single color for each item or component.
2.4. OTHER MATERIALS

2.4.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the Contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

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

3.1.1.2.2. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the maximum levels recommended by the manufacturer:

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. PREPARATION

3.2.1. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.

3.2.2. Correct minor defects and clean surfaces which affect work of this Section.

3.2.3. Shellac and seal marks which may bleed through surface finishes.

3.2.4. Steel Surfaces:

3.2.4.1. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous.

3.2.4.2. Bare Steel: Sand and scrape to remove loose primer and rust. Clean surfaces with solvent.
3.2.4.3. Galvanized steel: Test all galvanized steel surfaces for evidence of chromate conversion treatments or other post-galvanizing applications that are not compatible with paint finishes. Where testing demonstrates presence of such treatment, brush blast or otherwise mechanically abrade the surface as required by coating manufacturer.

3.2.5. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair. Remove drywall texture nibs and other protrusions.

3.2.6. Plaster Surfaces: Repair minor defects, including cracks, in an approved manner. Remove plaster nibs and other protrusions.

3.2.7. Interior Wood millwork and miscellaneous Items: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried. Sand between coats.

3.2.8. Verify weatherstripping at door assemblies is compatible with specified paint finish.

3.2.9. Steel Doors and Door/Window Frames:

3.2.9.1. Provide specified primer at all frames, including frames with fabricators primer system. Comply with criteria specified in this Section.

3.2.9.2. Prepare frame steel surfaces as required for proper adhesion and appearance of specified finish coat system.

3.2.9.3. Paint all surfaces of window frames, including surfaces not visible when operable vent portions are in closed position.

3.3. PROTECTION

3.3.1. Protect elements surrounding the work of this Section from damage or disfiguration.

3.3.2. Repair damage to other surfaces caused by work of this Section.

3.3.3. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

3.3.4. Remove empty paint containers from site.

3.4. APPLICATION

3.4.1. Apply products in accordance with manufacturer's instructions.

3.4.2. Do not apply finishes to surfaces that are not dry.

3.4.3. Apply each coat to uniform finish.

3.4.4. The number of coats specified are minimum. Additional coats shall be applied until finish is uniform in color and sheen.

3.4.5. Sand lightly between coats to achieve required finish.
3.4.6. Obtain Owners Representative approval of each coat prior to applying succeeding coat.

3.4.7. Allow applied coat to dry before next coat is applied.

3.4.8. Do not paint over labels at fire rated doors, door or window frames or other fire rated assemblies.

3.4.9. Paint all structural components and surfaces visible through louvers and vents in wall and soffit surfaces.

3.4.10. Steel Doors: Finish all surfaces of doors, including tops and bottoms.

3.4.10.1. Apply paint to non-factory prefinished doors and frames by spray method only.

3.4.11. Exterior surfaces, including plaster, concrete, metal fabrications, structural components and metal flashings: Unless noted otherwise, apply paints and coatings as specified below:

3.4.11.1. Unless noted otherwise, do not paint exterior galvanized metals, including railings, steel structural components, all roof flashings and accessories, all plaster trim and accessories, and all mechanical and electrical system components.

3.4.11.2. Apply exterior paint PFX-2 to steel components and miscellaneous fabrications visible to the eye from typically occupied locations in the finished project.

3.4.11.3. Apply paint to all other exterior components as specified or shown on drawings.

3.5. FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

3.5.1. Paint shop primed equipment. Paint shop prefinished items exposed to view in non-utility areas.

3.5.2. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

3.5.3. At interior and exterior applications, prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, mechanical equipment units, hangers, brackets, collars and supports, except where items are prefinished.

3.5.4. Replace identification markings on mechanical or electrical equipment when painted accidentally.

3.5.5. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with flat black paint, to limit of sight line. Paint dampers, except fire dampers, exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
3.5.6. Paint exposed panels, pedestals, boxes, conduit and related electrical equipment occurring in exterior and interior finished areas.

3.5.7. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.

3.6. CLEANING

3.6.1. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.

3.6.2. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

3.6.3. At end of workday remove from building flammable paint, solvents, and reducing agents.

3.6.4. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.7. SCHEDULE

3.7.1. For ease of specifying, unless otherwise noted, product numbers of Dunn Edwards have been used. Equivalent products of Vista, Sherwin Williams, Glidden Professional, Frazee, and other manufacturers may be used subject to the substitution provisions listed under Section 01 25 00.

3.7.2. INTERIOR SURFACES

3.7.2.1. Steel Doors and Frames/Miscellaneous metal- Galvanized - Semi-Gloss (PFX-1)

3.7.2.1.1. Solvent clean, etch with Metal Conditioner solution and rinse with clear water.

3.7.2.1.2. One coat block rust premium BRPPR00

3.7.2.1.3. Two Coats Spartashield 50 SSHL50

3.7.2.2. Gypsum Board - Semi-Gloss Enamel finish (PF-1)

3.7.2.2.1. One coat Dunn Edwards Vinlylastic select VNSL00

3.7.2.2.2. Two coats Dunn Edwards Sparta Wall 50 SWLL50

3.7.3. EXTERIOR SURFACES

3.7.3.1. Ferrous metal piping, miscellaneous metal fabrications, and related components. (PFX-2)

3.7.3.1.1. Solvent clean, etch with Metal Conditioner solution and rinse with clear water.

3.7.3.1.2. One coat block rust premium BRPPR00
3.7.3.1.3. Two Coats Sparta Shield SSHL50

END OF SECTION
SECTION 10 11 16
MARKERBOARDS AND TACKBOARDS

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Markerboards

1.1.2. Fabric covered tackboards

1.2. REFERENCES

1.2.1. ANSI A 208.1 - Mat Formed Wood Particleboard.

1.2.2. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.2.3. ASTM A 424 - Steel Sheet for Porcelain Enameling.

1.2.4. Porcelain Enamel Institute-Performance Specifications for Porcelain Enamel Markerboards.

1.3. SUBMITTALS

1.3.1. Submit shop drawings and product data under provisions of Section 01 33 00.

1.3.2. Indicate on shop drawings, wall elevations, dimensions, joint locations, and special anchor details.

1.3.3. Submit samples under provisions of Section 01 33 00.

1.3.4. Submit two samples 3x4 inches in size, illustrating materials, finish and color of board surfacing and trim.

1.4. MAINTENANCE DATA

1.4.1. Submit maintenance data under provisions of Section 01 77 19.

1.4.2. Include maintenance information on regular cleaning and stain removal.

2. PART 2 – PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products manufactured by Platinum Visual Systems, a division of ABC School Equipment, Inc. (www.pvsusa.com) are indicated to establish required level of quality, appearance, and performance. The Architect will consider requests for substitutions, under the provisions of Section 01 25 00.
2.1.1. Approved alternate manufacturer: Claridge Products and Equipment Co.  
http://www.claridgeproducts.com/

2.2. MARKERBOARDS

2.2.1. Type: Porcelain enamel markerboards.

2.2.1.1. Type A: Stationary, wall mount.

2.2.1.1.1. MKBD-1: 8 feet by 4 feet, unless shown otherwise.

2.2.1.1.2. MKBD-2: 12 feet by 4 feet, unless shown otherwise.

2.2.2. Series/Style:

2.2.2.1. Type A: Factory Built Unit, STS Series frame.

2.2.2.1.1. Design: Unless otherwise shown on drawings, provide Type A design with STS trim and map rail.

2.2.3. Construction:

2.2.3.1. Writing Surface: 24 gauge porcelain enamel skin.

2.2.3.2. Core: 1/2 inch particle board.

2.2.3.3. Back: 0.015 inch aluminum sheet.

2.2.3.4. Perimeter Trim: Aluminum channel trim.

2.2.3.5. Adhesives: Type recommended by manufacturer.

2.2.3.6. Map Rail: Aluminum map rail with cork insert.

2.2.3.7. Map Supports: Formed aluminum hooks, sliding type to fit map rail, provide two for each 4 feet of board length.

2.2.3.8. Chalk/marker trough: Extruded aluminum, one piece, full length of markerboard; molded end closures.

2.2.3.9. Fabricate in full lengths, no joints allowed except as shown on drawings.

2.2.3.10. Flag Holders: Cast aluminum bored to receive one inch diameter flag staff, bracketed to fit top rail of markerboard, provide one per classroom.

2.2.4. Finish:

2.2.4.1. Porcelain Enamel: Glass fiber enamel, baked to vitreous surfaces; color as selected from manufacturer's standard range for standard dry marker surfaces.

2.2.4.2. Aluminum Frame and Accessories: Clear satin anodized finish.
2.3. FABRIC COVERED TACKBOARDS

2.3.1. Type: Fabric covered tackboards

2.3.2. Series/Style: Factory built Unit, Series STS.

2.3.3. Construction:

2.3.3.1. Size: Refer to Drawings.

2.3.3.2. Tackboard Surface: Fabric.

2.3.3.3. Core: Fire retardant Duracore.

2.3.3.4. Perimeter Trim: Aluminum channel trim.

2.3.3.5. Adhesives: Type recommended by manufacturer.

2.3.4. Finishes:

2.3.4.1. Covering: Nylon fabric, color as selected by Architect from manufacturer’s complete color line.

2.3.4.2. Aluminum Frame and Accessories: Clear satin anodized finish.

2.4. OTHER MATERIALS

2.4.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the Contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this Section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards. Advise the Contractor of required backing and assure it is installed.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3.2. INSTALLATION

3.2.1. Install markerboards and tackboards in accordance with manufacturer's instructions.

3.2.2. Secure units level and plumb.

3.3. CLEANING

3.3.1. Clean board surfaces in accordance with manufacturer's instructions.

3.3.2. Cover board surfaces with protective cover, taped to frame.

3.3.3. Remove protective covers at Owner occupancy.

END OF SECTION
SECTION 10 26 00
WALL AND DOOR PROTECTION

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Wall protection elements: Corner guards.

1.2. REFERENCES

1.2.1. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials

1.3. QUALITY ASSURANCE

1.3.1. Applicator: Company specializing in installing wall surfacing and protection components with 3 years documented experience.

1.3.2. Installing Foreman: Individual with 3 years documented experience installing wall surfacing and protection components with 3 years documented experience.

1.4. SUBMITTALS

1.4.1. Provide submittals under provisions of Section 01 33 00.

1.4.2. Product Data

1.4.2.1. Submit manufacturers product data and installation instructions in accordance with Section 01 33 00.

1.4.3. Samples

1.4.3.1. Submit one sample of each corner and wall guard, 5 inches in length and including end cap/wall return, illustrating each color, finish, and texture.

1.5. DELIVER, STORAGE AND HANDLING

1.5.1. Deliver products to site and store under the provision of Section 01 60 00.

1.6. ENVIRONMENTAL REQUIREMENTS

1.6.1. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 60 degrees F, unless required otherwise by manufacturer's instructions.

1.6.2. Do not apply adhesive when substrate surface temperature or ambient temperature is below 60 degrees F or relative humidity is above 40 percent.
1.6.3. Maintain these conditions 24 hours before, during, and after installation of adhesive wall covering.

1.6.4. Provide lighting level of 80 ft candles measured mid - height at substrate surfaces.

2. PART 2 – PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. The Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.2. WALL PROTECTION ELEMENTS - CORNER GUARD CG-1

2.2.1. Manufacturer: C/S Group [http://www.c-sgroup.com/]

2.2.2. Type: Surface mounted corner guard.

2.2.3. Series: SM-20AN 4000 PVC Free

2.2.4. Characteristics:

2.2.4.1. Size: 3 inch x 3 inch x full height to ceiling.

2.2.4.2. Provide end caps in matching material, finish and color.

2.2.4.3. Finish: C/S Matte Pebblette

2.2.4.4. Color: To be selected by architect from manufacturers full range.

2.2.5. Materials:

2.2.5.1. Continuous aluminum retainer/anchor system, minimum 0.063 inch thick.

2.2.5.2. Acrovyn 4000 PVC Free, minimum 0.078 inch thick.

2.2.6. Fire/Life Safety/Habitability Criteria

2.2.6.1. Flame Spread: Class 1 per ASTM E84.

2.2.6.2. Smoke Density: Class 1 per ASTM E84.

2.2.6.3. Listing: UL Classified and Labeled.

2.2.6.4. Chemical and Stain Resistance: In compliance with manufacturers literature.
2.3. ACCESSORIES

2.3.1. Adhesive: Type recommended by rigid wall covering manufacturer to suit substrate, UL Classified for installation, water based type. Use of contact adhesive not permitted.

2.3.2. Substrate Filler: As recommended by adhesive and rigid wall covering manufacturers; compatible with substrate.

2.4. OTHER MATERIALS

2.4.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. INSTALLATION

3.2.1. Install assembly in accordance with manufacturers instructions.

3.2.2. Use mechanical fasteners to attach to substrate.

3.3. CLEANING

3.3.1. Clean surfaces of completed installation.

END OF SECTION
SECTION 10 44 00
FIRE PROTECTION SPECIALTIES

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Fire extinguisher cabinets.

1.1.2. Fire extinguishers.

1.1.3. Wall bracket.

1.2. SUBMITTALS

1.2.1. Submit product data and installation instructions under provisions of Section 01 33 00.

1.2.2. Include physical dimensions, operational features, color and finish, wall mounting brackets with mounted measurements, anchorage details, rough-in measurements, location, and details.

1.2.3. Verify extinguisher size and type with Architect.

2. PART 2 - PRODUCTS

2.1. CABINETS

2.1.1. Basis of Design: Characteristics of specific products manufactured by J.L Industries are indicated to establish required level of quality, appearance, and performance. The Architect will consider requests for substitutions, under provisions of Section 01 25 00.

2.1.2. Fire Extinguisher Cabinets must comply with IBC Sections 11.

2.1.3. Type:

2.1.3.1. Type: Semi - Recessed painted steel cabinet, rolled edge return trim and wire glass door, located at framed walls.

2.1.4. Cabinet

2.1.4.1. Model Number: Ambassador # 1817-F13.

2.1.4.2. Door Style: Full glass.

2.1.4.3. Glazing: Clear wire glass, with FE letters, red.

2.1.4.4. Finish/Color: White Color Epoxy Coated tub and frame.
2.2. EXTINGUISHER


2.2.2. Types:

2.2.2.1. Type: Multi-Purpose Dry Chemical - UL Rating 2A-10B:C, for use in other areas in Type 2 and 3 cabinet.

2.2.3. Approvals:

2.2.3.1. Approved for intended use by Arizona State Fire Marshal.

2.2.4. Color: Red Enamel (for dry chemical extinguishers).

2.3. OTHER MATERIALS

2.3.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. INSTALLATION

3.2.1. Install cabinets plumb and level in wall openings, with cabinet and extinguisher handle located at maximum 48 inches above finish floor.

3.2.2. Secure rigidly in place.

3.2.3. Inspect, tag, and charge extinguishers not more than ten days nor less than one day before actual date of Notice of Substantial Completion.

END OF SECTION
SECTION 10 51 13
METAL LOCKERS

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Lockers, hinged door type, staff application.

1.1.2. Hardware, base, top, and filler panels.

1.2. REFERENCES

1.2.1. ASTM A 653 – Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.

1.3. SUBMITTALS

1.3.1. Submit shop drawings and product data under provisions of Section 01 33 00.

1.3.2. Include locker types, sizes, configurations, layout of groups of lockers, accessories, and numbering plan.

1.3.2.1. Verify locker lay-out with actual conditions, including base alignment, clearance dimensions, and related criteria.

1.3.3. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.4. PROTECTION

1.4.1. Store and protect lockers under provisions of Section 01 60 00.

1.4.2. Protect locker finishes and adjacent surfaces from damage during installation.

1.5. GUARANTEE

1.5.1. Manufacturers Guarantee:

1.5.1.1. Provide Owner with manufacturers written guarantee complying with the following criteria:

1.5.1.1.1. Type: Unlimited dollar amount of recovery for labor and material necessary to restore lockers to original condition, in accordance with manufacturers published warranty and limitations.

1.5.1.1.2. Term: Lifetime.
2. PART 2 – PRODUCTS

2.1. MANUFACTURERS

2.1.1. Basis of Design: Characteristics of specific products, where named in this Section, are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under the provisions of Section 01 25 00.

2.1.2. Provide latch and locking hardware that does not require twisting, pinching or grasping to operate.

2.2. STEEL LOCKERS

2.2.1. Manufacturer: DeBourg [http://www.debourgh.com](http://www.debourgh.com/) or equal.

2.2.2. Type: Steel Lockers, fully enclosed, fully assembled and welded. Welding of knockdown locker construction not acceptable.

2.2.3. Construction Characteristics

2.2.3.1. Sheet Steel: ASTM A 653 commercial quality, G60 coating; mill phosphatized; suitable for exposed applications, and stretcher or roller leveled to stretcher leveled flatness, in the following minimum thicknesses:

2.2.3.1.1. Tops, Bottoms, Shelves, Tier Dividers, end panels: 16 gauge, solid sheet steel.

2.2.3.1.2. Backs: 18 gauge, solid. Mesh not permitted.

2.2.3.1.3. Frames, Sides and Intermediate Partitions: 1 x 1 x 1/8 inch steel angle with 13 gauge, 3/4 inch mesh welded to frame.

2.2.3.1.4. Doors: 14 gauge, style as specified, welded door reinforcement.

2.2.3.1.5. Hinges: 3 inch, 5 knuckle, welded to door panel and frame.

2.2.3.1.6. Locking mechanism: Recessed stainless steel pan, operating latch free, with single point latch.

2.2.4. Characteristics: Lockers

2.2.4.1. Style: Triple Tier, Secur-N-Vent Door, with stainless steel Sentry III recessed pan and single point latch.

2.2.4.1.1. Place pull/latch mechanism maximum 36 inches above finished floor at lower tier, centered in door panel at accessible lockers.
2.2.4.2. Locker Size: 12 inches wide x 16 inches deep x 24 inches high.

2.2.4.3. Top: Sloped Top.

2.2.4.4. Base: Manufacturer's standard base.

2.2.5. Hardware and Accessories

2.2.5.1. Lock: Padlocks provided by Owner.

2.2.5.2. Numerals: Provide polished aluminum numeral plates at each locker.

2.2.6. Finish and Color

2.2.6.1. Finish: Manufacturer’s standard baked-enamel finish (thermosetting topcoat), applied after phosphatized steel preparation. Provide minimum dry film thickness of 1.4 mils on doors, frames, and legs, and 1.1 mils elsewhere.

2.2.6.2. Colors: One color, as selected by Architect from manufacturers standard 24 color line.

2.3. OTHER MATERIALS

2.3.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify bases and recesses are properly sized and located, and that all required blocking is in place.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. INSTALLATION

3.2.1. Install lockers secure, plumb, square, and in line. Set on prepared base provided.
3.2.2. Anchor lockers with appropriate anchor devices to suit materials encountered.

3.2.3. Install end panels, filler panels, sloped tops, and bases to completely close off openings.

END OF SECTION
SECTION 12 21 13
HORIZONTAL LOUVER BLINDS

1. PART 1 - GENERAL
1.1. SECTION INCLUDES

1.1.1. Horizontal louver blinds.

1.2. SUBMITTALS

1.2.1. Submit manufacturers data, samples, and certificates under the provisions of Section 01 33 00.

1.2.2. Submit 4 samples, 10 inches long, of specified vane.

1.2.3. Submit manufacturers data and installation instructions.

1.3. QUALITY ASSURANCE

1.3.1. Fabricator: Company specializing in the fabrication of louver blinds with 5 years documented experience.

1.4. DELIVERY STORAGE AND HANDLING

1.4.1. Deliver to and store products on site in conformance with Section 01 60 00.

1.4.2. Do not deliver until interior finish work is complete and painted surfaces are fully cured.

2. PART 2 - PRODUCTS

2.1. HORIZONTAL BLINDS

2.1.1. Basis of Design: Characteristics of specific products manufactured by Levolor Contract are indicated to establish required level of quality, appearance, and performance. Architect will consider requests for substitutions, under provisions of Section 01 25 00.

2.1.2. Type: Horizontal metal blind, manual operation.

2.1.3. Series: Riviera.

2.1.4. Construction:

2.1.4.1. Headrail: U-shaped steel, 0.025 thickness.

2.1.4.2. Slats: 1 inch aluminum alloy, 0.0075 inches thick, non-perforated.

2.1.4.3. Slat Count: nominal 15.7 slats per vertical foot.
2.1.4.4. Ladders: Manufacturers standard.

2.1.4.5. Size: Coordinate mounting with architect.

2.1.5. Hardware:

2.1.5.1. Wand Location: Manufacturers standard, side as directed by Architect.

2.1.5.2. Brackets: Provide open end brackets and all associated clips, supports and fasteners.

2.1.6. Colors: As selected from manufacturers standard Tiltone color line.

2.2. OTHER MATERIALS

2.2.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this Section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2. INSTALLATION

3.2.1. Install in accordance with the manufacturers instructions.

3.2.2. Securely attach brackets to studs or backing and install level to full length of window frame or pocket.

END OF SECTION
SECTION 220500
COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED WORK

A. General Conditions

B. Special Conditions

C. Supplementary General Conditions

D. Architectural, Structural, Civil, Electrical and Mechanical Drawings & Specifications

1.2 SCOPE OF WORK

A. The work covered by the Plumbing Sections of the Specifications shall include the furnishing of all materials, labor, transportation, tools, permits, fees, inspections, utilities and incidentals necessary for the complete installation of all mechanical and plumbing work required in the Contract Drawings.

B. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction is required for work indicated or specified in this Section or work specified in other sections, it shall be the responsibility of the Contractor to provide all material and equipment which is usually furnished with such systems in order to complete the installation, whether mentioned or not.

C. The Contractor shall visit the premises and thoroughly familiarize himself with all the details of the work and working conditions and to verify all dimensions in the field. The Contractor shall advise the Architect of any discrepancy prior to bidding. The submission of bids shall be deemed evidence of the Contractor's site visit, the coordination of all existing conditions, and the inclusion of all considerations for existing conditions.

1.3 PLANS AND SPECIFICATIONS

A. These Specifications are accompanied by drawings of the building and details of the installations indicating the locations of equipment, piping, outlets, etc. The drawings and these specifications are complementary to each other, and what is required by one shall be as binding as if required by both.

B. If departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted to the Architect for review. No departures shall be made without prior written acceptance of the Architect.

C. The interrelation of the specifications, the drawings, and the schedules is generally as follows: The specifications determine the nature and setting of the materials, the drawings establish the quantities, dimensions, and details, and the schedules give the performance characteristics.

D. Should the drawings disagree in themselves or with the specifications, the contractor shall immediately notify the architect and shall perform and/or furnish the better quality or greater quantity of work or materials unless otherwise directed by the architect in writing. In case the specifications should not fully agree with the schedules, the latter shall govern. Figures indicated on drawings govern scale measurements and large scale details govern small scale drawings. In case of disagreement between specifications and drawings, see Division I of these specifications for clarifications.
E. Items specifically mentioned in the specifications but not shown on the drawings and/or items shown on the drawings but not specifically mentioned in the specifications shall be installed by the Contractor under the appropriate section of work as if they were both specified and shown.

1.4 QUALITY ASSURANCE

A. All work shall comply with the applicable rules of the following:

1. 2012 International Building Code
2. 2012 International Mechanical Code
3. 2012 International Plumbing Code
4. 2012 International Fire Code
6. National Fire Protection Association Codes
7. State Fire Marshall
9. All applicable city, county, state, and federal rules, codes, and ordinances.

B. In any instance where these specifications call for materials for construction of a better quality or larger size than required by the codes, the provisions of these specifications shall take precedence. None of the terms or provisions of this specification shall be construed as waiving any rules, regulations, or requirements of these authorities. The codes shall govern in case of direct conflict between the codes and the Drawings.

1.5 SUPERVISION

A. A competent foreman or superintendent, initially approved by the Architect, shall be assigned to the project to receive instructions and to act for the Contractor. Once this superintendent has been approved, no change shall be made without approval of the Architect. Architect's authorized representative and/or owner's observer shall have the right to observe the work at any time. The Contractor shall have a representative present when his work is being observed, and he shall give assistance, as may be required, to the Architect's representative. Recommendations made by the observer shall be promptly carried out, and all unsatisfactory material and/or workmanship shall be replaced at once, to the satisfaction of the Architect.

1.6 GUARANTEE

A. The Contractor shall guarantee all materials and workmanship for a period of two (2) years after the final acceptance of work.
1.7 UTILITIES

A. The contract documents reflect the general location, size, and elevations of sewer line, location, size and pressure of water and other lines and manner of routing for all utilities known to be required on this project. It shall be the responsibility of the Contractor to visit the site, meet with the local utility companies in order to coordinate and confirm the exact requirements for each utility to provide a complete and operative system. The bid submitted by the Contractor shall include costs for all such utility company charges and/or fees.

1.8 BUILDING CONSTRUCTION AND LAYOUT OF WORK

A. It shall be the responsibility of the Contractor to consult the architectural and engineering drawings and details so as to thoroughly familiarize himself with the type and quality of construction to be provided on this project.

B. The Drawings are diagrammatic in character and cannot show every connection in detail or every pipe in its exact location. These details are subject to the requirements of ordinances and also structural and architectural conditions. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases or above suspended ceilings, etc., in finished portions of the building, unless specifically noted or indicated to be exposed. Work shall be installed to avoid crippling of structural members; therefore, inserts to accommodate hangers shall be set before concrete is poured, and proper openings through floor, walls, beams, etc., shall be provided as hereinafter specified or as otherwise indicated or required before concrete is poured. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted.

C. The approximate location of each item is indicated on the drawings. These drawings are not intended to give complete and exact details in regard to location. Exact locations are to be determined by actual measurements at the building and will in all cases be subject to the approval of the Architect, and he reserves the right to make any reasonable changes in the locations indicated without additional cost.

1.9 SHOP DRAWINGS AND BROCHURES

A. After the Contract is awarded, but prior to proceeding with the Work, the Contractor shall obtain, check, certify, and submit complete Shop Drawings and Brochures from Manufacturers, Suppliers, Vendors, etc., for all materials and equipment specified herein. Submit Shop Drawings and Brochures in sufficient time so as not to impede the progress of work. At least two weeks will be required for the processing of Shop Drawings and Brochures in the Engineer's office, exclusive of transmittal time. This time shall be considered by the Contractor when scheduling submittal data.

B. The Engineer's review of Shop Drawings and Brochures shall not relieve the Contractor of the responsibility for dimensions, errors that may be contained therein, or deviations from Contract Document requirements. It shall be clearly understood that the Engineer's noting some errors but overlooking others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the Shop Drawings, the requirements of the Contract Documents shall govern and are not waived or superseded in any way by the submittal data review.

C. Each Shop Drawing shall indicate in the lower right hand corner and each Brochure shall indicate on the front cover the following: the Title of the Sheet or Brochure; name and location of the building; names of the Architect, Engineer, Contractor, Manufacturer, Supplier, Vendor, etc., the date of submittal; and the date of each correction and revision. So far as is practical, each Shop Drawing and/or Brochure shall bear a cross-reference note to the sheet number or numbers of the Contract Drawings and/or Specifications showing the same work. Shop Drawings and Brochures shall be prepared as follows:
I. Shop Drawings: Drawings shall be drawn to a scale that can be easily read and shall contain sufficient plans, elevations, sections, and isometrics to describe clearly the items in question. Drawings shall be prepared by skilled technicians experienced in this type of work. All piping, equipment layouts, ductwork and similar Shop Drawings shall be drawn to at least 1/4" = 1'0" scale.

2. Brochures/Cut-sheets: Brochures/Cut-sheets shall be published by the Manufacturers and shall contain complete and detailed engineering and dimensional information to show that the equipment will fit into the allotted space. Brochures not compiled in the manner described below shall be returned for resubmittal.

3. Brochures submitted shall contain only information which is relevant to the particular equipment or materials to be furnished. Do not submit catalogs that describe several different items other than those items to be used unless all irrelevant information is marked out or relevant information is clearly marked.

D. The submittal format shall follow the Specifications format with a submittal required for each section of this Division. Each major category of equipment shall be submitted under a separate cover letter. The first submittal shall be accompanied by a three-ring hard back binder for the A/E to use in retaining copies of the submittals. Copies of each submittal shall be three-hole punched and arranged (or folded if required) for the A/E’s filing convenience. Provide one copy of updated TABLE OF CONTENTS and progressive-tabbed manila index sheets also for the A/E’s filing convenience.

E. Submit six (6) copies of all Shop Drawings and Brochures for review and approval. One set will be retained by the Engineer, one set by the Architect for record purposes.

F. Minimum size of submittal data shall be 8-1/2” x 11”.

G. Any submittal that is disapproved must be resubmitted within two (2) weeks following notification of such disapproval. If no satisfactory material is submitted within the two-week period, the Architect reserved the right to require the Contractor to furnish items exactly as described in the Contract Documents.

H. No allowances will be made for submittals which are not made in a timely fashion or which are turned down because they are not equal. Should delivery problems arise due to the above, affecting the completion time of the project, the Contractor will furnish and install acceptable alternates until the proper materials arrive and then replace the alternate materials with the approved materials, all at no cost to the Owner. If the Contractor is not able to furnish an acceptable alternate until the proper materials arrive, he will assume all costs for furnishing and installing all alternates as directed by the Architect and/or will pay a suitable penalty for the inconvenience experienced by the Owner. This penalty will be set by the Architect based on the particular circumstances.

1.10 SUBSTITUTIONS

A. The listing of product manufacturers, catalog numbers, etc., in the various sections of the specifications is intended to establish a standard of quality only, and is not intended to preclude open, competitive bidding. The Contractor may at his option submit substitute materials or methods which he feels are equal or superior to those specified. If the Contractor does submit alternate materials or methods, it shall be understood that the Contractor:

1. Has personally investigated the proposed substitute product and determined that it has all the same accessories and is equal or superior in all respects to the item specified.

2. Will provide the same guarantee for the substitution that he would for that specified.
3. Has coordinated the installation of the equipment which he proposes to substitute with all other trades especially in regard to electrical requirements and to operating weights trades and includes the costs for any changes required for the work to be complete in all respects. The Contractor will prepare shop drawings where required by the Architect or where dimensions vary.

4. Waives any and all claims for additional costs related to the substitution.

1.11 SPARE PARTS DATA

A. As soon as practicable after approval of materials and equipment, and, if possible, not later that one month prior to the date of beneficial occupancy, the Contractor shall furnish spare parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies, with current unit prices and sources of supply; a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment or specified hereinafter to be furnished as part of the contract. The foregoing shall not relieve the Contractor of any responsibilities under the guarantee specified.

1.12 RECORD DRAWINGS

A. The Contractor shall keep a set of Drawings of the job, noting daily all changes made in the Drawings in connection with the final installation including exact dimensioned locations of all new and uncovered existing active and inactive utilities outside the building and shall turn over a clean, neatly marked set of sepias reproducible Drawings showing "as-built" work to the A/E for delivery to the Owner. All underground utilities and services and systems shall be accurately located by the Contractor and dimensioned on the "as-built" Drawings.

1.13 OPERATING AND MAINTENANCE MANUAL

A. Prepare and submit to the Architect for delivery to the Owner an indexed manual with complete technical data for every piece of equipment and material installed under this contract.

1. Complete submittals as approved by Architect.

2. Manufacturer's installation instruction brochures.

3. Manufacturer's local representative and/or Distributor's name, address and phone number.

4. Manufacturer's operating and maintenance brochures.

5. Replacement part number listings and/or descriptions.


7. Valve tag list.

B. This manual shall include all of the listed data bound into a permanent hard-back binder identified on the cover as "Operating and Maintenance Manual" with additional cover display of the names and location of the Building, the Owner, the Architect, the Engineers, the General Contractor, and the Sub-Contractors installing equipment represented in the brochure.

C. Contents of the Manual shall be grouped in sections according to the various sections of the specifications and shall be listed in a Table of Contents.
PART 2 - PRODUCTS

2.1 STANDARDS FOR MATERIALS

A. All materials, in general, shall conform to the requirements of all agencies of publications hereinbefore specified under the paragraph QUALITY ASSURANCE and shall be listed, inspected, and approved by the Underwriters Laboratories and shall bear the U.L. label where labeling service is available. The label or listing of the Underwriters Laboratories, Inc. will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this listing, the Contractor may submit a statement from a nationally recognized testing agency indicating that the items have been tested in accordance with required procedures, and that the materials and equipment comply with all contract requirements.

2.2 STANDARD PRODUCTS

A. Materials and equipment to be provided shall be the standard catalog products of manufacturers regularly engaged in the manufacture of products conforming to these specifications, and shall essentially duplicate materials and equipment that have been in satisfactory use at least two years.

2.3 MANUFACTURERS INSTRUCTIONS

A. The responsibility for the furnishing of the proper equipment and/or material and the responsibility for seeing that it is installed as intended by the manufacturer, rests entirely upon the Contractor. If needed for proper installation, operation, or startup, the Contractor shall request advice and supervisory assistance from the representative of the specific manufacturer. The manufacturers' published instructions shall be followed for preparing, assembling, installing, erecting, and cleaning manufactured materials or equipment, unless otherwise indicated. The Contractor shall promptly notify the Architect in writing of any conflict between the requirements of the contract documents and the manufacturers' directions and shall obtain the Architect's instructions before proceeding with the work. Should the Contractor perform any such work that does not comply with the manufacturers' directions or such instructions from the Architect, he shall bear all costs arising in connection with the deficiencies.

2.4 RUST PREVENTION

A. All metallic materials shall be protected against corrosion. Exposed metallic parts of outdoor apparatus made of ferrous metals but not of corrosion-resistant steel, shall be zinc-coated in accordance with ASTM A123 or A153, except where other equivalent protective treatment is specifically approved in writing.

2.5 STORAGE ON SITE

A. The Contractor shall not receive material or equipment at the job site until ready for installation or until there is a suitable space provided to properly protect equipment from rust, weather, humidity, dust, or physical damage.

2.6 CAPACITIES

A. Capacities shall be not less than those indicated and shall be such that no component or system becomes inoperative or is damaged because of startup or other overload conditions.
2.7 NAMEPLATES

A. Each major component of equipment shall have the manufacturer's name, address, and catalog number on a plate securely attached to the item of equipment. All data on nameplates shall be legible at the time of final inspection.

2.8 CONDITION OF MATERIAL AND APPURTENANCES

A. All pipe, fittings, appurtenances, and other material required for complete installation of these systems shall be new to conform to manufacturer's recommendations, unless otherwise specified. All equipment injured or damaged in transit from factory, during delivery to premises, while in storage on premises, while being erected and installed, and while being tested, until time of substantial completion, shall be replaced by the Contractor without extra cost to Owner.

PART 3 - EXECUTION

3.1 INSTALLATION OF SYSTEMS

A. Provide and install unions at proper points to permit removal of pipe and various equipment and machinery items without injury to other parts of system. No union will be required in welded lines or lines assembled with solder joint fittings, except at equipment items, machinery items, and other special pieces or apparatus. Companion flanges on lines at various items of equipment, machines and pieces of apparatus, shall serve as unions to permit removal of the particular items. Unions connecting ferrous pipe to copper or brass pipe shall be dielectric type.

3.2 SPACE AND EQUIPMENT ARRANGEMENT

A. All equipment shall be installed in a manner to permit access to parts requiring service without disassembly of other equipment.

B. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to permit access through stairways, doorways, or shafts shall be brought to the job and placed in the space before the enclosing structure is completed. Following placement in the space, such apparatus shall be thoroughly protected against damage.

3.3 PRECEDENCE OF WORK

A. This contract includes many different systems furnished and installed by different trades. Each trade shall coordinate their work with that of all other trades so that it may be installed in the most direct and workmanlike manner without hindering or handicapping any other trades.

3.4 EXCAVATION AND BACKFILL

A. The Contractor shall perform all excavation of every description required in the execution of his work. Excavation shall be through whatever substance encountered, to the depths indicated on the drawings, or as required. Excavated material suitable for backfill shall be piled in an orderly manner a sufficient distance from the trench to prevent overloading sides and causing cave-ins. Excavated materials not suitable for backfill shall be removed or stored as directed. Such grading shall be done as is necessary to protect the excavation from surface water. Trenches shall be maintained in a dry condition by bailing, pumping, or other approved methods. Pipe shall not be laid in wet trenches. Sheeting and shoring shall be provided as required for the protection of the work and the safety of personnel.

B. Trenches shall be of the necessary width and depth to provide for proper laying of pipe and appurtenances, with banks as nearly vertical as possible. Bottoms of trenches shall be excavated to the grade and depth indicated or required, and barrel of pipe shall be laid on firm and undisturbed...
soil. Bell holes, of a size to permit proper grading, shall be provided as required. Over-depth excavations shall be backfilled to proper level with sand. When rock or other soil not suitable for bedding the pipe is encountered, it shall be removed to a depth of not less than 1' below grade, and backfilled with sand to grade, to provide a suitable bed for pipe. Existing underground piping shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired to the Architect's satisfaction, at the Contractor's expense.

C. Trenches shall not be backfilled until all required tests have been performed. This requirement does not preclude sectional testing and backfilling of the various systems. Trenches shall be carefully backfilled with a minimum 6" sand cover over piping then backfilled with material (free from large earth clods, rocks, and/or foreign materials), laid in 6" layers, compacted to 90 percent of maximum dry density as determined by ASTM D698 (compaction shall be to 95 percent below structures, including sidewalks and roadways).

D. Open trenches abutting foundation or basement excavations, building walls, and grade beams, will not be permitted, but shall be backfilled and completed, for as distance of not less than 10' from the above features, as soon as possible. All damage resulting from flooding due to open trenches shall be paid for by the Contractor.

E. Where excavation requires, existing walks, street, drives, or other existing pavement shall be cut to install new lines and to make new connections to existing lines. The size of the cut shall be held to a minimum, consistent with the work to be accomplished. After the installation of the new materials is completed and the excavation has been backfilled, the paving shall be patched, using materials to match those cut out. The patches shall be thoroughly bound with the original surfaces, and shall be level with them.

3.5 CUTTING AND PATCHING

A. Where it becomes necessary to cut through any wall, floor, or ceiling to permit installation of any work under this section of the specifications or to repair any defects that may appear, up to the expiration of the guarantee period, such cutting shall be done under the observation of the Architect by the Contractor. The Contractor shall not be permitted to cut or modify any structural members without the written direction of the Architect.

B. Patching of all openings cut by the Contractor, or repairing of any damage to the work of other trades occasioned by the cutting operations, or occasioned by the failure of any part of work installed under this contract, shall be performed by the trade whose work is involved, but shall be paid for by the Contractor.

C. Any openings cut through exterior walls or roofs shall be provided with suitable covers, while they are left open, to protect the property or materials involved. Any openings cut through walls below grade shall be properly protected to prevent entrance of water or other damaging elements.

3.6 HOISTING, SCAFFOLDING, AND TRANSPORTATION

A. The Contractor shall provide his own hoisting facilities to set his materials and equipment in place in the building, as indicated on drawings and for subsequent cleaning, testing, and adjusting.

B. The Contractor shall provide necessary transportation to facilitate the delivery of all materials, equipment, tools, and labor to the job, in accordance with intent of these documents.

3.7 CLEANING

A. The Contractor shall, at all times, keep the premises free from accumulations of waste material or rubbish caused by him, his employees, or his work. This debris shall be removed, not only from the building, but also from the project site.
B. At completion of the job, the Contractor shall remove all of his tools, scaffolding, and surplus materials. He shall leave the area "broom clean."

3.8 ELECTRICAL WIRING OF MOTORS AND EQUIPMENT

A. Unless specifically shown, indicated, or specified to the contrary, each item shown or required by the Drawings or specified in the Specifications shall be accompanied by all motors and starting and controlling equipment necessary for the items' proper operations. These motors shall be integrally attached to and/or installed with their associated equipment item and electrically connected as specified in the Electrical Specifications. Equipment controlled from motor control centers shall be supplied with motors only. Motor control centers are specified in the Electrical Specifications and shown on the Electrical Drawings.

END OF SECTION
SECTION 220523
VALVES FOR PLUMBING

PART 1   GENERAL

1.1 WORK INCLUDED
A. Gate Valves
B. Ball Valves
C. Check Valves
D. Balancing Valves

1.2 RELATED WORK
A. Section 220500 – Common Work Results for Plumbing
B. Section 221100 - Plumbing Piping

1.3 SHOP DRAWINGS
A. Submit product data in accordance with Section 15010.

PART 2   PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Valves as manufactured by KITZ, Nibco, Crane, Apollo, Watts or approved equal are acceptable provided they meet or exceed these specifications.
B. Provide valve types of same manufacturer throughout where possible.
C. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.
D. Provide factory-fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated; provide proper selection as determined by installer to comply with installation requirements. Provide sizes as indicated, and connections, which properly mate with pipe, tube and equipment connections. Where more than one type is indicated, selection is Installer's option. Valves shall be of same make for all these services.

2.2 VALVE CONNECTIONS
A. Provide valves suitable for connection to adjoining piping as specified for pipe joints. Use pipe size valves unless otherwise indicated.
B. Provide threaded valves for pipe sizes 2 inches and smaller.
C. Provide flanged valves for pipe sizes 2 1/2 inches and larger.
D. Solder or screw to solder adaptors for copper tubing.
2.3 GATE VALVES

A. Select valves, equipped with packing suitable for intended service. (Under no circumstances is asbestos acceptable) Select valves designed so back seating protects packing and stem threads from media when valve is fully opened, and equipped with gland follower. Guides for disc on rising stem valves must be machined for accurate fit.

B. Comply with the following standards:

Bronze Valves: MSS SP - 80

C. Domestic Water

1. Threaded ends 2” and smaller: Class 125, bronze body, screwed bonnet, rising stem, solid wedge: Kitz #44, Nibco T-111, Crane 428 or equal. (Non-rising gate valves may be used where headroom prevents full extension of rising stems: Kitz #40, Nibco T-113, Crane 438 or equal)

2. Solder ends 2” and smaller: Class 125, bronze body, screwed bonnet, rising stem, solid wedge: Kitz #44, Nibco S-111, Crane 428 or equal. (Non-rising stem gate valves may be used where headroom prevents full extension of rising stems: Kitz #41, Nibco S-113, Crane 438 or equal)

3. Flanged ends 2” and larger: Class 125 iron body, bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge: Kitz #72, Nibco F617-0, Crane 465-1/2 or equal.

2.4 BALL VALVES

A. Select with full port opening, blow out proof stem, hard chrome plated forged brass vented ball, adjustable packaging nut, rated not less than 600# W.O.G., 150 W.S.P.

B. Comply with the following standards:

Ball Valves: MSS SP - 110

C. Domestic Water Service

1. Threaded ends 3” and smaller: 600# W.O.G., 150 W.S.P., bronze two piece body, hard chrome plated full port forged brass ball, true adjustable packing nut, blow-out proof stem: Kitz #68, Nibco T-585-70, Apollo 77-100 Series, Watts 6080 or equal.

2. Solder ends 3” and smaller: 600# W.O.G., 150 W.S.P., bronze two piece body, hard chrome plated full port forged brass ball, true adjustable packing nut, blow-out proof stem: Kitz #69, Nibco S-585-70, Apollo 77-200 Series, Watts B-6081 or equal.

2.5 SWING CHECK VALVES

A. Comply with the following standards for design, workmanship, material and testing:

Bronze Valves: MSS SP - 80

B. Construct valves of pressure casting free of any impregnating materials.
C. Domestic Water Service

1. Threaded ends 2" and smaller: Class 125, bronze body, screwed cap, "Y" pattern swing, bronze disc: Kitz #22, Nibco T-413B, Crane 37 or equal.

2. Soldered ends 2" and smaller: Class 125, bronze body, screwed cap, "Y" pattern swing, bronze disc: Kitz #23, Nibco T-413B, Crane 1342 or equal.

3. Flanged ends 2-1/2" and larger: Class 125, iron body, bronze mounted, horizontal swing, cast-iron disc: Kitz #78, Nibco F918-B, Crane 373 or equal.

2.6 BALANCING VALVES

A. Manual Balance Valve: Furnish and install as shown on plans, a calibrated (bronze/cast iron with bronze disc) balance valve equipped with readout valves to facilitate the connecting of a differential pressure meter. Each readout valve shall be fitted with an integral check valve designed to minimize system fluid loss during the monitoring process. The balancing valve shall have an indexing pointer and calibrated nameplate to indicate the degree of closure of the precision machined orifice. Each balancing valve is to be constructed with internal O-ring seals to prevent leakage around the rotating element. The balancing valves shall be supplied with performed polyurethane insulation, suitable for use on heating and cooling system.

B. Automatic Balance Valves: Furnish threaded or flanged valves with cartridge, bronze or steel housing to match pipe material and pressure and temperature taps. Flow shall be accurate to a +/- 5% within a pressure range of 4 - 55 psi for Areas A,B,C,D & M; 2 - 30 psi for Areas E,F,G & H and 1 - 20 psi for Areas J & K. For flows below 30 gpm, combo valves may be used. Griswold Controls, Auto Flow or Hays valves are acceptable.

2.7 VALVE FEATURES

A. Provide valves with features indicated and where not otherwise indicated, provide proper valve features as outlined in this specification. Comply with ANSI B31.1.


C. Threaded valve ends comply with ANSI B2.1.

D. Solder Joint valve ends complying with ANSI B16.18.

E. Fabricate pressure-containing components of valves, including stems and seats from brass or bronze materials; of standard alloy recognized in valve manufacturing that resist de-zincification.

F. Butterfly valve designed for flow regulation and manufactured to be tight in closed position. Test pressures in accordance with MSS SP-67 as follows: Seat 2-12" 220 psi. No leakage permitted under test.

2.8 VALVE OPERATORS

A. Provide suitable handwheels for all valves.
PART 3 EXECUTION

3.1 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install ball valves on all water piping 3” and smaller for shut-off and isolating service, to isolate equipment, part of systems, or vertical risers.

C. Provide shut-off valves and check valves on discharge of pumps.

D. Install check valves in horizontal position with pin horizontally perpendicular to center line of pipe. Install for proper direction of flow. Installations on any vertical piping must be up flow only.

E. All valves shall be located so that the bonnets can be removed.

F. Where valves are installed concealed in pipe chases provide Zum Z-1460-4 or approved equal access doors with concealed hinge and key operated locks. Door shall be large enough to service valves and shall be installed flush with finished walls.

G. Provide brass tag for each valve labeling the fluid in the pipe, the area served, and the normal operating position.

END OF SECTION
PART 1 GENERAL

1.1 WORK INCLUDED
   A. Pipe Hangers and Supports

1.2 RELATED WORK
   A. Section 220500 – Common Work Results For Plumbing
   B. Section 221100 - Plumbing Piping

1.3 SUBMITTALS
   A. Submit shop drawings in accordance with Section 220500 Common Work Results For Plumbing.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
   A. Products shall be as manufactured by Grinnell, Elcen, Fee and Mason, Unistrut or approved equal.

2.2 INSERTS
   A. Malleable iron case of galvanized steel sheet and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms.
   B. Size inserts to suit threaded hanger rods.

2.3 PIPE HANGERS AND SUPPORTS
   A. Hangers: Pipe sizes 1/2 inch to 1-1/2 inch: adjustable wrought steel ring.
   B. Hangers: Pipe sizes 2 inches to 4 inches: adjustable wrought steel clevis.
   C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
   D. Vertical Support: Steel riser clamp.
   E. Steel Beam Clamps: Elcen Figure 33, Type 3 or approved equal.
   F. Expansion Anchors: Phillips Red Head or approved equal.
   G. Design hangers to impede disengagement by movement of supported pipe.
   H. Provide copper plated hangers and supports for copper piping or two layers Scotch 33 PVC tape or equal.
2.4 HANGER RODS

A. Provide cadmium plated steel hanger rods, threaded both ends, threaded one end, or continuous threaded.

2.5 SLEEVES

A. Pipes through Walls, Fire Proofing, Footings, Potentially Wet Floor: Form with galvanized steel pipe.
B. Size large enough to allow for movement due to expansion and to provide for continuous installation.

PART 3 EXECUTION

3.1 PIPE HANGERS AND SUPPORTS

A. All structures and appurtenances employed for the purpose of supporting the pipe and guiding it properly shall be carefully fabricated in such a manner as to preserve the true grade of the pipe without subjecting either the pipe or the supporting and guidance members to any undue strain.

B. Support horizontal piping as follows:
C. Space hangers and furnish rods as follows:

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<th>Nominal Pipe Size (in.)</th>
<th>Span (ft.)</th>
<th>Hanger Rod Diameter (in.)</th>
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<td>Steel</td>
<td>Copper</td>
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D. Install hangers to provide minimum 1/2 inch clear space between finished covering and adjacent work.

E. Place a hanger within one foot of each horizontal elbow.

F. Use hangers which are vertically adjustable 1-1/2 inch maximum after piping is erected.

G. Support piping at each change or direction, at ends of branches, at base and top of riser pipes and drops, and wherever necessary to prevent sag, bending or vibration, in addition to above-listed hanger spacing.

H. Pipe hangers on insulated lines shall be sized to fit the outside of the insulation.

I. Where several pipes can be installed in parallel and at the same elevation, provide multiple or trapeze hangers, designed to support loads per ANSI B31.1.

J. Where practical, support riser piping independently of connected horizontal piping.
3.2 PRIMING
   A. Prime coat non-galvanized steel hangers and supports.

3.3 SLEEVES
   A. Set sleeves in position in advance of concrete work. Provide suitable reinforcing around sleeves.
   B. Extend sleeves through potentially wet floors 1 inch above finished floor level. Caulk sleeves full depth and provide floor plate.
   C. Where piping passes through floor, ceiling or wall close off space between pipe or duct and construction with non-combustible insulation. Provide tight fitting metal caps on both sides and caulk.
   D. Install chrome plated escutcheons where piping passes through finished surfaces.
   E. Size pipe sleeves to permit placing pipe and specified insulation material for pipes passing through concrete or masonry walls or concrete slabs.
   F. Sleeves for pipe through walls standard weight galvanized steel pipe or 18-gauge galvanized sheet metal with ends flush with wall surface.
   G. Seal pipes passing through walls. Use mastic or oakum seal in the annular space in non-fire-rated walls; use Dow-Corning 3-6548 silicone RTV foam firestop sealant or equal in the annular space in fire-rated walls or other envelopes.
   H. Seal exposed pipe passing through floor slabs with Dow-Corning 3-6548 silicone RTV foam firestop sealant or equal and point with caulking compound. Strike off flush at top of sleeve.
   I. Insulated pipe shall be insulated in sleeves, caulked and pointed as above.
   J. All piping shall be installed with due regard to expansion and contraction. Type of hanger, methods of support, location of supports, etc., shall be governed in part by this consideration.

END OF SECTION
SECTION 220719
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 WORK INCLUDED
A. Insulation of Domestic Hot Water Piping

1.2 RELATED WORK
A. Section 220500 – Common Work Results For Plumbing
B. Section 221100 - Plumbing Piping

1.3 QUALITY ASSURANCE
A. All insulation materials required for piping, and mechanical equipment, etc. shall be furnished and installed under this contract. The execution of the work shall be by approved insulation contractor in strict accordance with the best practice of the trade and the intent of this Specification.

B. It is mandatory that all insulation be applied in a neat and workmanlike manner. Contractor shall be required to remove and replace all insulation not applied in strict accordance with manufacturer's specifications or not presenting a neat finished appearance.

C. All insulation on indoor work shall have composite (insulation, jacket or facing, and adhesive used to adhere jacket or facing to the insulation) fire and smoke hazard Ratings, as tested by procedure ASTM E-84, NFPA 255 and UL 73 not exceeding Flame Spread of 25, Fuel Contributed of 50 and Smoke Developed of 50. Accessories, such as adhesives, mastics, cements, tapes and cloths for fittings shall have component ratings as listed above.

D. Insulation shall be continuous through wall, floor and ceiling openings and sleeves.

E. Specified mastics, adhesives and coatings shall be applied in strict accordance with manufacturer's instructions, including recommended coverages.

1.4 SUBMITTALS
A. Submit materials and installation instructions in accordance with Section 220000 Plumbing.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Products manufactured by Owens-Corning, Knauf, Johns Manville, Certain-Teed, Govain, Benjamin Foster are acceptable provided they meet or exceed these specifications.
2.2 PIPING

A. Piping:

1. Insulation thickness - Fiberglass pipe covering.

<table>
<thead>
<tr>
<th>PIPING TYPE</th>
<th>PIPE SIZE</th>
<th>INSULATION SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Hot Water Supply &amp; Return</td>
<td>2&quot; &amp; under</td>
<td>1&quot;</td>
</tr>
<tr>
<td></td>
<td>2-1/2&quot; &amp; up</td>
<td>1-1/2&quot;</td>
</tr>
</tbody>
</table>

2. All fiberglass pipe insulation shall be nominal 5 pcf density.

3. Insulation jacket shall be factory applied white All Service Jacket (ASJ), with factory supplied self-sealing laps.

4. Fittings, Valves and Flanges:
   a. Where manufactured, factory premolded fittings (of the same material and thickness as the pipe insulation) shall be used for all fittings, flanges and valves.
   
   b. Where premolded insulation fittings are not manufactured, all fittings, flanges and valves shall be insulated with mitered segments of nominal 5 lb. density fiberglass pipe covering. Hot Service Finish: embed a 20 x 20 weave white glass reinforcing cloth between two 1/16 inch coats of Benjamin Foster 30-36. The glass cloth and second coat shall overlap adjacent covering by at least two inches. Cold Service Finish: same as above except use Benjamin Foster 30-35.
   
   c. Insulation for removable flanges of pipe strainers shall be fabricated with built-up sections of Fiberglass pipe covering, so arranged as to facilitate servicing of the strainer. Applications for cold services shall be complete with vapor seals.

6. Insulation on pipes shall be protected by saddles from hangers, guides, and rollers.

7. Any piping subject to freezing shall be covered with minimum layer of 2 inch fiberglass. Install heating cable when specified between pipe and insulation.

PART 3 EXECUTION

3.1 PREPARATION

A. Do not install covering before piping and equipment has been tested and approved.

B. Ensure surface is clean and dry prior to installation. Ensure insulation is dry before and during application.

3.2 INSTALLATION

A. Provide a minimum 12" long, high density insulation insert such as calcium silicate or its equivalent at each support. Insert shall be the same thickness as adjacent piping.

B. Ensure insulation is continuous through inside walls. Pack around pipes with fire proof self-supporting insulation material, fully sealed.
C. Insulate fittings and valves. Do not insulate unions, flanges, strainers, flexible connections and expansion joints. Terminate insulation neatly with plastic material troweled on bevel.
D. Finish insulation neatly at hangers, supports and other protrusions.
E. Locate insulation cover seams in least visible locations.
F. Cold Piping: Cover fittings and valves with equivalent thickness of insulation material. Cover with open mesh glass cloth sealed with vapor barrier sealant. Seal lap joints with 100% coverage of vapor barrier sealant and adhesive. Seal butt joints with 4 inches wide strips of vapor barrier sealed with vapor barrier adhesive. For exposed fittings and valves, apply hydraulic setting cement paste over insulation material before applying canvas jacket.
G. Hot Piping: Cover fittings and valves with equivalent thickness of insulation material. For exposed fittings and valves apply hydraulic setting cement paste over insulating material before applying canvas jacket.
H. Cover exposed insulation with 8 oz. canvas jacket.
I. Repair separation of joints or cracking of insulation due to thermal movement or poor workmanship.

END OF SECTION
PART 1  GENERAL

1.1  WORK INCLUDED
   A. Sanitary Sewer Piping
   B. Domestic Water Piping

1.2  RELATED WORK
   A. Section 220000 – Common Work Results For Plumbing
   B. Section 220523 – Valves For Plumbing
   C. Section 220529 - Supports, Anchors and Sleeves For Plumbing
   D. Section 220719 - Plumbing Piping Insulation

1.3  REFERENCES
   A. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings Class 150 NS 300.
   B. ANSI/ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.
   C. ANSI/ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder. Joint Drainage Fittings - DWV.
   D. ANSI/ASME Sec. 9 - Welding and Brazing Qualifications.
   E. ANSI/ASTM B32 - Solder Metal.
   H. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
   I. ASTM A74 - Cast Iron Soil Pipe and Fittings.
   J. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses.
   K. ASTM A234 - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
   L. ASTM B88 - Seamless Copper Water Tube.
   M. ASTM B306 - Copper Drainage Tube (DWV).
   O. AWS 5.8 - Brazing Filler Metal.

1.4 QUALITY ASSURANCE

A. Valves: Manufacturer's name and pressure rating marked on valve body.
B. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
C. Welders Certification: In accordance with ANSI/ASME Sec. 9.

1.5 SUBMITTALS

A. Submit product data in accordance with Section 220500.
B. Include data on pipe materials, pipe fittings, and accessories.

PART 2 PRODUCTS

2.1 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING


2.2 SANITARY SEWER PIPING, ABOVE GRADE


2.3 WATER PIPING, ABOVE GRADE


2.4 FLANGES, UNIONS, AND COUPLINGS

A. Pipe Size 2 Inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.

B. Pipe Size Over 2 Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping; neoprene gaskets for gas service; 1/16 inch thick preformed neoprene bonded to asbestos.

C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
PART 3 EXECUTION

3.1 PREPARATION
A. Ream pipe and tube ends. Remove burrs.
B. Remove scale and dirt, on inside and outside, before assembly.
C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION
A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
B. Route piping in orderly manner and maintain gradient.
C. Install piping to conserve building space and not interfere with use of space.
D. Group piping whenever practical at common elevations.
E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
F. Provide clearance for installation of insulation and access to valves and fittings.
G. Provide access doors to match wall or ceiling construction where valves and fittings are not exposed.
H. Slope water piping and arrange to drain at low points.
I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
J. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting where exposed.

3.3 APPLICATION
A. Install unions downstream of valves and at equipment or apparatus connections.
B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.

3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM
A. Prior to starting work, verify system is complete, flushed and clean.
B. Ensure pH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
E. Maintain disinfectant in system for 24 hours.
F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

H. Take samples no sooner than 24 hours after flushing, from 2 percent of outlets and from water entry, and analyze in accordance with AWWA C601.

I. Submit statement of test results and procedures to Architect.

3.5 FLUSHING OF DOMESTIC WATER PIPING SYSTEM

A. Prior to start of work, verify system has been disinfected per paragraph 3.4 of this section.

B. All installed plumbing fixtures shall be rinsed (ran) daily for a minimum of 30 seconds each. This shall continue for a minimum period of one (1) week.

C. At the conclusion of the flushing cycle, verification samples may be collected by a school representative for testing.

D. Records of flushing must be maintained and available for inspection.

3.6 TESTING

A. Test soil, vent, and rainwater systems by plugging lines and filling systems with water to a static head of ten (10) feet of water. Observe water level for two (2) hours. If level is lowered, indicating leakage, repair leaks and test again until no further leakage is detected.

B. Test water piping at 100 psig for a continuous period of four (4) hours. During this time, carefully inspect the system for leaks. If necessary, repair leaks and test again until no further leakage is detected.

END OF SECTION
SECTION 230500
COMMON WORK RESULTS FOR HVAC

PART 1 GENERAL

1.1 RELATED WORK
A. General Conditions
B. Special Conditions
C. Supplementary General Conditions
D. Architectural, Structural, Civil, Electrical and Mechanical Drawings & Specifications

1.2 SCOPE OF WORK
A. The work covered by the Mechanical Sections of the Specifications shall include the furnishing of all materials, labor, transportation, tools, permits, fees, inspections, utilities and incidentals necessary for the complete installation of all mechanical and plumbing work required in the Contract Drawings.

B. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction is required for work indicated or specified in this Section or work specified in other sections, it shall be the responsibility of the Contractor to provide all material and equipment which is usually furnished with such systems in order to complete the installation, whether mentioned or not.

C. The Contractor shall visit the premises and thoroughly familiarize himself with all the details of the work and working conditions and to verify all dimensions in the field. The Contractor shall advise the Architect of any discrepancy prior to bidding. The submission of bids shall be deemed evidence of the Contractor’s site visit, the coordination of all existing conditions, and the inclusion of all considerations for existing conditions.

1.3 PLANS AND SPECIFICATIONS
A. These Specifications are accompanied by drawings of the building and details of the installations indicating the locations of equipment, piping, ductwork, outlets, etc. The drawings and these specifications are complementary to each other, and what is required by one shall be as binding as if required by both.

B. If departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted to the Architect for review. No departures shall be made without prior written acceptance of the Architect.

C. The interrelation of the specifications, the drawings, and the schedules is generally as follows: The specifications determine the nature and setting of the materials, the drawings establish the quantities, dimensions, and details, and the schedules give the performance characteristics.

D. Should the drawings disagree in themselves or with the specifications, the contractor shall immediately notify the architect and shall perform and/or furnish the better quality or greater quantity of work or materials unless otherwise directed by the architect in writing. In case the specifications should not fully agree with the schedules, the latter shall govern. Figures indicated on drawings govern scale measurements and large scale details govern small scale drawings. In case of
disagreement between specifications and drawings, see Division I of these specifications for clarifications.

E. Items specifically mentioned in the specifications but not shown on the drawings and/or items shown on the drawings but not specifically mentioned in the specifications shall be installed by the Contractor under the appropriate section of work as if they were both specified and shown.

1.4 QUALITY ASSURANCE

A. All work shall comply with the applicable rules of the following:

1. 2012 International Building Code
2. 2012 International Mechanical Code
3. 2012 International Plumbing Code
4. 2012 International Fire Code
6. National Fire Protection Association Codes
7. State Fire Marshall
9. All applicable city, county, state, and federal rules, codes, and ordinances.

B. In any instance where these specifications call for materials for construction of a better quality or larger size than required by the codes, the provisions of these specifications shall take precedence. None of the terms or provisions of this specification shall be construed as waiving any rules, regulations, or requirements of these authorities. The codes shall govern in case of direct conflict between the codes and the Drawings.

1.5 SUPERVISION

A. A competent foreman or superintendent, initially approved by the Architect, shall be assigned to the project to receive instructions and to act for the Contractor. Once this superintendent has been approved, no change shall be made without approval of the Architect. Architect's authorized representative and/or owner's observer shall have the right to observe the work at any time. The Contractor shall have a representative present when his work is being observed, and he shall give assistance, as may be required, to the Architect's representative. Recommendations made by the observer shall be promptly carried out, and all unsatisfactory material and/or workmanship shall be replaced at once, to the satisfaction of the Architect.

1.6 GUARANTEE

A. The Contractor shall guarantee all materials and workmanship for a period of two (2) years after the final acceptance of work.
1.7 BUILDING CONSTRUCTION AND LAYOUT OF WORK

A. It shall be the responsibility of the Contractor to consult the architectural and engineering drawings and details so as to thoroughly familiarize himself with the type and quality of construction to be provided on this project.

B. The Drawings are diagrammatic in character and cannot show every connection in detail or every pipe and duct in its exact location. These details are subject to the requirements of ordinances and also structural and architectural conditions. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases or above suspended ceilings, etc., in finished portions of the building, unless specifically noted or indicated to be exposed. Work shall be installed to avoid crippling of structural members; therefore, inserts to accommodate hangers shall be set before concrete is poured, and proper openings through floor, walls, beams, etc., shall be provided as hereinafter specified or as otherwise indicated or required before concrete is poured. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted.

C. The approximate location of each item is indicated on the drawings. These drawings are not intended to give complete and exact details in regard to location. Exact locations are to be determined by actual measurements at the building and will in all cases be subject to the approval of the Architect, and he reserves the right to make any reasonable changes in the locations indicated without additional cost.

1.8 SHOP DRAWINGS AND BROCHURES

A. After the Contract is awarded, but prior to proceeding with the Work, the Contractor shall obtain, check, certify, and submit complete Shop Drawings and Brochures from Manufacturers, Suppliers, Vendors, etc., for all materials and equipment specified herein. Submit Shop Drawings and Brochures in sufficient time so as not to impede the progress of work. At least two weeks will be required for the processing of Shop Drawings and Brochures in the Engineer's office, exclusive of transmittal time. This time shall be considered by the Contractor when scheduling submittal data.

B. The Engineer's review of Shop Drawings and Brochures shall not relieve the Contractor of the responsibility for dimensions, errors that may be contained therein, or deviations from Contract Document requirements. It shall be clearly understood that the Engineer's noting some errors but overlooking others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the Shop Drawings, the requirements of the Contract Documents shall govern and are not waived or superseded in any way by the submittal data review.

C. Each Shop Drawing shall indicate in the lower right hand corner and each Brochure shall indicate on the front cover the following: the Title of the Sheet or Brochure; name and location of the building; names of the Architect, Engineer, Contractor, Manufacturer, Supplier, Vendor, etc., the date of submittal; and the date of each correction and revision. So far as is practical, each Shop Drawing and/or Brochure shall bear a cross-reference note to the sheet number or numbers of the Contract Drawings and/or Specifications showing the same work. Shop Drawings and Brochures shall be prepared as follows:

1. Shop Drawings: Drawings shall be drawn to a scale that can be easily read and shall contain sufficient plans, elevations, sections, and isometrics to describe clearly the items in question. Drawings shall be prepared by skilled technicians experienced in this type of work. All piping, equipment layouts, ductwork and similar Shop Drawings shall be drawn to at least 1/4” = 1’0” scale.

2. Brochures/Cut-sheets: Brochures/Cut-sheets shall be published by the Manufacturers and shall contain complete and detailed engineering and dimensional information to show that
the equipment will fit into the allotted space. Brochures not compiled in the manner described below shall be returned for resubmittal.

3. Brochures submitted shall contain only information which is relevant to the particular equipment or materials to be furnished. Do not submit catalogs that describe several different items other than those items to be used unless all irrelevant information is marked out or relevant information is clearly marked.

D. The submittal format shall follow the Specifications format with a submittal required for each section of this Division. Each major category of equipment, such as fans or pumps or air devices, shall be submitted under a separate cover letter. The first submittal shall be accompanied by a three-ring hard back binder for the A/E to use in retaining copies of the submittals. Copies of each submittal shall be three-hole punched and arranged (or folded if required) for the A/E’s filing convenience. Provide one copy of updated TABLE OF CONTENTS and progressive-tabbed manila index sheets also for the A/E’s filing convenience.

E. Submit six (6) copies of all Shop Drawings and Brochures for review and approval. One set will be retained by the Engineer, one set by the Architect for record purposes.

F. Minimum size of submittal data shall be 8-1/2” x 11”.

G. Any submittal that is disapproved must be resubmitted within two (2) weeks following notification of such disapproval. If no satisfactory material is submitted within the two-week period, the Architect reserved the right to require the Contractor to furnish items exactly as described in the Contract Documents.

H. No allowances will be made for submittals which are not made in a timely fashion or which are turned down because they are not equal. Should delivery problems arise due to the above, affecting the completion time of the project, the Contractor will furnish and install acceptable alternates until the proper materials arrive and then replace the alternate materials with the approved materials, all at no cost to the Owner. If the Contractor is not able to furnish an acceptable alternate until the proper materials arrive, he will assume all costs for furnishing and installing all alternates as directed by the Architect and/or will pay a suitable penalty for the inconvenience experienced by the Owner. This penalty will be set by the Architect based on the particular circumstances.

1.9 SUBSTITUTIONS

A. The listing of product manufacturers, catalog numbers, etc., in the various sections of the specifications is intended to establish a standard of quality only, and is not intended to preclude open, competitive bidding. The Contractor may at his option submit substitute materials or methods which he feels are equal or superior to those specified. If the Contractor does submit alternate materials or methods, it shall be understood that the Contractor:

1. Has personally investigated the proposed substitute product and determined that it has all the same accessories and is equal or superior in all respects to the item specified.

2. Will provide the same guarantee for the substitution that he would for that specified.

3. Has coordinated the installation of the equipment which he proposes to substitute with all other trades especially in regard to electrical requirements and to operating weights trades and includes the costs for any changes required for the work to be complete in all respects. The Contractor will prepare shop drawings where required by the Architect or where dimensions vary.

4. Waives any and all claims for additional costs related to the substitution.
1.10 SPARE PARTS DATA

A. As soon as practicable after approval of materials and equipment, and, if possible, not later that one month prior to the date of beneficial occupancy, the Contractor shall furnish spare parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies, with current unit prices and sources of supply; a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment or specified hereinafter to be furnished as part of the contract. The foregoing shall not relieve the Contractor of any responsibilities under the guarantee specified.

1.11 RECORD DRAWINGS

A. The Contractor shall keep a set of Drawings of the job, noting daily all changes made in the Drawings in connection with the final installation including exact dimensioned locations of all new and uncovered existing active and inactive utilities outside the building and shall turn over a clean, neatly marked set of sepias reproducible Drawings showing "as-built" work to the A/E for delivery to the Owner. All underground utilities and services and systems shall be accurately located by the Contractor and dimensioned on the "as-built" Drawings.

1.12 OPERATING AND MAINTENANCE MANUAL

A. Prepare and submit to the Architect for delivery to the Owner an indexed manual with complete technical data for every piece of equipment and material installed under this contract.

1. Complete mechanical submittals as approved by Architect.

2. Manufacturer’s installation instruction brochures.

3. Manufacturer’s local representative and/or Distributor’s name, address and phone number.

4. Manufacturer’s operating and maintenance brochures.

5. Manufacturer’s internal wiring diagrams.

B. This manual shall include all of the listed data bound into a permanent hard-back binder identified on the cover as “Operating and Maintenance Manual” with additional cover display of the names and location of the Building, the Owner, the Architect, the Engineers, the General Contractor, and the Sub-Contractors installing the equipment represented in the brochure.

C. Contents of the Manual shall be grouped in sections according to the various sections of the specifications and shall be listed in a Table of Contents.

PART 2 PRODUCTS

2.1 STANDARDS FOR MATERIALS

A. All materials, in general, shall conform to the requirements of all agencies of publications hereinbefore specified under the paragraph QUALITY ASSURANCE and shall be listed, inspected, and approved by the Underwriters Laboratories and shall bear the U.L. label where labeling service is available. The label or listing of the Underwriters Laboratories, Inc. will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this listing, the Contractor may submit a statement from a nationally recognized testing agency indicating that the items have been tested in accordance with required procedures, and that the materials and equipment comply with all contract requirements.
2.2  STANDARD PRODUCTS
A. Materials and equipment to be provided shall be the standard catalog products of manufacturers regularly engaged in the manufacture of products conforming to these specifications, and shall essentially duplicate materials and equipment that have been in satisfactory use at least two years.

2.3  MANUFACTURERS INSTRUCTIONS
A. The responsibility for the furnishing of the proper equipment and/or material and the responsibility for seeing that it is installed as intended by the manufacturer, rests entirely upon the Contractor. If needed for proper installation, operation, or startup, the Contractor shall request advice and supervisory assistance from the representative of the specific manufacturer. The manufacturers’ published instructions shall be followed for preparing, assembling, installing, erecting, and cleaning manufactured materials or equipment, unless otherwise indicated. The Contractor shall promptly notify the Architect in writing of any conflict between the requirements of the contract documents and the manufacturers’ directions and shall obtain the Architect's instructions before proceeding with the work. Should the Contractor perform any such work that does not comply with the manufacturers' directions or such instructions from the Architect, he shall bear all costs arising in connection with the deficiencies.

2.4  RUST PREVENTION
A. All metallic materials shall be protected against corrosion. Exposed metallic parts of outdoor apparatus made of ferrous metals but not of corrosion-resistant steel, shall be zinc-coated in accordance with ASTM A123 or A153, except where other equivalent protective treatment is specifically approved in writing.

2.5  STORAGE ON SITE
A. The Contractor shall not receive material or equipment at the job site until ready for installation or until there is a suitable space provided to properly protect equipment from rust, weather, humidity, dust, or physical damage.

2.6  CAPACITIES
A. Capacities shall be not less than those indicated and shall be such that no component or system becomes inoperative or is damaged because of startup or other overload conditions.

2.7  NAMEPLATES
A. Each major component of equipment shall have the manufacturer’s name, address, and catalog number on a plate securely attached to the item of equipment. All data on nameplates shall be legible at the time of final inspection.

2.8  CONDITION OF MATERIAL AND APPURTENANCES
A. All pipe, fittings, appurtenances, and other material required for complete installation of these systems shall be new to conform to manufacturer's recommendations, unless otherwise specified. All equipment injured or damaged in transit from factory, during delivery to premises, while in storage on premises, while being erected and installed, and while being tested, until time of substantial completion, shall be replaced by the Contractor without extra cost to Owner.
PART 3  EXECUTION

3.1 INSTALLATION OF SYSTEMS

A. Provide and install unions at proper points to permit removal of pipe and various equipment and machinery items without injury to other parts of system. No union will be required in welded lines or lines assembled with solder joint fittings, except at equipment items, machinery items, and other special pieces or apparatus. Companion flanges on lines at various items of equipment, machines and pieces of apparatus, shall serve as unions to permit removal of the particular items. Unions connecting ferrous pipe to copper or brass pipe shall be dielectric type.

3.2 SPACE AND EQUIPMENT ARRANGEMENT

A. All equipment shall be installed in a manner to permit access to parts requiring service without disassembly of other equipment.

B. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to permit access through stairways, doorways, or shafts shall be brought to the job and placed in the space before the enclosing structure is completed. Following placement in the space, such apparatus shall be thoroughly protected against damage.

3.3 PRECEDENCE OF WORK

A. This contract includes many different systems furnished and installed by different trades. Each trade shall coordinate their work with that of all other trades so that it may be installed in the most direct and workmanlike manner without hindering or handicapping any other trades.

3.4 CUTTING AND PATCHING

A. Where it becomes necessary to cut through any wall, floor, or ceiling to permit installation of any work under this section of the specifications or to repair any defects that may appear, up to the expiration of the guarantee period, such cutting shall be done under the observation of the Architect by the Contractor. The Contractor shall not be permitted to cut or modify any structural members without the written direction of the Architect.

B. Patching of all openings cut by the Contractor, or repairing of any damage to the work of other trades occasioned by the cutting operations, or occasioned by the failure of any part of work installed under this contract, shall be performed by the trade whose work is involved, but shall be paid for by the Contractor.

C. Any openings cut through exterior walls or roofs shall be provided with suitable covers, while they are left open, to protect the property or materials involved. Any openings cut through walls below grade shall be properly protected to prevent entrance of water or other damaging elements.

3.5 HOISTING, SCAFFOLDING, AND TRANSPORTATION

A. The Contractor shall provide his own hoisting facilities to set his materials and equipment in place in the building, as indicated on drawings and for subsequent cleaning, testing, and adjusting.

B. The Contractor shall provide necessary transportation to facilitate the delivery of all materials, equipment, tools, and labor to the job, in accordance with intent of these documents.
3.6 CLEANING

A. The Contractor shall, at all times, keep the premises free from accumulations of waste material or rubbish caused by him, his employees, or his work. This debris shall be removed, not only from the building, but also from the project site.

B. At completion of the job, the Contractor shall remove all of his tools, scaffolding, and surplus materials. He shall leave the area "broom clean."

3.7 ELECTRICAL WIRING OF MOTORS AND EQUIPMENT

A. Unless specifically shown, indicated, or specified to the contrary, each item shown or required by the Drawings or specified in the Specifications shall be accompanied by all motors and starting and controlling equipment necessary for the items' proper operations. These motors shall be integrally attached to and/or installed with their associated equipment item and electrically connected as specified in the Electrical Specifications. Equipment controlled from motor control centers shall be supplied with motors only. Motor control centers are specified in the Electrical Specifications and shown on the Electrical Drawings.

END OF SECTION
SECTION 230519
PIPING SPECIALTIES

PART 1  GENERAL

1.1  WORK INCLUDED
A. Escutcheons
B. Strainers
C. Dielectric Unions
D. Air Vents
E. Pressure Relief Valve
F. Thermometers
G. Pressure Gauges

1.2  RELATED WORK
A. Section 230500 – Common Work Results for HVAC
B. Section 230529 - Supports, Anchors & Sleeves for Plumbing
C. Section 230523 – Valves for HVAC
D. Section 232113 - HVAC Piping Systems

1.3  SUBMITTALS
A. Submit manufacturer's product and dimensional data in accordance with Section 230500 Heating, Ventilating & Air Conditioning.

PART 2  PRODUCTS

2.1  ESCUTCHEONS
A. Escutcheons shall be chrome plated sectional type. Solid type escutcheons with set screws shall be used when sectional type are not available of adequate size or where sectional type will not stay in place.

2.2  STRAINERS
A. Strainers shall be Y-Pattern the same size as the pipe in which they are installed, threaded or flanged as indicated by pipe size. An arrow shall be cast on the side of the strainer to indicate the direction of flow. The basket shall be made of stainless steel or monel and shall provide a net free area through the basket of at least four times that of the pipe in which the basket is installed up to a maximum of 20 mesh.
B. Strainers for water services shall have a cast iron body, an easily removable cover and a sediment screen. Cover shall have threaded 3/4" blow-off port.

C. Strainers shall be RP&C, Hoffman, B&G, O.C. Keckley or approved equal.

2.3 DIELECTRIC UNIONS
A. Unions shall be threaded or flanged type as dictated by the size of the piping. High temperature type insulating fittings shall be provided where required. Unions shall be EPCO or approved equal.

2.4 AIR VENTS
A. All air vents required in the hot water circuit shall be of the ball and float type, cast iron body, stainless steel internals, Metraflex MV-15, Armstrong Pumps or V.O. Anderson 70A.

B. Air vents shall be 3/4" screwed pattern valves suitable for 150 psig maximum working pressure. The vent shall be suitable for both hot and cold water service.

2.5 PRESSURE RELIEF VALVE
A. Provide a pressure relief valve on all closed loop chilled water and heating water systems as follows:
   1. ASME stamped.
   2. Cast iron body with bronze trim.
   3. Set to relieve at 30 psig unless higher pressure required due to operating pressures involved.

B. Pressure relief valves shall be Bell & Gossett, Watts, TACO, Amtrol, Conbraco or approved equal.

2.6 THERMOMETERS AND THERMOMETER WELLS
A. Provide 9 inch, aluminum case, brass stem, (aluminum stem in submersible wells), adjustable angle, mercury red reading type thermometers where shown on the drawings.

B. Provide brass separable sockets of the correct length for the pipe size in which they are installed. Provide with extension necks when installed in insulated piping.

C. Ranges shall be as follows:
   - Heating Water: 30°F to 240°F
   - Chilled Water: 0°F to 100°F

D. Brass industrial test wells, 3/4" N.P.T., with cap and chain. Test wells shall be the correct length for the pipe size in which they are installed.

E. Thermostats shall be Trerice, Weksler or approved equal.

2.7 PRESSURE GAUGES
A. Provide 4-1/2" inch dial, bourdon type pressure gauges where shown on the drawings.

B. Case shall be cast aluminum with black finish.
C. Gauges shall have adjustable pointer and bronze movement with 1 percent accuracy over middle half of scale range and 1-1/2 percent accuracy over the balance of the range.

D. Gauges shall have brass socket and be provided with brass pressure snubbers.

E. Ranges shall be as follows:

Chilled & Heating Water 0 to 100 psi

F. Pressure gauges shall be Trerice, Weiss, Weksler or approved equal.

PART 3  EXECUTION

3.1 INSTALLATION

A. All strainers, air separators, suction diffusers, backflow preventers and pressure reducing valves shall be full line size unless noted otherwise.

3.2 ESCUTCHEONS

A. Escutcheons shall be installed around all pipes passing exposed in finished areas through walls, floors and ceiling. Escutcheons shall be sized to fit tight around the outside of the pipe or pipe insulation.

3.3 STRAINERS

A. Each control valve, and pressure reducing valve assembly regardless of its size shall be preceded by a strainer. The arrangement of these strainers shall be such that the screens may be removed for cleaning.

B. Strainers shall be installed in piping systems wherever shown on the drawings and at such other points as may be required for the removal of foreign material from the piping system.

C. All strainers shall be provided with full size blow-down ball valve with nipple and cap.

3.4 DIELECTRIC UNIONS

A. Install dielectric unions or flanges where copper or brass piping connects to ferrous piping or equipment.

3.5 AIR VENTS

A. Install automatic air vents at all high points in the chilled and heating water systems with overflows piped to the nearest drain.

3.6 THERMOMETERS AND THERMOMETER WELLS

A. Install thermometers with scales upright and in a location where they may be easily read.

B. Install thermometer wells where shown and where required to test and adjust the system.

C. Replace any damaged thermometers. Do not repair.
3.7 PRESSURE GAUGES

A. Provide gauge cocks or needle valves at all gauges suitable for the pressures and service involved.

B. Replace any damaged gauges. Do not repair.

END OF SECTION
SECTION 230523
VALVES FOR HVAC

PART 1   GENERAL

1.1 WORK INCLUDED
A. Gate Valves
B. Ball Valves
C. Globe Valves
D. Check Valves
E. Butterfly Valves
F. Balancing Valves

1.2 RELATED WORK
A. Section 230500 – Common Work Results for HVAC
B. Section 232113 - HVAC Piping Systems

1.3 SHOP DRAWINGS
A. Submit product data in accordance with Section 15010.

PART 2   PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Valves as manufactured by KITZ, Nibco, Apollo, Watts or approved equal are acceptable provided they meet or exceed these specifications.
B. Provide valve types of same manufacturer throughout where possible.
C. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.
D. Provide factory-fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated; provide proper selection as determined by installer to comply with installation requirements. Provide sizes as indicated, and connections, which properly mate with pipe, tube and equipment connections. Where more than one type is indicated, selection is Installer's option. Valves shall be of same make for all these services.

2.2 VALVE CONNECTIONS
A. Provide valves suitable for connection to adjoining piping as specified for pipe joints. Use pipe size valves unless otherwise indicated.
B. Provide threaded valves for pipe sizes 2 inches and smaller.
C. Provide flanged valves for pipe sizes 2 1/2 inches and larger.

D. Solder or screw to solder adaptors for copper tubing.

E. Use valve body suitable for mechanical coupling jointed piping.

F. Provide butterfly valves with full tapped lug bodies.

2.3 GATE VALVES

A. Select valves, equipped with packing suitable for intended service. (Under no circumstances is asbestos acceptable) Select valves designed so back seating protects packing and stem threads from media when valve is fully opened, and equipped with gland follower. Guides for disc on rising stem valves must be machined for accurate fit.

B. Comply with the following standards:

- Cast Iron Valves: MSS SP - 70
- Bronze Valves: MSS SP - 80

D. HVAC Water Service

1. Threaded ends 2" and smaller: Class 125, bronze body, union bonnet, rising stem, solid wedge: Kitz #42, Nibco T-124/134, Crane 431UB or equal.

2. Solder ends 2" and smaller: Class 150, bronze body, union bonnet, rising stem, solid wedge: Kitz #43, Nibco S-134 or equal.

3. Flanged ends 2-1/2" and larger: Class 125 iron body, bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge: Kitz #72, Nibco F617-0, Crane 465-1/2 or equal.

2.4 GLOBE VALVES

A. Select valves equipped with packing suitable for intended service. (Under no circumstances is asbestos acceptable) Select valves designed so back seating protects packing and stem threads from media when valve is fully opened, and equipped with gland follower.

B. Comply with the following standards:

- Cast Iron Valves: MSS SP - 85
- Bronze Valves: MSS SP - 80

C. HVAC Water Service

1. Threaded ends 2" and smaller: Class 125, bronze body, screwed bonnet, rising stem, bronze disc: Kitz #11, Nibco T-211-B, Crane 1 or equal.

2. Solder ends 2" and smaller: Class 125, bronze body, screwed bonnet, rising stem, bronze disc (swivel type): Kitz #12, Nibco S-211-B, Crane 1310 or equal.

3. Flanged ends 2-1/2" and larger: Class 125 iron body, bolted bonnet, rising stem, OS&Y, renewable seat and disc: Kitz #76, Nibco F718-B, Crane 351 or equal.
2.5 BALL VALVES

A. Select with full port opening, blow out proof stem, hard chrome plated forged brass vented ball, adjustable packaging nut, rated not less than 600# W.O.G., 150 W.S.P.

B. Comply with the following standards:

Ball Valves: MSS SP - 110

C. HVAC Water Service

1. Threaded ends 3” and smaller: 600# W.O.G., 150 W.S.P., bronze two piece body, hard chrome plated full port forged brass ball, true adjustable packing nut, blow-out proof stem: Kitz #68, Nibco T-585-70, Apollo 77-100 Series, Watts B-6080 or equal.

2. Solder ends 3” and smaller: 600# W.O.G., 150 W.S.P., bronze two piece body, hard chrome plated full port forged brass ball, true adjustable packing nut, blow-out proof stem: Kitz #68, Nibco S-585-70, Apollo 77-200 Series, Watts B-6081 or equal.

2.6 BUTTERFLY VALVES

A. Where butterfly valves are used as shut-off for termination, or equipment removal or repair, select ductile iron lug type valves, bi-directional, dead-end service rated to the full working pressure of the valve. Provide gear operators on butterfly valves 8” and larger. Valve bodies to have extended necks to provide for 2-1/2” insulation as needed. Butterfly valves 12 inch and smaller rated to 200 psi, 14 inch and larger to 150 psi.

B. Comply with the following standards:

Butterfly Valves: MSS SP - 67

C. HVAC Water Service

1. Lug type 2” and larger: Ductile iron body, lever operated, 10-position throttling handle 2-6 inch, 8 inch and larger gear operated, bronze disc, type 400 Series stainless steel stem, EPDM seat. Butterfly valves 12 inch and smaller rated to 200 psi, 14 inch and larger to 150 psi.

D. Manufacturer subject to compliance with requirements, provide butterfly valves with one of the following: Kitz #6122E (Lug type), Milwaukee, ML233E (Lug), Nibco LD2000 (Lug) or equal.

2.7 SWING CHECK VALVES

A. Comply with the following standards for design, workmanship, material and testing:

Bronze Valves: MSS SP - 80
Cast Iron Valves: MSS SP - 71

B. Construct valves of pressure casting free of any impregnating materials

C. Domestic Water Service

1. Threaded ends 2” and smaller: Class 125, bronze body, screwed cap, “Y” pattern swing, bronze disc: Kitz #22, Nibco T-413B, Crane 37 or equal.

D. HVAC Water Service
1. Threaded ends 2" and smaller: Class 125, bronze body, screwed cap, "Y" pattern swing, Teflon disc: Kitz #22T, Nibco T-413Y, Crane 141 or equal.

2. Soldered ends 2" and smaller: Class 125, bronze body, screwed cap, "Y" pattern swing, Teflon disc: Kitz #23T, Nibco T-433Y, Crane 37 or equal.

3. Flanged ends 2-1/2" and larger: Class 125, iron body, bronze mounted, horizontal swing, cast-iron disc: Kitz #78, Nibco F918-B, Crane 373 or equal.

2.8 BALANCING VALVES

A. Manual Balance Valve: Furnish and install as shown on plans, a calibrated (bronze/cast iron with bronze disc) balance valve equipped with readout valves to facilitate the connecting of a differential pressure meter. Each readout valve shall be fitted with an integral check valve designed to minimize system fluid loss during the monitoring process. The balancing valve shall have an indexing pointer and calibrated nameplate to indicate the degree of closure of the precision machined orifice. Each balancing valve is to be constructed with internal O-ring seals to prevent leakage around the rotating element. The balancing valves shall be supplied with performed polyrethane insulation, suitable for use on heating and cooling system.

B. Automatic Balance Valves: Furnish threaded or flanged valves with cartridge, bronze or steel housing to match pipe material and pressure and temperature taps. Flow shall be accurate to a +/- 5% within a pressure range of 4 - 55 psi for Areas A,B,C,D & M; 2 - 30 psi for Areas E,F,G & H and 1 - 20 psi for Areas J & K. For flows below 30 gpm, combo valves may be used. Griswold Controls, Auto Flow or Hays valves are acceptable.

2.9 VALVE FEATURES

A. Provide valves with features indicated and where not otherwise indicated, provide proper valve features as outlined in this specification. Comply with ANSI B31.1.


C. Threaded valve ends comply with ANSI B2.1.

D. Solder Joint valve ends complying with ANSI B16.18.

E. Fabricate pressure-containing components of valves, including stems and seats from brass or bronze materials; of standard alloy recognized in valve manufacturing that resist de-zincification.

F. Butterfly valve designed for flow regulation and manufactured to be tight in closed position. Test pressures in accordance with MSS SP-67 as follows: Seat 2-12" 220 psi. No leakage permitted under test.
2.10 VALVE OPERATORS

A. Provide suitable handwheels for gate, globe and butterfly valves.

B. For butterfly valves provide gear operators for sizes 8 inches and larger. For smaller sizes provide lever lock handle with toothed plate for shut-off service and infinitely adjustable handle with lock nut and memory stop for throttling service.

C. Provide valves located more than 7 feet from floor in equipment room areas with chain wheel operators. Extend chains to about 5 feet above floor and hook to clips arranged to clear walking aisles.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install ball valves for shut-off and isolating service, to isolate equipment, part of systems, or vertical risers.

C. Install globe valves for throttling service and control device or meter by-pass.

D. Provide shut-off valves and check valves on discharge of pumps.

E. Install check valves in horizontal position with pin horizontally perpendicular to center line of pipe. Install for proper direction of flow. Installations on any vertical piping must be up flow only.

F. All valves shall be located so that the bonnets can be removed.

G. Where valves are installed concealed in pipe chases provide Zum Z-1460-4 or approved equal access doors with concealed hinge and key operated locks. Door shall be large enough to service valves and shall be installed flush with finished walls.

H. Provide brass tag for each valve labeling the fluid in the pipe, the area served, and the normal operating position.

END OF SECTION
SECTION 230529
SUPPORTS, ANCHORS AND SLEEVES FOR HVAC

PART 1 GENERAL

1.1 WORK INCLUDED
A. Pipe Hangers and Supports
B. Duct Hangers and Supports

1.2 RELATED WORK
A. Section 230500 – Common Work Results For HVAC
B. Section 232113 - HVAC Piping Systems
C. Section 233100 - HVAC Ducts

1.3 SUBMITTALS
A. Submit shop drawings in accordance with Section 230500 – Common Work Results For HVAC.

1.4 REFERENCES
A. Duct Hangers: SMACNA Duct Manuals.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Products shall be as manufactured by Grinnell, Elgen, Fee and Mason, Unistrut or approved equal.

2.2 INSERTS
A. Malleable iron case of galvanized steel sheet and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms.
B. Size inserts to suit threaded hanger rods.

2.3 PIPE HANGERS AND SUPPORTS
A. Hangers: Pipe sizes 1/2 inch to 1-1/2 inch: adjustable wrought steel ring.
B. Hangers: Pipe sizes 2 inches to 4 inches: adjustable wrought steel clevis.
C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
D. Vertical Support: Steel riser clamp.
E. Steel Beam Clamps: Elcen Figure 33, Type 3 or approved equal.
F. Expansion Anchors: Phillips Red Head or approved equal.
G. Design hangers to impede disengagement by movement of supported pipe.

H. Provide copper plated hangers and supports for copper piping or two layers Scotch 33 PVC tape or equal.

2.4 HANGER RODS

A. Provide cadmium plated steel hanger rods, threaded both ends, threaded one end, or continuous threaded.

2.5 DUCT HANGERS AND SUPPORTS

A. Hangers: Galvanized steel band iron or rolled angle and 3/8 inch rods.

B. Wall Supports: Galvanized steel band iron or fabricated angle bracket.

2.6 SLEEVES

A. Pipes through Walls, Fire Proofing, Footings, Potentially Wet Floor: Form with galvanized steel pipe.

B. Round Ducts: Form with 18 gauge galvanized steel.

C. Rectangular Ducts: Form with 18 gauge galvanized steel.

D. Size large enough to allow for movement due to expansion and to provide for continuous installation.

PART 3 EXECUTION

3.1 PIPE HANGERS AND SUPPORTS

A. All structures and appurtenances employed for the purpose of supporting the pipe and guiding it properly shall be carefully fabricated in such a manner as to preserve the true grade of the pipe without subjecting either the pipe or the supporting and guidance members to any undue strain.

B. Support horizontal piping as follows:

C. Space hangers and furnish rods as follows:

<table>
<thead>
<tr>
<th>Nominal Pipe Size (in.)</th>
<th>Span (ft.)</th>
<th>Steel</th>
<th>Copper</th>
<th>Hanger Rod Diameter (in.)</th>
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</thead>
<tbody>
<tr>
<td>1/2</td>
<td>5</td>
<td>5</td>
<td>3/8</td>
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<td>3/4</td>
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<td>1</td>
<td>7</td>
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<td>4</td>
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<td>5/8</td>
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</tbody>
</table>

D. Install hangers to provide minimum 1/2 inch clear space between finished covering and adjacent work.

E. Place a hanger within one foot of each horizontal elbow.

F. Use hangers which are vertically adjustable 1-1/2 inch maximum after piping is erected.
G. Support piping at each change or direction, at ends of branches, at base and top of riser pipes and drops, and wherever necessary to prevent sag, bending or vibration, in addition to above-listed hanger spacing.

H. Pipe hangers on insulated lines shall be sized to fit the outside of the insulation.

I. Where several pipes can be installed in parallel and at the same elevation, provide multiple or trapeze hangers.

J. Where practical, support riser piping independently of connected horizontal piping.

3.2 LOW VELOCITY DUCT HANGERS AND SUPPORTS

A. Duct hangers and supports to be sized and spaced as per SMACNA requirements.

3.3 PRIMING

A. Prime coat non-galvanized steel hangers and supports.

3.4 SLEEVES

A. Where piping or ductwork passes through floor, ceiling or wall close off space between pipe or duct and construction with non-combustible insulation. Provide tight fitting metal caps on both sides and caulk.

B. Install chrome plated escutcheons where piping passes through finished surfaces.

C. Provide pipe sleeves for all mechanical piping. Pipe sleeves are not required for core-drilled holes.

D. Size pipe sleeves to permit placing pipe and specified insulation material for pipes passing through concrete or masonry walls or concrete slabs.

E. Sleeves for pipe through walls standard weight galvanized steel pipe or 18-gauge galvanized sheet metal with ends flush with wall surface.

F. Seal pipes passing through walls or slabs. Use mastic or oakum seal in the annular space in non-fire-rated walls; use Dow-Coming silicone RTV foam fire-stop sealant or equal in the annular space in fire-rated walls or other envelopes.

G. Seal exposed pipe passing through floor slabs with Dow-Coming silicone RTV foam fire-stop sealant or equal and point with caulking compound. Strike off flush at top of sleeve.

H. Insulated pipe shall be insulated in sleeves, caulked and pointed as above.

I. All piping shall be installed with due regard to expansion and contraction. Type of hanger, methods of support, location of supports, etc., shall be governed in part by this consideration.

END OF SECTION
SECTION 230593

TESTING, ADJUSTING AND BALANCING

PART 1 GENERAL

1.1 WORK INCLUDED

A. Testing, adjusting and balancing of the following systems:
   1. Air Distribution Systems
   2. Exhaust Systems
   3. Domestic Hot Water Systems
   4. HVAC Hydronic System

1.2 RELATED WORK

A. Section 230500 – Common Work Results For HVAC
B. Section 230523 – Valves For HVAC
C. Section 233423 – Exhaust Fans
D. Section 233713 - Diffusers, Registers & Grilles
E. Section 238126 – Split System Air Conditioners
E. Section 238220 – Hydronic Fan Coil Units

1.3 REFERENCED STANDARDS

A. Associated Air Balance Council, AABC National Standards.
B. Applicable SMACNA Standards.

1.4 QUALITY ASSURANCE

A. All work for the testing and balancing of the HVAC air distribution and hydronic systems shall be done by an independent Testing and Balancing firm that specializes in and whose business is limited to the testing and balancing of heating, ventilating and air conditioning systems.

B. If requested, the test shall be conducted in the presence of the Architect and/or the Owner.
C. The environmental systems including all equipment, apparatus and distribution systems shall be tested, adjusted and balanced in accordance with the latest edition of the AABC Procedural Standards for Testing, Adjusting and Balancing of Air Distribution and Hydronic Systems.

D. Instruments used in all HVAC systems and equipment tests shall be as recommended by the AABC, ASHRAE, NEBB, or as approved by the Architect. Test instruments used shall be initially and periodically checked thereafter to verify their calibration accuracy.

E. All test equipment shall be furnished by the Contractor and shall remain in his property. Any adapters such as "Pete's Plugs", pitot tube traverse connections, etc. shall be left in place and marked for future use.

1.5 SUBMITTALS

A. Submit test reports in accordance with Section 230500.

B. Specific procedures used in all tests shall be included in the test report. Contractor shall identify all equipment by the identification code as shown on the drawings.

C. Data shall be on printed forms published by either AABC or the Contractor.

D. The test report shall include as a minimum the following information and data:

1. Motors:
   - Equipment number
   - Manufacturer
   - Model or serial number
   - Frame size
   - Rated horsepower
   - Rate rpm
   - Corrected full load amperage
   - Measured amperage and voltage
   - Calculated bhp
   - Measured rpm
   - Sheave size, type and manufacturer

2. Fans:
   - Equipment number
   - Manufacturer
   - Model or serial number
   - Rated cfm
   - Rated rpm
   - Rated pressures
   - Measured cfm
   - Measured rpm
   - Measured pressures
   - Pulley size, type and manufacturer
   - Belt size and quantity

3. Pumps:
   - Equipment number
   - Manufacturer
   - Model or serial number
   - Rated gpm
   - Rated head
Rated pressures
Final discharge pressures
Final suction pressures
Final gpm
Operating head
Operating rpm

4. Diffuser, Registers and Grilles:
    System identification
    Grille number
    Grille or diffuser manufacturer
    Manufacturer's model number
    ADC flow factor
    Instrument to be used with ADC flow factor
    Grille size
    Design velocity
    Design cfm
    Final measured velocity
    Final measured cfm

E. All reports shall be certified by the Testing and Balancing Contractor that the methods used and the results achieved are as specified. In addition, each individual reporting form submitted must bear the signature and the Technician.

1.6 GUARANTEE

A. The test and balance firm shall include an extended warranty of 90 days, after the submittal of the test and balance report, during which time the Architect, at his discretion, may request a recheck or resetting of any outlet, supply air fan, exhaust fan, or any other item listed in the test report. The firm shall provide technicians to assist the Architect making any tests he may require during this period of time.

PART 2 PRODUCTS

Not applicable for this section.

PART 3 EXECUTION

3.1 INSPECTION

A. The Testing and Balancing Contractor shall act as an authorized inspection firm responsible to the Architect. He shall review the HVAC design drawings and shop drawings prior to fabrication and installation of the HVAC systems to insure that all of the necessary balancing equipment required to balance these systems is shown.

3.2 PREPARATION

A. Coordinate Schedules with the Test and Balancing Engineer and provide sufficient time before final completion of work so that testing and balancing can be accomplished. Provide all labor and tools to make corrections to the system when required to balance the system without undue delay to the Test and Balancing Contractor. Put all equipment into full operation and continue it in operation during each working day of testing and balancing. No test and balancing work shall start until all of the air handling equipment has new filters installed. The Test and Balancing Engineer shall be kept informed during the construction of the project of major changes made to the HVAC system. Provide the Test and
Balancing Contractor with one (1) set of shop drawings on all equipment which he will be required to work on when balancing the HVAC system.

B. Shop drawings shall be submitted to the Test and Balancing Contractor. The Test and Balancing Contractor will, during the construction of the HVAC system, make job site inspections to familiarize himself with the project and shall report to the Architect items installed incorrectly or not installed in accordance with the contract drawings and specifications.

C. Work shall not begin until all systems which are to be tested have been completed and are in full working order. Put all systems and equipment into full operation and continue the operation of all equipment during each working day of the testing and balancing work.

3.3 AIR DISTRIBUTION SYSTEMS TESTING AND BALANCING

A. Utilizing the latest issue of design documents, compare the installed equipment to the design and check for completeness of the installation.

B. The system and air outlet air quantities shall be balanced to the values indicated on the drawings.

C. The grille manufacturer's outlet flow factors as determined by the ADC test code and recommended procedure for testing air outlets shall be used.

D. Prebalance equipment check:

1. Check fan housing, ducts, duct elbows, coils, louvers, etc., to insure they are clean and free of foreign material.

2. Check filters to insure that they are clean and in place.

3. Examine drivers for proper belt tension and alignment.

4. Check fan and motor lubrication.

5. Coordinate with Electrical Contractor to verify correct motor overload protectors.

6. Coordinate with HVAC Control Contractor for proper operation and position of operating dampers.

7. Check fans for proper rotation.

E. Prebalance System Check:

1. Verify installation of all required balancing dampers. Set all systems dampers in their open position.

2. Check for air leaks at the fan and the system ductwork. Coordinate with the Contractor for repair of leaks.

3. Position all building doors and windows (if a part of system design) in their normal position.

4. Check air temperature to insure required air temperature delivery.
F. Air Handling Equipment Balance:
   1. Check motor amperage and voltage to insure motor is not being overloaded.
   2. Measure and set minimum outdoor air quantity where applicable.
   3. Determine the volume of air being delivered by the fan. Adjust the fan speed, if belt-driven, or the dampers in the system, if direct-driven, to increase or decrease the flow required. If the speed is increased, or the flow changes due to a damper adjustment, insure that the motor is not overloaded.
   4. Check fan and motor speed, no-load amperage, operating amperage and voltage. Calculate brake horsepower.
   5. Take fan static pressure readings.
   6. Variation of air flow for all modes of operation from the design values shall be within +10 percent of design values.

3.4 WATER DISTRIBUTION SYSTEM BALANCING AND TESTING

A. Utilizing the latest issue of design documents, compare the installed equipment to the design and check for completeness of the installation.

B. Prebalance Equipment Check:
   1. Check to insure that automatic fill valves are functioning properly.
   2. Check pump and motor lubrication, and overload protectors for proper size.
   3. Check pump for proper rotation.

C. Prebalance System Check:
   1. Set all valves in their wide open position.
   2. Check system strainers for cleanliness.

D. Pump Testing and Adjustment:
   1. Determine pump impeller size by plotting no-flow pump differential pressure on pump curve.
   2. Determine water flow by plotting full-flow pump differential pressure on pump curve. Adjust flow to approximately 110 percent of design.
   3. Record motor voltage and amperage and calculate brake horsepower.

E. Water System Balancing:
   1. Determine and set flow rates to insure proper GPM and water supply temperature.

3.5 OTHER EQUIPMENT TESTS

A. All equipment installed shall be tested, adjusted, and reported upon unless stated otherwise. The equipment discussed herein is not necessarily all of the equipment requiring testing.
B. Fans:

1. Record nameplate data.
2. Check belt alignment and belt tension.
3. Measure current, voltage, and speed (rpm)

END OF SECTION
SECTION 230713
DUCT INSULATION

PART 1 GENERAL

1.1 WORK INCLUDED
A. Duct Thermal Insulation
B. Adhesives, Tie Wires, Tapes

1.2 RELATED WORK
A. Section 230500 – Common Work Results For HVAC
B. Section 233100 - HVAC Ducts

1.3 QUALITY ASSURANCE
A. All insulation materials required for ductwork shall be furnished and installed under the contract. The execution of the work shall be by approved insulation contractor in strict accordance with the best practice of the trade and the intent of the specification.
B. It is mandatory that all insulation be applied in a neat and workmanlike manner. Contractor shall be required to remove and replace all insulation not applied in strict accordance with the manufacturer's specifications or not presenting a neat finished appearance.
C. The Ductwork insulation shall meet NFPA Standards 902 and 906 for fire resistance.

1.4 SUBMITTALS
A. Submit product data and installation instructions in accordance with Section 230500 – Common Work Results For HVAC.

1.5 REFERENCE STANDARDS
A. NFPA 90A and 90B.
B. ASTM Standard E84-75.

1.6 JOB CONDITIONS
A. Deliver material to job site in original non-broken factory packaging, labeled with manufacturer's density and thickness.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Materials as manufactured by Certain-Teed, Johns-Manville, Knaul, Owens-Corning, Foster Products, Childers or approved equal meeting these specifications are acceptable.
2.2 TYPE AND PERFORMANCE

A. Adhesives and Insulation Materials: Composite fire and smoke hazard ratings maximum 25 for Flame Spread and 50 for Smoke Developed. Adhesives to be waterproof.

B. Round and Rectangular Ducts: Rigid or Flexible fibrous glass insulation, 1 1/2 inch thick "K" value at 75 degrees F maximum 0.26 btu/hr./sq.ft./Deg. F/hr. with factory applied reinforced aluminum foil vapor barrier for temperatures for +40 Deg. F to +250 Deg. F services.

PART 3 EXECUTION

3.1 PREPARATION

A. Do not install covering before ductwork has been tested and approved.

B. Ensure surface is clean and dry prior to installation. Ensure insulation is dry before and during application.

3.2 INSTALLATION

A. Ensure installation is continuous through inside walls. Pack around ducts with fireproof self-supporting insulation material, properly sealed.

B. Finish insulation neatly at hangers, supports and other protrusions.

C. Locate insulation or cover seams in least visible locations.

D. Concealed Ducts: Adhere flexible insulation to ductwork with adhesive applied in 6 inch wide strips on 16 inch centers. Provide 16 gage annealed tie wire tied, spiral wound or half hitched at 16 inch centers for securing duct insulation until adhesive sets. Butt insulation and seal joints and breaks [in ducts conveying air at less than room temperature] with 2 inch of foil adhered over joint.

E. Exposed Ducts: Adhere rigid insulation to ductwork with weld pins at 12 inches on center. Butt insulation and seal joints, breaks and pins with 2 inch wide adhesive backed foil tape.

F. Cover exposed insulation with 8 oz. canvas jacket.

G. Repair separation of joints or cracking of insulation due to thermal movement or poor workmanship.

END OF SECTION
SECTION 230719
HVAC PIPING & EQUIPMENT INSULATION

PART 1   GENERAL

1.1   WORK INCLUDED
A. Insulation of Condensate Drain Piping
B. Insulation of Chilled and Heating Water Piping

1.2   RELATED WORK
A. Section 230500 – Common Work Results For HVAC
B. Section 232113 - HVAC Piping Systems

1.3   QUALITY ASSURANCE
A. All insulation materials required for piping, and mechanical equipment, etc. shall be furnished and installed under this contract. The execution of the work shall be by approved insulation contractor in strict accordance with the best practice of the trade and the intent of this Specification.

B. It is mandatory that all insulation be applied in a neat and workmanlike manner. Contractor shall be required to remove and replace all insulation not applied in strict accordance with manufacturer's specifications or not presenting a neat finished appearance.

C. All insulation on indoor work shall have composite (insulation, jacket or facing, and adhesive used to adhere jacket or facing to the insulation) fire and smoke hazard Ratings, as tested by procedure ASTM E-84, NFPA 255 and UL 73 not exceeding Flame Spread of 25, Fuel Contributed of 50 and Smoke Developed of 50. Accessories, such as adhesives, mastics, cements, tapes and cloths for fittings shall have component ratings as listed above.

D. Insulation shall be continuous through wall, floor and ceiling openings and sleeves.

E. Specified mastics, adhesives and coatings shall be applied in strict accordance with manufacturer's instructions, including recommended coverages.

1.4   SUBMITTALS
A. Submit materials and installation instructions in accordance with Section 230500 – Common Work Results For HVAC

PART 2   PRODUCTS

2.1   ACCEPTABLE MANUFACTURERS
A. Products manufactured by Owens-Corning, Knauf, Johns Manville, Certain-Teed, Govain, Benjamin Foster are acceptable provided they meet or exceed these specifications.
2.2 PIPING

A. Piping:

1. Insulation thickness - Fiberglass pipe covering.

<table>
<thead>
<tr>
<th>PIPING TYPE</th>
<th>PIPE SIZE</th>
<th>INSULATION SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating Water Supply &amp; Return</td>
<td>1/2” to 1-1/2”</td>
<td>1”</td>
</tr>
<tr>
<td>Heating Water Supply &amp; Return</td>
<td>2” and above</td>
<td>2”</td>
</tr>
<tr>
<td>Chilled Water Supply &amp; Return</td>
<td>1/2” to 1-1/2”</td>
<td>1”</td>
</tr>
<tr>
<td>Chilled Water Supply &amp; Return</td>
<td>2” and above</td>
<td>1-1/2”</td>
</tr>
<tr>
<td>Condensate</td>
<td>all sizes</td>
<td>1/2”</td>
</tr>
</tbody>
</table>

2. All fiberglass pipe insulation shall be nominal 5 pcf density.

3. Insulation jacket shall be factory applied white All Service Jacket (ASJ), with factory supplied self-sealing laps.

4. Condensate piping may be insulated with 1/2” thick expanded rubber insulation at the contractor's option.

5. Fittings, Valves and Flanges:

   a. Where manufactured, factory premolded fittings (of the same material and thickness as the pipe insulation) shall be used for all fittings, flanges and valves.

   b. Where premolded insulation fittings are not manufactured, all fittings, flanges and valves shall be insulated with mitered segments of nominal 5 lb. density fiberglass pipe covering. Hot Service Finish: embed a 20 x 20 weave white glass reinforcing cloth between two 1/16 inch coats of Benjamin Foster 30-36. The glass cloth and second coat shall overlap adjacent covering by at least two inches. Cold Service Finish: same as above except use Benjamin Foster 30-35.

   c. Insulation for removable flanges of pipe strainers shall be fabricated with built-up sections of Fiberglass pipe covering, so arranged as to facilitate servicing of the strainer. Applications for cold services shall be complete with vapor seals.

6. Insulation on pipes shall be protected by saddles from hangers, guides, and rollers.

PART 3 EXECUTION

3.1 PREPARATION

A. Do not install covering before piping and equipment has been tested and approved.

B. Ensure surface is clean and dry prior to installation. Ensure insulation is dry before and during application.

3.2 INSTALLATION

A. Ensure insulation is continuous through inside walls. Pack around pipes with fire proof self-supporting insulation material, fully sealed.
B. Insulate fittings and valves. Do not insulate unions, flanges, strainers, flexible connections and expansion joints. Terminate insulation neatly with plastic material troweled on bevel.

C. Finish insulation neatly at hangers, supports and other protrusions.

D. Locate insulation cover seams in least visible locations.

E. Cold Piping: Cover fittings and valves with equivalent thickness of insulation material. Cover with open mesh glass cloth sealed with vapor barrier sealant. Seal lap joints with 100% coverage of vapor barrier sealant and adhesive. Seal butt joints with 4 inches wide strips of vapor barrier sealed with vapor barrier adhesive. For exposed fittings and valves, apply hydraulic setting cement paste over insulation material before applying canvas jacket.

F. Hot Piping: Cover fittings and valves with equivalent thickness of insulation material. For exposed fittings and valves apply hydraulic setting cement paste over insulating material before applying canvas jacket.

G. Equipment: Apply insulation with edges tightly butted, joints staggered and secured in place by steel bands. Where necessary weld on suitable anchors. Provide sufficient clearance around openings for normal operation of equipment. Finish hot surface insulation with 1 inch galvanized hexagonal mesh and coat with hydraulic setting insulation cement. Finish cold surface insulation joints with 4 inches wide strips of vapor barrier sealed with vapor barrier adhesive finished insulation with heavy coat of vapor barrier mastic applied over whole body. Finish with a final coat of cement containing 25% by weight of Portland Cement. Recover and provide an extra coat of lagging adhesive.

H. Cover exposed insulation with 8 oz. canvas jacket. All piping within the Central Plant shall be covered with a canvas jacket.

I. Repair separation of joints or cracking of insulation due to thermal movement or poor workmanship.

END OF SECTION
PART 1 GENERAL

1.1 WORK INCLUDED
A. Heating Hot Water Piping Systems
B. Chilled Water Piping Systems

1.2 RELATED WORK
A. Section 230500 – Common Work Results for HVAC
B. Section 230519 - Piping Specialties
C. Section 230529 - Supports, Anchors and Sleeves for HVAC
D. Section 230523 - Valves for HVAC
E. Section 230719 - HVAC Piping and Equipment Insulation

1.3 SUBMITTALS
A. Submit product data on materials to be used in accordance with Section 230500 – Common Work Results for HVAC

1.4 QUALITY ASSURANCE
A. Welding materials and labor to conform to ASME Code and applicable state Labor Regulations.
B. Use welders fully qualified and licensed by state authorities.
C. All piping shall be manufactured in the United States.

1.5 REFERENCES
A. ANSI/ASTM A53 - Pipe, steel, Black and Hot-Dipped Zinc- Coated, Welded and Seamless.
B. ANSI/ASME B16.3 - Malleable - iron, Black or Galvanized, Threaded Fittings
C. FS WW-P-521 - Pipe Fittings, Flange Fittings, and Flanges: Steel and Malleable Iron (Threaded and Butt Welding), Class 150.

1.6 PIPING, GENERAL
A. The accompanying drawings are intended for the contractor's guidance, and he shall verify their accuracy and immediately notify the Architect of any discrepancies so that such discrepancies may be resolved prior to actual fabrication or installation of work. Minor changes in position of piping as necessary to meet job conditions shall be anticipated by the contractor and shall not be made the basis for change order. Changes affecting accessibility to or clearance about equipment or accessories shall be promptly communicated to the Architect.
B. Sizes and arrangement of piping shall be as shown on the drawings. In case of inconsistency of
details for final connections, resulting in conflict, such conflict shall be resolved by the Architect.

C. Attention is called to the inclusion of the "piping diagrams" in the working drawings. These piping
diagrams are not for the purpose of giving physical dimensions or locations but rather to make clear
the interconnections, by the piping, of the various units of the process. If an item is shown on either
the piping diagram or the piping detail drawings, but not on both, it will be assumed that the
Contractor has included such item in his estimate of the cost of the work and that he shall install
same.

PART 2 PRODUCTS

2.1 PIPE AND TUBE

A. Chilled and Heating Water Piping: Schedule 40, ANSI/ASTM A-53 black steel pipe plain end or
grooved end. Chilled and Heating Water Piping 2" and smaller can be ASTM B88 Type L hard
drawn copper tubing.

B. Condensate Piping: Copper Tubing: ASTM B88, Type M, hard drawn. Fittings: ANSI/ASME
Grade 95TA.

2.2 PIPE AND TUBE JOINTS AND FITTINGS

A. Threaded Steel Pipe Fittings: ANSI/ASME B16.3 black or galvanized malleable iron threaded
fittings.

B. Grooved Steel Pipe Fittings: ASTM A47 malleable iron or ASTM A536 black or galvanized, ductile
iron. UL listed and FM approved.

95TA.

2.3 UNIONS AND COUPLINGS

A. Pipe Size 2 Inches and Under: 150 psi malleable iron for threaded ferrous piping.

B. Pipe Size 2-1/2 Inches and Over: 150 psi forged steel flanges for ferrous piping.

C. Grooved End Pipe: Malleable iron or ductile iron split couplings with ASTM D-2000 sealing gasket,
bolts and nuts; galvanized couplings for galvanized pipe.

2.4 VALVES

A. Valves shall be in accordance with Section 230523.

2.5 PIPE IDENTIFICATION

A. All chilled and heating water piping shall be provided with pipe identification markers. Piping behind
non-accessible walls and ceilings does not require identification markers.

B. All interior chilled and heating water piping shall be provided with snap or strap on type plastic
markers equal of Seton Setmark or Brady. Adhesive or stenciled type markers are not acceptable
for interior installation. Pipe markers shall identify the piping and direction of flow. Install all pipe
markers at maximum 10 foot intervals and within 5 feet of a floor, ceiling, or wall penetration.
C. Pipe markers shall be standard ANSI color identifying the fluid and flow direction.

**PART 3 EXECUTION**

3.1 INSTALLATION

A. Grade piping to facilitate drainage.

B. Install piping with careful regard to expansion.

C. All piping shall be run straight and parallel with adjacent walls and shall present a uniform and neat appearance.

D. Make connections to equipment with unions or flanges.

E. On closed systems, equip all low points with 3/4 inch drain valves and hose ends. Provide air vents at high points.

F. Make reductions in water pipes with eccentric reducing fittings installed to provide drainage and venting.

G. Group piping whenever practical at common elevations.

H. Provide clearance for installation of insulation and for access to valves, air vents, drains and unions.

3.2 IDENTIFICATION

A. Each marker shall indicate direction of flow with an arrow pointing away from the marker. When flow can be in each direction, the marker shall have double-ended arrows.

B. Locate pipe markers so that the view is unobstructed.

C. Apply pipe markers at intervals not exceeding 10’ in mechanical rooms and 20’ at all other locations. Also, locate pipe markers at every point of pipe entry or exit of equipment and rooms.

3.3 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, inside and outside, before assembly.

C. Remove rust or foreign material from pipe and fitting materials.

D. Clean the ends of copper pipe and the inside of soldered fittings with emery cloth, metallic wool, or other suitable means prior to joining.

3.4 STEEL PIPE CONNECTIONS

A. Use galvanized fittings, flanges and couplings for galvanized pipe.

B. Screw joint steel piping up to and including 2 inches. Weld piping 2-1/2 inch and larger, including branch connections.
C. Die cut screwed joints with full cut standard taper pipe threads using linseed oil. Make joints using non-toxic joint compounds applied to male threads only.

D. Use main sized saddle branch connections for directly connecting branch lines to mains in steel piping. Do not project branch pipes inside the main pipe.

E. Joints for Threaded End Pipe: Coated with pipe lubricant compound.

F. Flanged Connections: Tighten nuts uniformly. Bolts shall not protrude more than 1/4" through the tightened nut.

3.5 TESTING

A. Test piping systems prior to the application of insulation.

B. For piping installed in concealed spaces or buried, test piping before system is concealed or backfilled.

C. Test water piping to a hydrostatic pressure of 1-1/2 times normal operating pressure, 100 psig minimum, for a continuous period of not less than eight hours. During this time carefully inspect the system for leaks. If necessary repair leaks in a manner acceptable to the architect and test again until no leakage is detected.

D. After testing, and whenever conditions permit, operate systems at normal operating pressure and temperature for not less than five consecutive days. The piping systems must remain free from leaks during this period.

E. Test using higher pressures if required by authorities having jurisdiction.

3.6 WATER TREATMENT

A. After piping has been tested leak free, flush the system clean with a liquid alkaliner cleaner formulated with soaps, synthetic detergents and dispersants. Apply as per manufacturer's instructions.

END OF SECTION
PART 1 GENERAL

1.1 WORK INCLUDED
A. Refrigerant Piping Systems

1.2 RELATED WORK
A. Section 230500 – Common Work Results for HVAC
B. Section 238126 – Split System Air Conditioners

1.3 REFERENCES
A. ANSI/ASTM B280 - Copper Air Conditioning and Refrigeration Tube (ACR).

PART 2 PRODUCTS

2.1 REFRIGERANT PIPING
A. Type ACR Copper tubing, hard temper with wrought copper fittings with long radius elbow.

2.2 JOINTS
A. Brazed, phos-copper alloy or bronzed, silver alloy.

PART 3 EXECUTION

3.1 INSTALLATION
A. Grade piping as necessary to facilitate oil return when required.
B. Joints shall be made up in the presence of dry nitrogen only and shall be tested before any coverings are applied. High side shall be tested at 400 psig and the low side at 250 psig.
C. All joints shall be carefully tested and if a leak is found, the joint shall be remade as described above. If no leaks are found, system shall be evacuated to a deep vacuum. Charge system as per manufacturer's recommendation.
D. Provide 1" thick expanded rubber insulation to suction and liquid lines and paint exterior insulation with two coats of weather- resistant pigmented plasticized vinyl lacquer. Apply per manufacturer's specifications.

3.2 TESTING
A. Test piping systems prior to the application of insulation.
B. For piping installed in concealed spaces or buried, test piping before system is concealed or backfilled.
C. After testing, and whenever conditions permit, operate systems at normal operating pressure and temperature for not less than five consecutive days. The piping systems must remain free from leaks during this period.

END OF SECTION
SECTION 233100
HVAC DUCTS

PART 1 GENERAL

1.1 WORK INCLUDED
A. Ductwork
B. Fasteners
C. Sealants
D. Duct Cleaning
E. Testing

1.2 RELATED WORK
A. Section 230500 – Common Work Results For HVAC
B. Section 230529 - Supports, Anchors and Sleeves For HVAC
C. Section 230593 - Testing, Adjusting and Balancing
D. Section 230713 - Ductwork Insulation
E. Section 233423 – Exhaust Fans
F. Section 233300 - Duct Liners
G. Section 233300 - Duct Accessories
H. Section 233713 - Diffusers, Registers & Grilles
I. Section 238220 – Hydronic Fan Coil Units

1.3 REFERENCE STANDARDS
A. Fabricate in accordance with the most recent edition of SMACNA HVAC Duct Construction Standards.

1.4 DEFINITIONS
A. Duct Sizes: Dimensions shown on the Drawings are sheet metal sizes.
PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Products manufactured by the following manufacturers meeting these specifications are acceptable.

B. Flexible ducts manufactured by Thermaflex, Wire Mold, Certain Tweed and ATCO are acceptable.

C. Round and oval ductwork manufactured by United Sheet Metal, Semco, General Metals, Spiro-Fab and Metal Manufacturing are acceptable.

2.2 MATERIALS

A. Galvanized Ductwork: Galvanized steel lock forming quality having zinc coating of 1.25 ounces per square foot for each side per ASTM A525 G90. All ductwork shall be galvanized unless otherwise noted.

B. Fasteners: Use rivets and bolts throughout; sheet metal screws accepted on low pressure ducts.

C. Sealant: Water resistant, fire resistive, compatible with mating materials.

D. Flexible Ducts: UL 181 Class 1 airduct consisting of inner vapor barrier supported by a helically wound steel wire; wrapped with 1-1/2” thick flexible fibrous glass insulation, enclosed by a reinforced foil outer jacket. Ductwork shall be a factory fabricated assembly with hanger tab support system equal to CertainTeed Certaflex 25.

2.3 FABRICATION

A. The contractor shall visit the premises and thoroughly familiarize himself with all the details of the work and working conditions and to verify all dimensions in the field prior to fabricating ductwork. The contractor shall advise the Architect of any discrepancy prior to fabrication.

B. Size round ducts installed in place of rectangular ducts from ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.

C. Lap metal ducts in direction of air flow. Hammer down edges and slips to leave smooth duct interior.

D. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on center line. Where not possible and where rectangular elbows used, provide single thickness type turning vanes.

E. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Maximum divergence upstream of equipment to be 30 degrees and 45 degrees convergence downstream.

F. Rigidly construct metal ducts with joints mechanically tight, substantially airtight, braced and stiffened so as not to breathe, rattle, vibrate, or sag. Seal all duct joints and connections with “hard cast” tape sealant or equal as ducts are being assembled.

G. Fabricate continuously welded medium pressure round and oval duct fittings one gauge heavier than gauges indicated for duct size. Joints shall be 4 inch cemented slip joint, brazed, or electric welded. Prime coat welded joints. Fabricate elbows of five piece construction. Provide standard 45 degree takeoffs unless otherwise indicated where conical 90 degrees tee takeoff connections may be used.
2.4 DUCT GAUGES AND REINFORCEMENT

A. Provide minimum duct wall thickness and reinforcement as required by the latest edition of the SMACNA HVAC Duct Construction Standards.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

B. Clean duct system with forced air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning.

C. Seal all transverse joints with Hard Cast or equivalent.

D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

E. At each point where ducts pass through partitions, seal joints around duct with non-combustible material. Provide sheet metal closure around opening when exposed.

F. Paint all exposed ductwork as directed by architect.

END OF SECTION
SECTION 233300
DUCT ACCESSORIES

PART 1 GENERAL

1.1 WORK INCLUDED
A. Access Doors
B. Balancing Dampers
C. Backdraft Dampers
D. Flexible Connections
E. Turning Vanes

1.2 RELATED WORK
A. Section 230500 – Common Work Results For HVAC
B. Section 230593 - Testing, Adjusting and Balancing
C. Section 233100 - HVAC Ducts
D. Section 233713 - Diffusers, Registers & Grilles
E. Section 233353 – Duct Liners

1.3 QUALITY ASSURANCE
A. Accessories shall meet the requirements of NFPA 90A, Air Conditioning and Ventilating Systems as applicable.
B. Fabricate in accordance with ASHRAE handbooks and SMACNA duct manuals.

1.4 SUBMITTALS
A. Submit product data in accordance with Section 230500 – Common Work Results For HVAC

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Products manufactured by Air Balance, Greenheck, DuroDyne, Penn, Krueger, Safe Air, Dowco or Ruskin meeting these specifications are acceptable.

2.2 ACCESS DOORS
A. Fabricate rigid and close-fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For internally lined or insulated ductwork, install minimum one inch thick insulation with sheet metal cover.
B. Provide two hinges and two sash locks for sizes up to 18 inch square, two hinges and two compression latches with outside and inside handles for sizes up to 24 inch x 48 inch. Provide an additional hinge for larger sizes.

2.3 DAMPERS

A. Fabricate counter balanced backdraft dampers with blades a maximum 8 inch width having felt or flexible vinyl sealing edges, linked together in rattle-free manner and width adjustment device to permit setting for varying differential static pressure.

B. Fabricate multi-blade damper of opposed blade pattern with maximum size 16 sq. ft. Assemble center and edge crimped blade in prime coated or galvanized channel frame with suitable hardware and locking quadrant.

C. Fabricate balancing dampers of galvanized steel, minimum 16 gauge and provide with locking quadrants. Damper controllers shall be raised for insulated ducts.

2.4 FLEXIBLE CONNECTION

A. Fabricate of neoprene coated flameproof fabric approximately 4 inch wide tightly crimped into metal edging strip and attach to ducting and equipment by screws or bolts at 6 inch intervals.

2.5 TURNING VANES

A. Fabricate turning vanes and rails of 24 gauge galvanized steel and assemble rattle free.

B. Turning vanes shall be single thickness prefabricated or assembled per manufacturer's instructions for optimum shape.

C. Secure to duct with sheet metal screws, rivets or weld. Final assembly shall be rattle free.

2.6 APPLICATION

A. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing and where indicated on the drawings.

B. Provide flexible connections immediately adjacent to equipment, in ducts associated with fans, equipment subject to forced vibration and as shown on the drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install items in accordance with manufacturer's printed instructions and SMACNA Standards.

B. For connections to fans, install 1/2 inch thick neoprene pad over fabric and hold in place with additional metal strips.

END OF SECTION
SECTION 233353
DUCT LINERS

PART 1   GENERAL

1.1  WORK INCLUDED
A. Duct Lining

1.2  RELATED WORK
A. Section 230500 – Common Work Results For HVAC
B. Section 233100 - HVAC Ducts

1.3  QUALITY ASSURANCE
A. International Mechanical Code and Local Codes
B. ASTM E-84 and NFPA 90A for Fire Hazard Classification
C. ASTM D 903 for Adhesive Bonds

1.4  REFERENCE STANDARDS
A. TIMA AHC-101
B. ASTM C-423-77 for Sound Absorption
C. ASTM C-177 for Thermal Conductance
D. SMACNA Duct Liner Application Standard

1.5  SHOP DRAWINGS
A. Submit product data and installation instructions in accordance with Section 230500 – Common Work Results for HVAC.

PART 2   PRODUCTS

2.1  ACCEPTABLE MANUFACTURERS
A. Products manufactured by Johns-Manville, Owens-Corning or CertainTeed meeting these specifications are acceptable.

2.2  MATERIALS
A. All rectangular supply and return ductwork shall be provided with Type 1 flexible duct liner, 1" thick, 1-1/2 lbs. per cubic foot density "K" value at 75 degrees F mean temperature of 0.26 BTU/in/sq. ft./degrees F/hr., suitable for temperature range of 40 degrees F to 250 degrees F and maximum velocity of 4000 fpm.
B. Weld pins or approved equal mechanical fasteners capable of withstanding 50 lb. tensile load test.
C. Adhesives meeting FM, UL and NFPA requirements for fire and smoke ratings, maximum 25 flame spread and maximum 50 smoke developed. Adhesives shall conform to Adhesive and Sealant Council Standards for Adhesives for Duct Liner ASC-A-7001C-1972.

PART 3 EXECUTION

3.1 INSTALLATION

A. All duct designated to receive liner shall be completely covered with liner. Transverse joints shall be neatly butted and there shall be no interruptions or gaps. The black coated surface of the duct liner shall face the air stream. Provide 26 gauge galvanized steel "Z" strip at leading edge of duct liner.

B. Duct liner shall be adhered to sheet metal with mechanical fasteners and 100% coverage of adhesive. Transverse edges of liner to be coated with adhesive. Duct liner shall be cut to assure overlapped and compressed longitudinal corner joints.

C. For velocities up to 2,000 feet per minute, fasteners shall start within 3" of the upstream transverse edges of the Duct Liner and 3" from the longitudinal joints and shall be spaced at a maximum of 12' o.c. around the perimeter of the duct, except that they may be a maximum of 12" from corner break. Elsewhere they shall be a maximum of 18" o.c. except that they shall be placed no more than 6" from a longitudinal joint of the liner nor 12" from a corner break.

D. For velocities from 2001 to 4,000 feet per minute, fasteners shall start within 3" of the upstream transverse edges of the liner and 3" from the longitudinal joints and shall be spaced at a maximum of 6' o.c. around the perimeter of the duct, except that they may be a maximum of 6" from a cornerbreak. Elsewhere they shall be a maximum of 16" o.c., except that they shall be placed not more than 6" from a longitudinal joint of the liner nor 12" from a corner break. In addition to the adhesive edge coating of transverse joints, any longitudinal joints shall be similarly coated with adhesive.

END OF SECTION
SECTION 233423
EXHAUST FANS

PART 1  GENERAL

1.1  WORK INCLUDED
    A. Cabinet Exhaust Fans

1.2  RELATED WORK
    A. Section 230500 – Common Work Results For HVAC
    B. Section 233100 - HVAC Ducts
    C. Section 230593 - Testing, Adjusting and Balancing

1.3  QUALITY ASSURANCE
    A. AMCA rated for both sound and air flow performance
    B. AMCA rating seals

1.4  SUBMITTALS
    A. Submit product data including dimensional data, material specifications, capacity data, sound data and installation procedures in accordance with Section 230500.

PART 2  PRODUCTS

2.1  ACCEPTABLE MANUFACTURERS
    A. Products manufactured by Greenheck, Cook, Penn, Jenn Fan, Twin City or ACME meeting these specifications are acceptable.

2.2  CABINET EXHAUST FANS
    A. Provide belt driven centrifugal fan. Performance shall meet or exceed that scheduled.
    B. Fan wheels shall be forward curved type statically and dynamically balanced for vibration free operation. Motor shall have built in thermal overload protection and shall be mounted on vibration isolators. Fan scroll shall be galvanized steel of lock seam construction.
    C. Housing shall be lined with acoustical fiberglass insulation. Construction shall be of corrosion resistant galvanized steel. Exhaust grille when required shall be aluminum with white baked enamel finish.
PART 3 EXECUTION

3.1 INSTALLATION

A. Install exhaust fans with vibration isolation as indicated on drawings.

B. Connect to ductwork as specified in Section 233100.

END OF SECTION
PART 1 GENERAL

1.1 WORK INCLUDED
A. Single duct terminal units.
B. Re-heat Coils

1.2 RELATED WORK
A. Section 230500 – Common Work Results for HVAC
B. Section 230529 – Hangers & Supports for HVAC
C. Section 230593 – Testing, Adjusting & Balancing For HVAC
D. Section 230900 – Instrumentation & Control For HVAC

1.3 REFERENCES
A. NFPA 90A - Installation of Air Conditioning and Ventilation Systems.
B. UL 181 - Factory-Made Air Ducts and Connectors.
C. ARI 880 - Air-Conditioning and Refrigeration Institute Standard Rating Conditions for Air Terminals

1.4 SUBMITTALS
A. Submit shop drawings in accordance with Section 230500.
B. Submit shop drawings and product data sheets indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings which indicate air flow, static pressure, and radiated sound power levels (2nd through 7th octave bands) at design maximum operating conditions.
C. Submit manufacturer's installation instructions.

1.5 OPERATION AND MAINTENANCE DATA
A. Submit operation and maintenance data.
B. Include manufacturer's descriptive literature, operating instructions, maintenance and repair data.
C. Include directions for resetting all control setpoints.

1.6 WARRANTY
A. Provide one year manufacturer's parts and labor warranty.
PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Products manufactured by Titus or Krueger meeting these specifications.

B. Unit performance data must be Rated in Accordance with ARI Standard 880, and must display the ARI Symbol on all standard units.

2.2 PERFORMANCE

A. Unit performance shall meet or exceed performance scheduled on the drawings.

2.3 GENERAL

A. Identify each terminal unit with clearly marked identification label and airflow indicator. Label shall include unit nominal air flow, maximum factory set air flow and minimum factory set air flow.

2.4 FABRICATION

A. Casings: Units shall be completely factory assembled, manufactured of corrosion protected welded steel, and fabricated with a minimum of 18-gauge metal on the high pressure (inlet) side of the VAV dampers and 22-gauge metal on the low pressure (outlet) side and unit casing.

B. Lining: Minimum 1/2 inch thick tuff-skin mat or aluminum foil-faced glass insulation, 1.5 lb/cu ft. density, or 3/8" closed cell insulation meeting NFPA 90A requirements and UL 181 erosion requirements.

C. Assembly: Air volume damper, fans and controls in single cabinet.

2.5 VOLUME DAMPER

A. Air volume control dampers shall be factory calibrated and tested assembly consisting of air modulation dampers and extension for connection to control actuators. All actuator linkages shall be protected by a sheet metal enclosure. Unit shall maintain constant volume mixed air flow.

2.6 CONTROLS

A. Units shall have pressure-independent DDC controls capable of maintaining required airflow set points +/-5% of the unit’s capacity at any inlet pressure up to 6-in. wg. The controllers shall be capable of resetting between factory or field-set maximum and minimum (>350 fpm inlet duct velocity) set points to satisfy the room thermostat demand.

B. The unit shall be equipped with an amplified flow probe located in the unit inlet. Air flow for the pressure independent controller shall be determined with a factory supplied 12 point total pressure, center averaging cross flow sensor, having a magnification resulting in no greater than 2625 fpm @ 1" developed signal.

C. Provide 120/24VAC control power transformer with inlet/outlet disconnects. Transformer shall be sized per the requirements of the controller operation. Transformer shall be located in controller cabinet. Verify hand location for cabinet to provide adequate access clearance based on plans and field conditions.
2.7 RE-HEAT COIL

A. Coil shall be mounted in a minimum 20 Ga. Galvanized steel casing with slip and drive discharge connections, and factory mounted on the base unit.

B. Right or left-hand fittings with sweat connection sizes as indicated on equipment drawings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide manufacturer's recommended clearance for access, minimum 24” in front of control cabinet.

C. Install a maximum of 12” above the ceiling.

D. Control and isolation valves shall be located a maximum of 18” from the terminal unit and 12” above the ceiling.

END OF SECTION
SECTION 233713
DIFFUSERS, REGISTERS & GRILLES

PART 1   GENERAL

1.1 WORK INCLUDED
A. Supply, Return, Transfer and Exhaust Air Devices and Accessories.

1.2 RELATED WORK
A. Section 230500 – Common Work Results For HVAC
B. Section 230593 - Testing, Adjusting and Balancing
C. Section 233100 - HVAC Ducts
D. Section 233300 - Duct Accessories

1.3 QUALITY ASSURANCE
A. Make air flow tests and sound level measurement in accordance with applicable ADC equipment test codes and ASHRAE standards.
B. Manufacturer shall certify cataloged performance and ensure correct application of air outlet types.

1.4 SUBMITTALS
A. Submit in accordance with Section 230500.
B. Submit product data and shop drawings covering each item together with schedule of outlets, listing cfm, neck velocity, NC level and Ak factor and air flow measurement procedures.

1.5 JOB CONDITIONS
A. Review requirements (including architectural drawings) of outlets as to size, finish, and type of mounting prior to submitting shop drawings and schedules of outlets.
B. Check location of outlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

PART 2   PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Products manufactured by Krueger, Titus, Price or Nailor, meeting these specifications are acceptable.

2.2 GENERAL REQUIREMENTS
A. Provide air devices equal in all respects to those scheduled on the drawings.
B. Rate units in accordance with ADC standards.
C. Base air outlet application on space noise level of NC 35 maximum in all areas unless indicated otherwise on drawings.

D. Provide supply outlets with sponge rubber seal around edge.

E. All devices shall be factory finished.

F. When required provide air devices factory installed in metal panels painted to match air device finish. Panel shall be suitable for insertion into lay-in-tile ceilings.

PART 3  EXECUTION

3.1  INSTALLATION

A. Install items in accordance with manufacturer's printed instructions.

B. Paint ductwork visible behind air outlets matt black.

C. Seal square to round adaptors or lined plenum boxes shall be seal airtight to diffusers and grilles.

C. When required cut metal panels for insertion in ceiling at grid location where tiles may be less than nominal size. Center diffuser or grille within modified panel.

END OF SECTION
PART 1   GENERAL

1.1 WORK INCLUDED
   A. Split-System Air-Conditioner
   B. Controls

1.2 RELATED WORK
   A. Section 230500 – Common Work Results for HVAC
   B. Section 230593 – Testing, Adjusting & Balancing For HVAC
   C. Section 232300 – Refrigerant Piping
   D. Section 233300 – Air Duct Accessories

1.3 QUALITY ASSURANCE
   A. Meet the requirements of UL and applicable codes.
   B. Test and rate cooling systems to the appropriate ARI Standard.

1.4 REFERENCE STANDARDS
   A. ARI Standard 210/240 or 360 and 270.
   B. National Electrical Code.

1.5 SUBMITTALS
   A. Submit shop drawings and product data in accordance with Section 230500.
   B. Submit manufacturer’s installation instructions.
   C. Submit manufacturer’s descriptive literature including dimensions, capacity data, fan performance data, motor data and filter data.
   D. Submit schedule of actual unit performance data versus design unit performance data.

1.6 WARRANTY
   A. Provide 5 year unconditional parts warranty on compressor.
PART 2  PRODUCTS

2.1  ACCEPTABLE MANUFACTURER'S

A. Units manufactured by Carrier, Samsung, Trane, Mitsubishi, Sanyo, LG or others meeting or exceeding these specifications are acceptable.

2.2  TYPE AND PERFORMANCE

A. Units shall be self-contained, factory assembled and prewired with single point electrical connection. Indoor unit shall consist of cabinet and frame, supply fan, evaporator coil and all required and necessary safety and operating controls. Outdoor unit shall consist of compressors, condenser coil and fan(s) and all required and necessary safety and operating controls.

B. Units shall be suitable for indoor and outdoor use as required.

C. Unit shall meet or exceed the capacity scheduled.

2.3  EVAPORATOR-FAN UNIT

A. Concealed Unit Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.

1 Insulation: Faced, glass-fiber duct liner.

2 Drain Pans: Galvanized steel, with connection for drain; insulated

3 Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Evaporator Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.

D. Fan Motor: Multi-speed.

E. Filters: Provide 1 inch thick, in fiberboard frames, Permanent or cleanable with ASHRAE 52.2 MERV rating of 6 or higher.

2.4  AIR-COOLED, COMPRESSOR-CONDENSER UNIT

A. Casing steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed reciprocating or scroll type with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor. [Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch].

1 Refrigerant: R-410A.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid sub-cooler.
D. Fan: Aluminum-propeller type, directly connected to motor.

E. Motor: Permanently lubricated, with integral thermal-overload protection.

F. Low Ambient Kit: Permits operation down to 0 deg F.

2.5 ACCESSORIES

A. Thermostat: Low voltage with subbase to control compressor and evaporator fan.

B. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

B. Install roof-mounted, compressor-condenser components on equipment supports.

3.2 CONNECTIONS

A. Connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

B. Connect supply and return condenser connections with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.

C. Install piping adjacent to unit to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

A. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

B. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new components, and retest.

C. Test and adjust controls and safeties. Replace damaged and malfunctioning components.

END OF SECTION
SECTION 238220
HYDRONIC FAN COIL UNITS

PART 1 GENERAL

1.1 WORK INCLUDED
   A. Hydronic Fan Coil Units

1.2 RELATED WORK
   A. Section 230500 – Common Work Results for HVAC
   B. Section 230519 – Mechanical Piping Specialties
   C. Section 230523 – Valves For HVAC
   D. Section 230529 – Hangers & Supports for HVAC
   E. Section 230593 – Testing, Adjusting & Balancing For HVAC
   F. Section 232113 – Hydronic Piping
   G. Section 233113 – Ductwork
   H. Section 233300 – Air Duct Accessories

1.3 QUALITY ASSURANCE
   A. Provide fans bearing AMCA certified rating seal.

1.4 SUBMITTALS
   A. Submit shop drawings and product data in accordance with Section 230500.
   B. Submit coil capacity data, motor data and filter data.
   C. Submit fan curves showing fan performance with system operating point plotted on curves.
   D. Submit dimensioned data.
   E. Submit manufacturer’s installation instructions and maintenance and operating procedures.

1.5 REFERENCED STANDARDS
   A. ASHRAE Test Standard 52-76.
   B. UL listing for filters, Class 2.
   C. ARI Standard 410-64.
PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Units manufactured by Carrier, IEC, Trane, McQuay or approved equal meeting these specifications are acceptable.

2.2 PERFORMANCE
A. Unit shall meet or exceed the performance schedule on the drawings.

2.3 CASING
A. Unit casing shall be minimum 18 gauge galvanized steel with minimum 3/4" duct collars. Provide factory return air plenum fully lined.
B. Drain pans shall be one piece galvanized steel completely insulated to prevent surface sweating. Provide connection for drain.

2.4 FAN
A. Forward curved double width, double inlet centrifugal type statically and dynamically balanced, resiliently mounted. Fan housing shall be galvanized steel, two piece, die formed with integral scroll and inlets.
B. Direct drive fan motors shall be three-speed, permanent split capacitor type. Motor shall have sleeve bearing with oilers, inherent thermal overload protection and automatic reset. Belt driven fans shall have a variable pitch drive system for air flow balancing.

2.5 COILS
A. Coils shall be seamless copper tubes and headers with tubes mechanically bonded into aluminum fins.
B. Hydronic Coils shall be burst tested at 450 psig (air) and leak tested at 300 psig (air under water). Provide manual air vent at coil high point.
C. Evaporative Coils shall be tested at 375 psig. Provide factory installed expansion valve.

2.6 FILTERS
A. Provide 2" thick disposable pleated media filters, Farr 30/30 or equivalent.
B. Provide (1) one additional set of filters per unit at substantial completion prior to balancing system.

2.7 VIBRATION ISOLATORS
A. Suspend units from structure with spring vibration isolators. Method of connection to be approved by structural engineer.
PART 3  EXECUTION

3.1  INSTALLATION

A. Install items in accordance with manufacturer’s instructions and as shown on the drawings.

END OF SECTION
SECTION 26 50 00
GENERAL ELECTRICAL PROVISIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

Basic requirements of a common or administrative nature that pertains to all electrical work.

1.2 RELATED SECTIONS

The requirements set out in the contract documents, contract forms, general conditions, supplementary general conditions and general requirements apply to all work specified herein.

1.3 WORK INCLUDED

The Contractor shall furnish all materials, labor, transportation, tools, permits, fees and incidentals necessary for the installation of a complete electrical system. It is the intent of the contract documents to provide an installation complete in every respect. In the event that additional details or special construction are required for work indicated or specified, it shall be the responsibility of the Contractor to provide all materials and equipment which are usually furnished with such systems in order to complete the installation, whether mentioned in the contract documents or not.

1.4 CODES AND STANDARDS

A. All work shall be in compliance with all applicable portions of the latest edition of the National Electrical Code (NEC), the National Electrical Safety Code (NESC), all city and county codes and ordinances, and other codes which may or may not be specifically referenced in these contract documents. None of the terms or provisions of these contract documents shall be construed as waiving any of the rules, regulations or requirements of these authorities.

B. In any instance where these contract documents call for construction materials of a better quality or larger size than required by the codes, the provisions of the contract documents shall take precedence. The codes shall govern in case violations are indicated in the construction documents.

1.5 DRAWINGS

A. The drawings are intended to show the general arrangement and the extent of the work. The exact location and arrangement of all parts shall be determined as the work progresses to conform in the best possible manner with the surroundings and as directed by the Owner's Representative.

B. If any departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefor shall be submitted to the Owner's Representative for review. No departures shall be made without prior written acceptance of the Owner's Representative.

1.6 SUBMITTALS

A. The Contractor shall furnish six copies of the manufacturer's literature and drawings describing all proposed equipment and materials indicated in the specifications. The front sheet or brochure shall have job name, architect, engineer, contractor and suppliers identified.
B. All sheets of the submittal shall have the job name stamped or permanently written on them, and shall be assembled in an indexed brochure. The descriptive materials shall be arranged in the brochure in the same order as found in the specifications. Each brochure shall be submitted in a three-ring binder. Binders shall be hardback unless the Engineer, at his discretion, allows heavy-paper-type binders on a smaller project. The leading sheet of the descriptive material for each item shall be full size of heavy paper, with a numbered outside tab. An index sheet showing the location in the brochure of all equipment and material submitted shall be placed in the front of the brochure. The index sheet shall be made to conform to the following example.

- INDEX -

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Specifications Paragraph No.</th>
<th>Specifications Page No.</th>
<th>Description</th>
</tr>
</thead>
</table>

C. Submittals shall include detailed specifications and construction data. Manufacturer’s regular catalog sheets will not be acceptable unless they indicate completely all of the specification requirements. Where submittal sheets cover several sizes or types of equipment, they shall clearly indicate, by the use of a different color ink, the type or size to be used on the project and the use intended. Products submitted as substitutions shall be identified in the index as a substitution.

D. Approval of the submittals, or any part of the contents therein, shall not eliminate the responsibility for compliance with the drawings and specifications, nor shall it eliminate the requirements or the responsibility for freedom from errors of any sort in the data submitted.

1.7 RECORD DRAWINGS

A. The Contractor shall maintain a set of electrical drawings at the job site neatly marked with all changes from the original contract drawings. This set of drawings shall not be used for construction purposes and shall be available to the Owner’s Representative at all times. Drawings shall be kept up to date as the job progresses and shall be delivered to the Owner’s Representative at the completion of the contract.

B. A fresh, clean set of drawings on which variations to the original construction documents are legibly recorded and designated "as-built" shall be furnished to the Owner's Representative upon completion and acceptance of work and before final payment is made.

1.8 OPERATION AND MAINTENANCE MANUALS

A. The Contractor shall furnish six sets of operation and maintenance manuals to the Owner's Representative. These manuals shall include all items designated in the specifications, shall be assembled in an indexed three-ring binder as described in the paragraph titled "SUBMITTALS" and shall include all warranties. Separate equipment brochures will not be acceptable. A pictorial parts list, operation and maintenance instructions, system descriptions, schematic wiring diagrams and equipment cut sheets shall be included for each item with source information. NOTE: These manuals shall be delivered to the Owner's Representative prior to final acceptance of the installation by the Owner.

B. Final acceptance of the installation shall not occur until the Owner's personnel have been trained in the maintenance and operation of all equipment for a minimum of eight hours.

1.9 SITE EXAMINATION

The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, and verify all dimensions in the field. The
Contractor shall advise the Owner's Representative of any discrepancy at least seven days prior to bidding. The submission of bids shall be deemed evidence of the Contractor's site visit, the coordination of all existing conditions and the inclusion of all considerations for existing conditions.

1.10 UTILITIES

The contract documents reflect the general location, voltage, capacity, size and manner of routing for all utilities known to be required on this project. It shall be the responsibility of the Contractor to visit the site and to meet with the local utility companies in order to coordinate and confirm the exact requirements for all electrical utilities, including, but not limited to, all facilities required to provide complete and operative electrical power and telephone services. The bid submitted by the Contractor shall include costs for all such coordinative work as well as any and all utility company charges and/or fees.

1.11 TEMPORARY POWER

A. The Electrical Contractor shall provide the necessary wiring, connections, service switches, poles, wiring protective devices, lighting fixtures, lamps, outlet devices, disconnect switches, etc., as required for temporary lighting. In addition, a similar system shall be provided for the distribution of single- and three-phase power of voltage levels and adequate amperage as required to facilitate the construction of the project. These services shall be installed in accordance with requirements of the NEC and OSHA.

B. The Electrical Contractor shall coordinate with the local utility company, the General Contractor and other trades involved to determine requirements for temporary power on this project. No additional charges shall be made to the Owner for wiring, connections, pole, fixtures or devices required to facilitate construction.

1.12 STORAGE AT SITE

Store major electrical equipment (switchboards, panelboards, lighting fixtures, dry type transformers, VFDs, etc.) sealed in original factory wrapping in a clean, dry and conditioned environment protected from the weather. Storage outdoors is not acceptable.

1.13 GUARANTEE

The Contractor shall guarantee all labor and materials furnished by him in accordance with state law or the general conditions of the contract, but in no case for a period of less than two years. Certain work and materials shall be guaranteed for a longer period when so specified. Guarantee period shall extend from the time of final acceptance of the installation. The Guarantee shall cover the repair or replacement, without additional cost to the Owner, of any defective material or faulty workmanship. All necessary service to each item and other work requiring specialized training shall be furnished by the Contractor, at no cost to the Owner, for a period of two years, concurrent with the warranty period specified above. The above items pertaining to routine servicing of the equipment and motors, replacing fuses or replacing lamps are the responsibility of the Owner unless a service agreement is made between the Contractor and the Owner.
PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

All materials shall be new and of quality grade. All materials of a type for which the Underwriters' Laboratories, Inc. (UL) has established a standard shall be listed by UL and shall bear the UL label.

2.2 SUBSTITUTIONS

References in the specifications or on the drawings to any article, device, product, material, fixture, form or type of construction by naming more than one acceptable manufacturer shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; however, the Contractor, in such cases, shall obtain written prior approval for substitution of unnamed manufacturers. Requests for substitution must be received in writing, in accordance with the contract documents, at least ten working days before bid date. The request shall include a detailed listing of all products and/or devices for which acceptance is being requested. Engineering specification sheets and/or construction details shall be included for comparative purposes. If the product is acceptable to the satisfaction of the Owner's Representative and the Engineer, an addendum item will be issued stating acceptability.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND COMPLETION OF INSTALLATION

A. All work shall be performed by competent mechanics, skilled in their trade, and shall be executed in a thorough and substantial manner.

B. The Contractor shall be held responsible for transportation of his materials to and on the job, and for their storage and protection until the final acceptance of the job.

C. The Contractor shall be held responsible for timely placing of all conduit and outlet boxes, cabinets and other wiring devices in the walls, ceilings, slabs, beams, etc., as construction progresses.

D. Contractor shall furnish all necessary scaffolding, tackle, tools and appurtenances of all kinds, and all labor required for the safe and expeditious execution of his contract.

E. All equipment shall be installed in a manner to permit access to parts requiring service. All electrical equipment shall be installed in such a manner as to allow removal for service without disassembly of other equipment, and shall have working clearances as required by NEC. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to fit through finished openings, shall be placed before enclosing structure is completed. Following placement, such apparatus shall be completely protected from damage.

F. The Contractor shall, at all times, keep the premises free from accumulations of waste material and packaging debris. This debris shall be removed daily from the construction site.

3.2 CUTTING AND PATCHING

A. Where it becomes necessary to drill or cut through any floors, walls or ceilings to permit the installation of any work under this contract, such cutting shall be done under the supervision of the Owner's Representative by the Contractor. After the necessary work has been completed, the damage shall be repaired by the Contractor.
B. No joists, beams, girders or columns shall be cut by the Contractor without first obtaining written permission from the Owner's Representative.

C. All drilling for expansion bolts, hangers and other supports shall be done by the Contractor, subject to the approval of the Owner's Representative. Labor and materials required to replace or rebuild parts cut or injured shall be furnished at the Contractor's expense, subject to the satisfaction of the Owner's Representative.

D. All openings made in fire-rated walls, floors and ceilings shall be patched by the electrical contractor in a manner maintaining the original fire rating.

3.3 COORDINATION

A. The Contractor shall coordinate the work of the different trades so that interferences between piping, equipment, structural and architectural work shall be avoided.

B. The Contractor is responsible for ensuring that all conduit sleeves are timely installed and are sealed, flashed or caulked to the satisfaction of the Owner's Representative.

3.4 HVAC EQUIPMENT WIRING AND CONTROL

In general, the Mechanical Contractor shall provide the low-voltage (less than 120 volts) control wiring from the heating, ventilation and air conditioning equipment (HVAC) to the mechanical furnished device (T-STAT, temperature control system, etc.). The electrical drawings will indicate only branch circuit power supplies to serve the HVAC equipment.

3.5 IDENTIFICATION AND LABELING

A. The Contractor shall provide and install a presentation grade one-line diagram of the electrical system in a framed plexiglass enclosure near the service entrance switchgear at a location as directed by the Owner's Representative.

B. All equipment shall have the manufacturer's nameplate permanently affixed in an obvious location.

C. Branch circuit panelboards shall contain a typed index card identifying all circuits.

D. Major pieces of equipment shall be labeled, as required by the NEC and directed by Owner's Representative, with engraved nameplates constructed of laminated phenolic. Letters shall be condensed gothic, 1/4 inch high. Nameplates shall be at least 1/16 inch thick, 3 ply, white surfaces, black core. Labels shall include equipment name, voltage and phases.

Example: Panel L1
         277/480V, 3φ

E. All junction boxes and pull boxes shall be labeled with a permanent felt tip marker, 1/4 inch wide, indicating the circuits contained within.

Example: L1 7, 9, 11

F. Permanently label device plates for all receptacles and light switches to indicate panelboard and circuit number supplying them.
G. Disconnect switches and/or starters for HVAC equipment shall not be supported by or mounted to the equipment. Provide unistrut brackets or sheet metal disconnect stands up from roof structure to support disconnects.

3.6 MISCELLANEOUS

A. Each piece of floor-mounted equipment, such as switchboards, transformers, etc., shall be set on a concrete base. Bases shall not be less than 4 inches high and shall be pinned to the floor.

B. The Contractor shall furnish and install vibration isolation means for all equipment and materials furnished under this contract which may transmit perceptible noise or vibration, structure borne or air borne, to occupied areas.

C. All transformers and other equipment indicated shall be mounted on 1-inch-thick cork rib pads and/or rubber or steel spring isolator units properly sized, spaced and loaded, as specified herein, which in turn shall rest on a 4-inch minimum concrete base.

D. Electrical conduit shall be isolated from all dry type transformers and rotating or reciprocating machinery with a minimum of 12 inches of liquidtight flexible metal conduit.

END OF SECTION 260500
SECTION 262200
DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 SECTION INCLUDES
A. Single-and three-phase dry type transformers.
B. Buck and Boost transformers.

1.2 RELATED SECTIONS
A. Section 260500, GENERAL ELECTRICAL PROVISIONS
B. Section 262700, BASIC MATERIALS AND METHODS

1.3 REFERENCES
A. ANSI/NFPA 70, National Electrical Code.
B. Underwriters’ Laboratories (UL).
C. Institute of Electrical and Electronics Engineers (IEEE).
E. National Electrical Manufacturers Association (NEMA).

1.4 SUBMITTALS
A. Submit under provisions of Section 260500.
B. Product Data: Provide nameplate data, impedance, dimensions, weight, mounting, decibel rating and connection diagrams.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
A. Cutler Hammer
2.2 DRY TYPE TRANSFORMERS

A. Electrical Ratings: Voltage, phases and kVA as shown on the drawings.

B. Insulation Systems:
   1. 30 kVA and above: Class H insulation for 220 degrees C total temperature, based on 150 degree C rise.
   2. Required performance shall be obtained without exceeding the above-indicated temperature rise in a 40 degree C maximum ambient, with a 30 degree C average ambient over 24 hours.
   3. Insulation shall be flame-retardant and shall not support combustion per ASTM Standard Test Method D635.

C. Core and Coil Assemblies:
   1. Constructed with high grade, nonaging, silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Magnetic flux densities shall be kept well below the saturation points.
   2. Coils shall be wound of electrical grade aluminum with continuous wound construction.
   3. Core and coil assembly for units rated 30 kVA and above shall be impregnated with a nonhydroscopic, thermo-setting varnish. Assembly shall be installed on vibration-absorbing pads and bolted to the base to minimize transmission.
   4. Core assembly to be grounded to the enclosure.

D. Enclosures:
   1. 30 kVA and above: Ventilated, NEMA 2, drip proof, with lifting holes.
   2. Outdoor units: Provide weather shields with rodent screens over ventilation openings.
   3. Finish: Degreased, cleaned, phosphatized, primed and finished with grey baked enamel.
   4. Enclosure temperature: Not to exceed 35 degrees C rise above a 40 degree C ambient.

E. Taps: Transformers 15 kVA and larger shall have a minimum of four 2-1/2 percent full-capacity primary taps; two above and two below normal voltage.

F. Sound Levels:
   1. 45 db for transformers 10-50 kVA.
2. 50 db for transformers 51-150 kVA.

Energy Efficiency:

1. Transformers shall be compliant with NEMA TP-1 energy efficiency requirements per EPAct 2005/CFR 10 Part 431.

G. Factory Tests:

1. Ratio tests on the rated voltage connection and on all tap connections.
2. Polarity and phase-relation tests on the rated voltage connection.
3. Applied potential tests.
4. Induced potential test.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install per manufacturer's recommendations.

B. Where floor mounted, provide 4-inch housekeeping pad in equipment rooms or areas subject to occasional moisture on the floor.

C. Provide transformer pad for outdoor locations as shown on the drawings.

D. Provide sound and vibration isolation devices under feet or contact points for transformer supports points, similar to isomode or core-form pads.

E. Connect primary and secondary wiring to transformer with flexible conduit.

F. Ensure National Electrical Code clearances on all sides.

G. Adjust transformer taps for proper secondary voltage.

END OF SECTION 262200
PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Conduit
B. Junction, pull and device boxes
C. Conductors
D. Wiring devices
E. Disconnect Switches
F. Overcurrent Devices
G. Lighting and Branch Circuit Panelboards
H. Grounding
I. Testing

1.2 RELATED SECTIONS

Section 260500 - GENERAL ELECTRICAL PROVISIONS

1.3 REFERENCES

A. National Electrical Manufacturers Association (NEMA).
B. Underwriters' Laboratories (UL).
C. American National Standards Institute (ANSI).
E. Institute of Electrical and Electronics Engineers (IEEE).

1.4 SUBMITTALS

A. Submit under provisions of Section 260500.
B. Product Data: Provide manufacturer's literature and product data on all equipment listed in Paragraph 1.01.
PART 2 - PRODUCTS

2.1 CONDUIT

A. Electrical metallic tubing (EMT) shall be galvanized on the outside and coated on the inside with a smooth hard finish of lacquer, varnish or enamel. EMT shall comply with Underwriters Laboratories (UL) Standard UL 797 and ANSI C80-3. EMT coupling and box connectors for EMT shall be of the steel compression gland type.

B. Rigid galvanized steel (RGS) conduit shall be hot-dipped, galvanized steel with zinc coating or corrosion-resistant lacquer on the inside. RGS shall comply with UL Standard UL 6 and ANSI C80-1. Fittings shall be threaded, water and concrete-tight.

C. Flexible metal conduit (FMC) shall be of hot-dipped, galvanized, interlocked, spirally wound steel strip and shall comply with ANSI/UL 1. Connectors shall be galvanized and shall be suitable for connection to the associated boxes and conduits.

D. Liquidtight flexible non-metallic conduit (LFNC) Connectors shall be listed for use with LFNC.

E. Plastic conduit for direct burial shall be rigid, heavywall, Schedule 40, polyvinyl chloride (PVC). All Schedule 40 PVC conduit shall meet the requirements of UL and shall be manufactured by Carlon or approved equal.

F. Plastic conduit for installation in concrete duct banks shall be thinwall conforming to NEMA Standard TC6 and shall be UL listed.

G. Minimum conduit size shall be 3/4 inch.

2.2 JUNCTION, PULL AND DEVICE BOXES

A. Junction and pull boxes shall be of code galvanized steel. Boxes mounted vertically on a wall shall be provided with hinged covers and catchlocks. Boxes mounted horizontally in or on the ceiling shall be furnished with screw covers. All such boxes shall conform to NEC for size and gauge of material. Junction and pull boxes shall be provided as required even if not shown on the drawings.

B. Device boxes and general purpose junction boxes shall be one-piece galvanized pressed steel knockout type with similar cover, and not less than 4 inches square. No sectional boxes will be permitted, except at single-pole switch locations with only two conductors.

C. All gang boxes for devices shall be designed specifically for the number of devices indicated.

D. Boxes for exterior devices shall be cast iron, Crouse Hinds FD, or approved equal, with gasketed covers.

2.3 CONDUCTORS

A. Conductors shall be of soft-drawn annealed copper. Conductors shall conform to federal specifications for the type of wire designated, and shall have a conductivity of not less than 98 percent of that of pure copper.

B. Minimum conductor size for power and lighting circuits shall be No. 12 AWG, unless shown otherwise on the drawings. Minimum conductor size for control and signal circuits shall be No. 14 AWG, unless shown otherwise on the drawings.

C. All conductors No. 8 AWG and larger shall be stranded. All conductors No. 10 AWG and smaller shall be solid.
D. All conductors located in dry locations shall be type THHN/THWN unless specifically designated otherwise. All conductors located in outdoor or wet locations shall be type XHHW-2.

E. All branch circuit conductors used for wiring in high temperature locations (such as boiler controls, range hoods, heating equipment, etc.) shall be type RHH heat-resistant grade.

F. Conductors shall be color coded as follows:

- 277/480V, 3 phase, 4 wire: Brown, Orange, Yellow and Gray
- 120/208V, 3 phase, 4 wire: Black, Red, Blue and White

Control circuits: Other than above

G. For phase conductors larger than No. 4 AWG, or neutral conductors No. 4 AWG or larger, colored plastic tape may be used in lieu of continuously colored conductor insulation. Each conductor shall have at least three 1-inch bands (4-inch separation) at every termination and splice.

H. Wire connectors shall be as follows:

1. Connectors for No. 8 AWG and smaller (dry locations) shall be self-insulated spiral spring screw-on connector with resilient or unbreakable plastic insulating cap. No ceramic or brittle plastic shell connectors will be approved.

2. Connectors for No. 8 AWG and smaller (damp locations) shall be compression sleeve type.

3. Connectors for No. 6 AWG and larger wires (damp or dry locations) shall be compression sleeve type.

2.4 WIRING DEVICES

A. Receptacles

1. Receptacles shall be flush, 20 amperes, 125 volts, specification grade, three wire, self or automatic grounding, duplex, and shall be Hubbell No. HBL5362-I or approved equal.

2. Ground fault receptacles shall be self testing and shall be flush, 20 amperes, 125 volts, specification grade, three wire, self or automatic grounding, duplex, and shall be Hubbell No. GF20WLA or approved equal.

3. Special purpose outlets not covered by the specifications but noted on the drawings shall be of the amperage and voltage rating indicated. The outlets shall be specification grade of the same quality, manufacturer and finish as those specified above.

4. Other approved wiring device manufactures are Bryant, P & S and Leviton.

B. Wall switches (color of switches to match existing)

1. All lighting circuits shall be supplied with 20-ampere, 120/277-volt specification grade ivory quiet type switches.
a. Single-pole switches shall be Hubbell No. 1221-1 or approved equal.
b. Three-way switches shall be Hubbell No. 1223-1 or approved equal.

2. Mullion single-pole switches shall meet all the requirements of the single-pole toggle switch.

C. Device plates and covers

1. Device plates for indoor concealed wiring shall match existing, unless otherwise shown on the drawings.
2. Device plates for mullion switches shall match the mullion as nearly as possible.
3. Device plates shall be manufactured by Hubbell, Bryant, P & S or Leviton.
4. Permanently label device plates for all receptacles and light switches to indicate panelboard and circuit number supplying them.

2.5. DISCONNECT SWITCHES

A. Provide enclosed, fusible or nonfusible switches as shown on the drawings.
B. Shall be horsepower rated and shall have quick-make and quick-break mechanisms and interlocked covers.
C. Disconnect switches shall be heavy duty type HD.
D. Switches shall be suitable for the voltage, number of phases and wires, and short circuit and load currents shown on the drawings.
E. Fusible disconnect switches shall have provisions for Class R fuses.
F. Enclosures shall be the NEMA type suitable for the environmental conditions where the switch is installed.
G. Enclosures shall be of code gauge steel (NEMA 1) or code gauge galvanized steel (NEMA 3R). Enclosures shall be treated with a rust-inhibiting phosphate and finished in gray baked enamel.
H. Disconnect switches shall be service entrance rated where required by the drawings or codes.

2.6. OVERCURRENT DEVICES

A. Fuses

1. All fuses, 600 volts and less, shall be Bussmann "Low-Peak" or approved equal, and shall meet the following:
   a. All fuses shall be manufactured by the same manufacturer. Fuses rated 1/10 to 600 amperes shall be UL Class R dual element current limiting. All dual-element fuses shall have separate overload and short-circuit elements, and shall be Bussmann type LPS RK (600V), LPN RK (250V) or approved equal.
   b. Motor circuit fuses rated 601 to 6,000 amperes shall be UL Class L, time delay, and shall be Bussmann type KRP C, or approved equal.
   c. Furnish to Owner one spare set of three of each size and type of fuse rated at more than 600 amperes, and 10 percent of each size and type of fuse rated 600 amperes or less, but in no case less than one set of three.
B. Circuit breakers

1. All circuit breakers shall be thermal magnetic, molded case, and shall have the following characteristics:
   
a. Quick-make, quick-break type.
b. "Bolt-on" type.
c. Fully rated for the available fault current as shown on the drawings. Series ratings are unacceptable.
d. Common trip type for all multipole breakers.
e. Operating handle shall visually indicate ON, OFF or TRIPPED conditions.
f. Indicate the ampacity and frame size on the breaker.
g. When used for switching light circuits, shall be marked "SWD," indicating "switch duty rated."
h. When required by equipment manufacturer, circuit breaker shall be "HACR" rated.

2. Where enclosed circuit breaker disconnects are shown on the drawings, provide an enclosure suitable for the environmental conditions where the breaker is installed.

2.7 LIGHTING AND BRANCH CIRCUIT PANELBOARDS

A. Panelboards shall have the voltage, number of phases and wires, and current ratings as shown on the drawings.

B. Panelboards shall be circuit breaker panelboards conforming to the requirements of UL 67, UL 50, NEMA No. PB1 and the NEC. Each panelboard shall be mounted in a galvanized sheet-metal cabinet with a removable front panel complete with hinged door, latch and lock. All locks shall be keyed the same and two keys shall be provided for each lock. Cabinets shall have means for securing, supporting and adjusting panelboard front. There shall be no sharp points or edges inside cabinets.

C. Bus bars shall be copper. Bus bar taps shall be arranged for sequence phasing of the branch circuit devices. Neutral bars, where specified, shall be full size, insulated from the cabinet and mounted at the opposite end of the panel from the mains. A bare, uninsulated grounding bar, brazed to the cabinet, shall be provided where indicated. Bus bars for the mains shall have pressure-type lug connections for attaching feeders unless a main protective device is indicated. Where paralleled conductors feed the panel, lugs shall be provided for each conductor. Where spaces are indicated, the bus shall have all applicable accessories provided to enable a breaker to be readily installed.

D. Branch circuit breakers shall be as specified in Paragraph 2.05 (B).

E. A directory frame and card having a transparent cover shall be furnished on each door, neatly typed to indicate loads.

F. Provide (1) ¾" spare conduit stubbed out to a readily accessible location for every 3-pole spare or space. Each panelboard 200 Amp or larger shall have at least (1) 1-1/4" spare conduit stubbed out to a readily accessible location.

G. Panelboards shall be Square D, Siemens, General Electric or Cutler Hammer,
2.8 GROUNDING

A. Grounding conductors shall be copper, stranded, soft drawn or soft annealed.

B. All equipment grounding conductors installed in conduits shall be insulated.

PART 3 - EXECUTION

3.1 GENERAL

The Contractor shall study all construction documents and shall carefully lay out all work in advance of fabrication and erection in order to meet requirements of limited spaces. Where conflicts occur, the Contractor shall meet with all involved trades and resolve the conflict prior to erection of any work in the area involved.

3.2 CONDUIT

A. Above-grade conduit

1. Conduits located indoors and not subject to physical damage shall be electrical metallic tubing (EMT).

2. Conduits located outdoors, or subject to physical damage, shall be rigid galvanized steel (RGS).

3. Flexible metallic conduit (FMC) shall be used in dry locations and liquid tight flexible metal conduit (LTFMC) shall be used in wet locations to extend conduit connections to motors, lighting fixtures, transformers, etc. The length of flexible conduit shall not exceed 24 inches. The length shall not exceed 72 inches for recessed lighting fixtures only.

4. Where to Conceal: Conduits shall be concealed in all finished parts of the building. Conduits shall be concealed in pipe chases, walls, furred spaces, topping or above ceilings unless otherwise shown. All conduits shall be routed parallel or perpendicular to the building lines. No diagonal runs will be permitted.

5. Where to Expose: Conduits may be exposed in mechanical/electrical rooms, duct and piping chases, under-floor crawl spaces, and locations shown on the drawings. All exposed conduit shall be run in the neatest, most inconspicuous manner, and parallel or perpendicular to the building lines. No exposed diagonal runs will be permitted. The Contractor shall run all conduit in a manner satisfactory to the Owner's Representative.

6. Conduits shall be securely supported to building structure at intervals of not more than 8 feet. Conduits shall be fastened in place with galvanized steel clamps or pipe straps, hangers, 3/8-inch-diameter-minimum rods or trapeze. No perforated steel tape is permitted. Supports of structural steel or manufactured framing members shall be provided with all necessary rods, anchors, clamps, spacers and bolts. Conduits above removable ceiling panels shall allow sufficient clearance for panel removal or insertion. Conduits of any size shall not be supported from ceiling hangers or light fixture hangers. Conduit shall not be supported from piping or mechanical equipment unless specifically shown on plans. Allow 7 feet of headroom clearance.

7. Fasteners for conduit supports shall be self-drilling self-tapping screws in metal; wood screws in wood; or threaded expansion anchors or inserts in masonry or concrete. Wooden, plastic or lead inserts, or power-actuated anchors, will not be acceptable.
8. Rigid galvanized steel conduit shall be made up to boxes and equipment with double locknuts and shall have insulated bushings installed. Grounding continuity shall be maintained.

9. All roof penetrations shall be properly sleeved, sealed and flashed for complete waterproofing. In lieu of the above, approved factory-fabricated watertight entrance glands shall be used.

10. In no case shall a raceway be run within 6 inches of steam or hot water pipes, breechings, flues or other high-temperature surfaces.

11. Provide sleeves in new concrete or masonry walls for passage of conduits. Waterproof all sleeves where required.

B. Below-grade conduit
   A. Nonencased, direct-buried conduits in or below slabs-on-grade, in earth, or in gravel shall be rigid, Schedule 40, polyvinyl chloride (PVC).
   B. Conduit encased in concrete shall be PVC thinwall.
   C. All offsets and ells shall be rigid galvanized steel, wrapped with tape as specified below.
   D. All conduit risers shall be rigid galvanized steel.
   E. All underground conduits shall be installed a minimum of 24 inches below grade unless shown otherwise on the drawings.
   F. Metal conduits and fittings buried underground shall be carefully wrapped with half-lapped 3M No. 51 "Scotchrap," or approved equal, vinyl tape, with wrapping extending at least 3 inches beyond the edge of any exposed metal.
   G. Where conduits are installed in slabs, conduits shall be set in position as soon as the forms are in place and in such manner as not to impair the strength of the slab. For exact locations, see architectural sections and locate as directed by Owner's Representative with respect to the reinforcing steel.
   H. Where concrete encasement is shown on the drawings, provide a minimum of 3 inches concrete envelope above, below and at sides of ductbank. Provide 2 inches of concrete between conduits. Concrete shall be 2,500 psi class concrete. For multiple rows of conduit, provide plastic spacers on maximum 10-foot centers to maintain horizontal and vertical spacing of conduits.

C. General
   1. To prevent the accumulation of water, dirt or concrete in conduit during work, conduit ends shall be sealed by use of metallic "pennies" or resilient plastic sealing caps during construction until wire is pulled. Properly cap spare and empty conduit systems, stubbed up from below grade or from below floor level, with permanent caps.
   2. Horizontal runs of conduit shall be installed to provide a natural drain for condensation without pockets or traps where moisture may collect. All conduits shall be blown out and swabbed out before pulling in wire.
3. Furnish and install a polypropylene pull cord in every empty raceway. Identify each end of pull wire with tags with complete information as to location of the other end of the wire.

4. Provide expansion couplings where conduits cross expansion joints, and where required by the NEC.

3. Junction, Pull and Device Boxes

A. Provide a standard access panel having a hinged metal door neatly fitted into a flush metal trim, where a junction box is located above hard ceilings or in finished walls. Coordinate the location and type with the Owner's Representative.

B. Verify final location of all boxes with Owner's Representative prior to rough-in.

C. Where more than one switch or device is located at the same location, multi-gang boxes and covers shall be provided.

D. Back-to-back device boxes in a wall are not permitted. Provide a minimum 12-inch-long nipple to offset boxes on opposite sides of a common wall to minimize sound transmission.

E. Provide proper throats and extension rings to ensure that device boxes are within 1/4 inch of finished wall surfaces.

F. Identify all circuits located in junction, pull and device boxes per Section 260500.

3.4 Conductors

A. All conductors shall be installed in conduit unless noted or specified otherwise.

B. Maximum branch circuit homerun lengths shall be as follows:

<table>
<thead>
<tr>
<th>Circuit Type</th>
<th>No. 12 AWG</th>
<th>No. 10 AWG</th>
<th>No. 8 AWG</th>
<th>No. 6 AWG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple 120V receptacle or lighting homerun</td>
<td>50 feet</td>
<td>100 feet</td>
<td>150 feet</td>
<td>225 feet</td>
</tr>
<tr>
<td>Dedicated 120V receptacle homerun</td>
<td>75 feet</td>
<td>150 feet</td>
<td>225 feet</td>
<td>350 feet</td>
</tr>
<tr>
<td>Multiple 277V lighting homerun</td>
<td>100 feet</td>
<td>200 feet</td>
<td>300 feet</td>
<td>500 feet</td>
</tr>
</tbody>
</table>

C. A UL-approved cable pulling compound shall be used as a lubricant where necessary. No materials which may be injurious to the wire covering or insulation shall be used.

D. Conductors pulled into a wrong raceway or cut too short for termination shall be replaced. Conductors shall not be reinstalled after removal from a raceway.

E. Mains and feeders shall run their entire length in continuous pieces without joints or splices unless otherwise shown.

F. Joints in branch circuits shall occur only where such circuits divide as shown on the plans. No splices shall be made in submersible locations.

G. Splices and taps shall not be made in any conductor except at outlet boxes, pull boxes or junction boxes. Splices shall not be made in conduit bodies.

H. All electrical conductor terminations shall be torque wrench or torque screwdriver tightened per UL and NEMA standards.
I. Where the bodies of fluorescent lighting fixtures are used as raceways for lighting branch circuits, conductors shall be securely clamped within the fixture body to positively prevent contact of the wires with the ballast case.

J. Wire connectors located in damp locations shall be wrapped with rubber and vinyl tape equal to Scotch No. 130 and Scotch No. 33 tape, followed by a coating of ScotchKote, or approved equal.

3.5 DISCONNECT SWITCHES

A. Install disconnect switches to maintain NEC clearances.

B. Install label inside each fused disconnect switch indicating the fuse type and ampere rating.

3.6 OVERCURRENT DEVICES

A. Verify proper fuse or circuit breaker size prior to installing.

B. Where circuit breakers are installed in existing panelboards, verify that breaker type and AIC ratings match the existing circuit breakers installed in the panel.

3.7 WIRING DEVICES

A. All mounting heights shown below are to centerline of devices.

B. Receptacles shall be installed 18 inches above finished floor unless otherwise shown.

C. Receptacles above counters shall be horizontally mounted at 42 inches above finished floor unless otherwise shown.

D. Receptacles shall generally be mounted vertically in box, set plumb and true with the ground pin receiver in the top position.

E. Switches shall be flush mounted 48 inches above finished floor unless otherwise noted.

F. Switches shall be mounted vertically, set plumb and true, so that toggle handle is "up" in the "ON" condition.

G. Switches that are indicated as adjacent to each other on the drawings shall be installed in a common junction box. Provide box dividers for 277-volt circuits and one-piece wall plate, ganged as required. Sectionalized device plates will not be accepted.

H. All devices installed shall be installed with 6-inch pigtails.

I. All devices shall be compatible with architectural room finishes. All devices shall be trimmed out as scheduled to the satisfaction of the Owner's Representative.

3.8 LIGHTING AND BRANCH CIRCUIT PANELBOARDS

A. Cabinets shall be set rigidly in place with fronts straight and plumb.

B. Provide type-written circuit identification card placed in door-mounted directory frame.
C. Install panelboards in areas where NEC clearances can be maintained.

D. Provide panelboard nameplates in accordance with Section 260500.

E. Panelboard mounting height shall be 6 feet to the top of trim.

3.9 GROUNDING

A. The electrical system shall be grounded in accordance with Article 250 of the NEC. All electrical equipment including conduit systems, boxes, disconnect switches, receptacles, panelboards, motors, etc. shall be grounded.

B. The service entrance groundbus shall be bonded to the building water service, building steel, ufer ground and ground rods with conductors sized per NEC Table 250-94.

C. Resistance between any point on the grounding electrode system and any object in the vicinity, including earth and floors, shall not exceed 25 ohms. Ground resistance measurements of all ground rods shall be made in normally dry weather, not less than 24 hours after rainfall. The Contractor shall submit measured ground resistance readings to the Engineer.

D. If the ground resistance exceeds 25 ohms, additional ground rods shall be installed to lower the ground resistance to below 25 ohms.

E. The ground terminal on all convenience receptacles shall be bonded to the box and to the branch circuit grounding conductor with a bonding jumper to provide good continuity back to the source.

F. Conduits which connect to boxes, cabinets or enclosures having concentric or eccentric knockouts shall be provided with bonding jumpers sized in accordance with NEC Table 250-95 connected between a grounding type bushing/locknut on the conduit and a groundbus or stud inside the enclosure.

G. Where grounding connections are made to conduits, cabinets, etc., metal surface contacts shall be cleaned so that there is a good ground connection.

H. All raceways shall contain a green insulated equipment grounding conductor sized per NEC 250-95, even if not shown on the drawings.

3.10 TESTING

A. All tests shall be satisfactorily completed and accepted before final inspection or acceptance. Provide test reports for all tests. Test reports shall be bound with O & M manuals.

B. Insulation of feeder conductors shall be tested with a 1,000-volt megger. Test each feeder conductor for a minimum acceptable ground resistance reading of 100 MEG ohms. Replace feeder conductors which do not meet the minimum reading or which differ appreciably from other feeder ground resistance readings.

C. Measure and record ground resistances in accordance with Paragraph 3.09.

D. Test each receptacle for proper phase, neutral and ground connections.
SECTION 265100
LIGHTING FIXTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

Requirements for furnishing and installing lighting fixtures as shown and scheduled on the drawings.

1.2 RELATED SECTIONS

A. Section 260500 - GENERAL ELECTRICAL PROVISIONS.
B. Section 263700 - BASIC MATERIALS AND METHODS.

1.3 REFERENCES

A. Underwriter's Laboratories (UL).
B. ANSI/NFPA 70, National Electrical Code.

1.4 SUBMITTALS AND SUBSTITUTIONS

Submit product data in accordance with Section 260500. Submittals shall include the manufacturer's name, catalog number, ballast type, type and size of lamp, and all ordering data. Should Contractor desire to substitute fixture types, the Owner's Representative may, at his option, require the Contractor to furnish an example of said fixture for examination and comparison purposes.

PART 2 - PRODUCTS

2.1 All lighting fixtures shall be furnished complete with mounting accessories to suit the specific service intended. See architectural and structural plans for ceiling and construction details where fixtures are to be mounted. Coordinate final location with architectural and mechanical features.

2.2 Fixtures shown in the schedule to be recessed shall be complete with any accessories required to fit the fixture to the ceiling construction. See architectural plans for type of ceilings. Locate fixtures in regard to ceiling patterns, unless otherwise indicated on drawings.

2.3 Fixtures scheduled to be surface mounted shall be furnished and installed employing supports, toggle bolts and any other accessories which, in the opinion of the Owner's Representative, are required to adequately support the fixtures.

2.4 Fluorescent fixtures in continuous rows shall be supplied with all fixture couplings, chase nipples and/or other accessories recommended by manufacturer for continuous row installation.

2.5 Fluorescent fixtures purchased new shall be field installed with T-5 energy-efficient rapid start lamps as manufactured by Westinghouse, General Electric or Sylvania. Lamps shall produce 2900 lumens and consume 28 watts. All fluorescent lamps shall be color corrected 3500°K.
unless otherwise indicated in fixture schedule. All fluorescent lamps shall be cool white unless otherwise indicated in fixture schedule.

2.6 Fluorescent fixtures purchased new shall be complete with energy-saving, high-power-factor electronic ballasts as manufactured by a certified ballast manufacturer, approved by ETL and guaranteed for two years. Ballasts shall be Class P rated, and shall comply with FCC limits governing EMI and RFI, encapsulated with an "A" sound rating. Complete ballast data shall be submitted. Advance and General Electric are acceptable. All fluorescent ballasts shall be provided with GLR-HLR type glass fuses. All fluorescent ballasts shall be internally fused.

2.7 Prismatic diffusers for troffer fixtures shall be acrylic with a minimum thickness of 0.125 inch.

PART 3 - EXECUTION

3.1 The Contractor shall furnish and install lighting fixtures complete with lamps for every lighting outlet scheduled on the accompanying drawings. Where a fixture type designation may have been omitted from the plans, it shall be the responsibility of the electrical bidder to contact the Owner's Representative prior to the bid opening and determine which fixture type is intended at the location in question. No allowance will be made on behalf of the Contractor who fails to comply with this requirement. In general, if fixtures are being relocated, Contractor shall ascertain the number of new fixtures to be purchased, if any.

3.2 All fixtures shall be cleaned and left free of any dirt, dust, grease, etc., at the completion of the job.

3.3 Where bodies of fluorescent fixtures are used as raceways for branch circuit wiring, the wire shall be approved for such location, 90 degrees C and carefully and securely clamped within the fixture body to positively prevent contact of the wires with the ballast case.

3.4 Contractor shall not order any fixtures until submittals are approved.

3.5 All fixtures shall be securely supported from building structure. Troffer fixtures in exposed T-bar grid shall have a ceiling hanger support at all four corners.

3.6 Contractor shall coordinate with other crafts for final location and openings for all recessed fixtures.

3.7 All exterior lighting fixtures shall be furnished complete with gaskets, cast aluminum weatherproof outlet boxes, labeled approved for damp locations, have lamp bases coated with a rust inhibitor to prevent base from corroding to the socket, and be solidly grounded.

3.8 All exterior lighting standards are to be grounded through a separately driven ground rod at the pole and through the system ground.

3.9 All fixtures shall be securely supported from the building structure. Fixtures in T-bar grid ceilings shall be supported from the structure with #12 ceiling wire at opposite corners, and shall be securely fastened to the grid. All lighting fixture installations shall comply with NEC Article 410

END OF SECTION 265100
SECTION 31 00 00
EARTHWORK

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Remove topsoil and subsoil; stockpile for later reuse.

1.1.2. Excavation for foundations, slabs-on-grade, paving, and landscaping.

1.1.3. Fill and backfilling to required elevations.

1.1.4. Consolidation and compaction.

1.1.5. Site Contouring.

1.2. PROJECT RECORD DOCUMENTS

1.2.1. Submit documents under provisions of Section 01 77 19.

1.2.2. Accurately record location of utilities remaining, rerouted utilities, new utilities by horizontal dimensions, elevations or inverts, and slope gradients.

1.3. PROTECTION

1.3.1. Protect trees, shrubs, lawns, rock outcropping, and other features remaining as portion of final landscaping.

1.3.2. Protect benchmarks, existing structures, fences, roads, sidewalks, paving and curbs.

1.3.3. Protect above or below grade utilities, which are to remain.

1.4. PUBLIC AGENCY STANDARDS

1.4.1. Perform all earthwork and related structures and devices indicated as public agency standards in accordance with the standard plans and specifications of that agency.

1.4.2. Where earthwork is constructed in public streets or rights of way, construct in accordance with the standard plans and specifications of the authority having jurisdictions and in the presence of a representative of that agency.

1.4.3. Secure and pay for all necessary permits for work performed under conditions which exist in 1.6.2 above. The Owner will pay for associated inspection fees.

1.4.4. Upon completion of the work, provide the Architect with written certification of acceptance of work by the governing agency having jurisdiction.
2. **PART 2 - PRODUCTS**

2.1. **FILL MATERIAL**

2.1.1. On-Site Fill Materials:

2.1.1.1. On site, granular, low-expansive fill material free of vegetation, organic material, debris and other deleterious material, and complying with the following criteria.

2.1.1.2. Grading:

2.1.1.2.1. Limit maximum dimension of rock to 3 inches in any dimension at all fills, unless otherwise approved by Geotechnical Engineer.

2.1.1.2.2. Limit maximum dimension of rock to 1 inch in any dimension at all fills located in landscaped areas within 12 inches of surface.

2.1.1.3. Obtain approval of the Architect of all fill materials prior to placing.

2.1.2. Import Soils

2.1.2.1. Comply with criteria specified in 2.1.1 above, and the following additional requirements.

2.1.2.2. Expansion Potential of 1.5% or less as per Geotechnical Report, RAMM Project No. 614349.

2.1.2.3. Sulphate Content: Limit to maximum 1,000 PPM and as approved by Geotechnical Engineer.

2.1.2.4. Electrical Resistivity: Minimum value in excess of 2,000 ohm cm when saturated with distilled water or soil resistivity box procedure per ASTM G 57.

2.1.2.5. Agricultural Suitability: Obtain approval of Architect of all fill materials used in landscaped areas prior to placing, including providing soil test/analysis results.

2.1.2.6. Obtain approval of Architect of all imported fill materials prior to delivery on site.

2.1.3. Topsoil: Defined as the upper 4 inches of on-site material, after completion of clearing operations.

2.1.4. Concrete: Lean concrete, with a compressive strength of 1000 psi.
2.2. PERMEABLE FILL MATERIAL

2.2.1. Permeable Backfill at Retaining Walls:

2.2.1.1. Characteristics: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, or organic matter.

2.2.1.2. Graded within the following limits:

<table>
<thead>
<tr>
<th>SIEVE SIZE</th>
<th>PERCENT PASSING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>100</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>90 to 100</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>40 to 100</td>
</tr>
<tr>
<td>No. 4</td>
<td>25 to 40</td>
</tr>
<tr>
<td>No. 8</td>
<td>18 to 33</td>
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<tr>
<td>No. 30</td>
<td>5 to 15</td>
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<tr>
<td>No. 50</td>
<td>0 to 7</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 to 3</td>
</tr>
</tbody>
</table>

2.2.1.3. Provide material with sand equivalent exceeding 75.

2.3. DESIGN CRITERIA

2.3.1. General

2.3.1.1. All public improvements shall be constructed per the referenced standards, the improvement drawings, and as specified in this section.

2.3.1.2. Where criteria shown on drawings or specified in this specification exceed that of the referenced standards, the more stringent criteria shall apply.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to work of this section, carefully inspect previously installed work. Verify all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that work of this section may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.2.1. Verify that survey benchmark and intended elevations for the Work are as indicated.

3.1.1.2.2. Identify required lines, levels, contours, and datum.

3.1.1.2.3. Identify known utilities. Stake and flag locations.
3.1.1.2.4. Maintain and protect existing utilities remaining which pass through work area.

3.1.1.2.5. Verify fill materials to be reused are acceptable.

3.1.1.2.6. Prior to placement of fill material, verify scarification and compaction of excavated surface is complete.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.1.2. Preparation

3.1.2.1. Provide all staking and field engineering required to implement the work as shown on the drawings.

3.1.2.2. Protect all stakes and benchmarks. Replace all stakes and benchmarks damaged during the course of construction at no cost to Owner.

3.1.2.3. Set grade stakes using instrument technology, at 50 foot grid interval at areas with gradients greater than 2 percent.

3.1.2.4. Set grade stakes, using instrument technology, at 25 foot grid interval at areas with gradients less than 2 percent.

3.1.2.5. Provide all equipment of such type, function and design as required to achieve specified values. Where necessary, provide rubber tired and vibratory sheepsfoot compaction equipment.

3.1.3. When the Architect determines existing soils in excavated areas do not provide sufficient bearing capacity or are otherwise unacceptable, remove such soils as necessary to expose soils with adequate capacity and characteristics, as approved by the Architect.

3.2. TOPSOIL EXCAVATION

3.2.1. After completion of clearing and grubbing, remove existing topsoil in excavated areas of work and where fill is to be placed on existing grade. Remove topsoil to depth of 4 inches. Stockpile on site for spreading at landscaped areas.

3.2.2. Stockpile topsoil to depth not exceeding 4 feet with 1:2 slope banks. Cover and protect from erosion.

3.3. SUBSOIL EXCAVATION

3.3.1. Excavate soil in work areas under this contract as specified in this Section.

3.3.1.1. Stockpile excavated material for reuse. Segregate material complying with specified criteria as suitable for re-use as compacted fill.

3.3.1.2. After completion of grading, remove unsuitable and excess soils from site in conformance with the regulations of jurisdictional authority.
3.3.2. Excavate subsoil required to accommodate building foundation, slabs-on-grade, paving, landscaped areas, site contouring and site structures.

3.3.2.1. Excavate as required to accommodate spreading of previously removed topsoil in upper 4 inches.

3.3.3. Grade top perimeter of excavation to prevent surface water from draining into, or eroding excavation.

3.3.4. Grade surfaces to provide positive drainage and prevent water ponding, prevent drainage onto adjoining properties and to implement the work.

3.3.4.1. Provide all field engineering and layout to construct work as shown on drawings, including establishing final grades, slope transitions, drainage paths and swales, and related engineering work.

3.3.4.2. Construct all drainage courses, swales, toes and tops of slopes, and related earthwork operations necessary to maintaining drainage and access as shown on drawings or required by jurisdictional authority.

3.3.4.3. Conform to Storm Water Pollution Protection Plan procedures and methods as shown on current SWPPP. Update plan as required.

3.3.4.4. Excavate areas as follows:

3.3.4.4.1. Strip the site of all existing fill zones, any backfill zones and unstable soils. Strip a minimum of 5 feet beyond edge of structure.

3.3.4.5. Asphalt and Concrete Paving Areas.

3.3.4.5.1. Strip this site of all existing fill zones, any backfill zones and unstable soils.

3.3.4.5.2. Excavate a minimum of two feet beyond paving edge.

3.3.4.6. Utilize excavation methods adjacent to existing structures that prevent the loss of material from beneath foundations, including concrete underpinning where required.

3.3.4.7. Rock Considerations:

3.3.4.7.1. Remove all rock of any kind, including material requiring removal by use of heavy earthwork equipment, hydro-hammers, or blasting within upper five feet of finished or existing grade, whichever is lower.

3.3.4.7.2. A contract adjustment will be made for removal of rock below five foot depth.

3.3.4.8. Prior to scarification and compaction, obtain Soils Testing Lab review and acceptance of excavated surface, and remove additional materials as required.
3.4. COMPACTION OF EXCAVATED SURFACES

3.4.1. Prepare areas in structures, exterior slabs and areas which will contain fill and backfill materials, Portland cement or asphaltic concrete paving as follows:

3.4.1.1. Scarify subgrade to a depth of 10 inches.

3.4.1.2. Water, mix and aerate as necessary to moisture condition in the range of optimum slab areas to 3 percent above optimum moisture content.

3.4.1.3. Compact to a relative compaction of 90 percent based on ASTM D 698.

3.4.1.4. Compact to a relative compaction of 95 percent at paving areas based on ASTM D 698.

3.4.2. Prepare areas designated to receive landscaping or playground surfacing as follows:

3.4.2.1. Scarify subgrade to a depth of 6 inches.

3.4.2.2. Water, mix and aerate as necessary to moisture condition within 1 percent minimum to 3 percent maximum optimum moisture content.

3.4.2.3. Compact to a relative compaction of 90 percent based on ASTM D 698.

3.4.3. Prepare areas designated to receive track fill and field event surfaces as follows:

3.4.3.1. Scarify subgrade to a depth of 6 inches.

3.4.3.2. Water, mix and aerate as necessary to moisture condition within 1 percent minimum to 3 percent maximum optimum moisture content.

3.4.3.3. Compact to a relative compaction of 95 percent based on ASTM D 698.

3.5. FILL PLACEMENT

3.5.1. Place fill with specified materials at locations as scheduled below.

3.5.1.1. Provide all cribbing, shoring, and sheathing required to perform work. Comply with all applicable regulations for design, installation, maintenance and removal of such construction products, including obtaining any required permits.

3.5.2. Do not place fill over porous, wet, or spongy subgrade.

3.5.3. Systematically backfill to allow maximum time for natural settlement.

3.5.4. Use equipment and procedures outlined in Green Book Section 300-4// and as specified. Green Book Section 300-4.9 is not applicable.

3.5.4.1. Place and compact materials in continuous layers not exceeding 6 inches compacted depth using methods which do not disturb or damage foundations, perimeter drainage and waterproofing systems, or utilities in trenches.
3.5.4.2. Compact all fill material as scheduled in this Section per ASTM D 698 at the same moisture contents list in 3.4.1.2.

3.5.4.3. Overfill all slope banks and compact. After compaction, trim to grade and contour as shown on drawings.

3.5.5. Where occurs, place fill concurrently on both sides of foundation elements in maximum 6 inch compacted layers. Compact to 90 percent of maximum density per ASTM D 698 with mechanical tampers per Article 3.3.4 above.

3.5.6. Compaction by flooding or jetting is prohibited.

3.5.7. Slope grade as shown on drawings.

3.5.8. Make grade changes gradual, blending slope into level areas. After completion of grading operation, proof roll earthwork areas. Repair low or spongy spots developed during rolling operation.

3.5.9. Extend compacted fill to design surfaces of slopes and compact surface.

3.5.10. Remove all excess soils and dispose off site in a legal manner.

3.5.11. Provide all fill material required to achieve grades, slopes and contours as shown on drawings at no additional expense to Owner.

3.5.12. Provide dust control as required per this section. Conform to Storm Water Pollution Protection Plan procedures and methods as shown on current SWPPP. Update plan as required.

3.6. FIELD QUALITY CONTROL

3.6.1. Field inspection will be performed under provisions of Section 01 45 29.

3.6.2. Soils testing lab shall verify the suitability of soil materials.

3.6.3. Field inspection and testing will be performed under provisions of Section 01 45 29, and conducted by the Owners Geotechnical Engineer.

3.6.4. Perform earthwork under the continuous observation of the Owner's Soils Testing Lab. Earthwork fill operations shall comply with the requirements of Part 2, Title 24, CCR.

3.6.5. Tests and analysis of fill material will be performed in accordance with ASTM D698.

3.6.5.1. The Soils Testing Lab will review and approve all fill materials, including on-site materials and imported materials.

3.6.5.2. The Soils Testing Lab will submit reports to the Architect, comparing results of testing with the requirements of this section and documenting location and scope of tested materials.

3.6.6. Compaction testing will be performed in accordance with ASTM D1556 or other referenced methods.
3.6.7. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.7. TOLERANCES

3.7.1. Final elevations shall comply with grades as shown on drawings.

3.7.2. Not more than one point within any 50 x 50 foot area shall exceed required elevations, measured to a tolerance of plus or minus 0.1 feet.

3.8. PROTECTION

3.8.1. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

3.8.2. Protect finished Work.

3.8.3. Re-compact fills subjected to vehicular traffic.

3.9. DUST CONTROL

3.9.1. Provide for dust control.

3.9.2. Maintain all streets and public ways free of dust and mud as directed by local jurisdictional authority, including use of wash down and street sweeper equipment.

3.10. FILL SCHEDULE

3.10.1. Structures.

3.10.1.1. Place approved fill material, placed to depth as necessary to achieve required subgrade elevations.

3.10.1.2. Compact as per 3.4.1.2.

3.10.2. Site Contouring:

3.10.2.1. Place fill materials as required to achieve site grades and profiles as shown on drawings and as required for drainage.

3.10.2.2. In landscaped areas, place stockpiled topsoil as the final 4 inches of fill.

3.10.2.3. Compact to 90 percent relative compaction.

3.10.3. Paving Areas.

3.10.3.1. Place approved fill material, placed to depth as necessary to achieve required subgrade elevations.

3.10.3.2. Compact per 3.5.4.
3.10.4. Fill to Correct Over-excavation:

3.10.4.1. Concrete as specified or fill material as directed by, and at the discretion of, the Geotechnical Engineer.

END OF SECTION
SECTION 31 31 16
TERMITE CONTROL

1. PART 1 - GENERAL

1.1. SECTION INCLUDES

1.1.1. Soil treatment for termite control below grade and at interior and exterior foundation perimeter.

1.2. REFERENCES

1.2.1. EPA - Environmental Protection Agency - Federal Insecticide, Fungicide and Rodenticide Act.

1.3. SUBMITTALS

1.3.1. Submit under provisions of Section 01 33 00.

1.3.2. Product Data: Indicate each toxicant to be used, composition by percentage, dilution schedule, intended application rate.

1.3.3. Pesticide Use Report: Prior to application, prepare draft pesticide use report on forms as required by District. Coordinate format and schedule with District staff. Following completion of application, provide final form.

1.3.4. Provide certificate of compliance from authority having jurisdiction indicating approval of toxicants.

1.3.5. Manufacturer's Installation Instructions: Indicate caution requirements.

1.4. PROJECT RECORD DOCUMENTS

1.4.1. Submit under provisions of Section 01 77 19.

1.4.2. Accurately record moisture content of soil before application, date and rate of application, areas of application, diary of meter readings and corresponding soil coverage.

1.5. MAINTENANCE DATA

1.5.1. Submit under provisions of Section 01 77 19.

1.5.2. Maintenance Data: Indicate retreatment schedule.

1.6. QUALIFICATIONS

1.6.1. Applicator: Company specializing in performing the work of this Section with minimum 10 years documented experience approved by manufacturer and licensed by the State of Arizona.
1.7. SEQUENCING

1.7.1. Apply toxicant immediately prior to installation of sand cushion under slabs-on-grade and not more than 12 hours prior to installation of vapor barrier under slabs-on-grade. At outside perimeter of foundations, apply after finish grading work.

1.8. WARRANTY

1.8.1. Provide five year warranty under provisions of Section 01 77 19.

1.8.2. Warranty: Include coverage for damage and repairs to building and building contents caused by termites. Repair damage. Retreat where required.

1.8.3. Inspect and report annually to Owner in writing.

2. PART 2 - PRODUCTS

2.1. MATERIALS

2.1.1. Toxicant Chemical: Generic chemical, EPA and Local authority approved; synthetically color dyed to permit visual identification of treated soil.

2.1.2. Diluent: Recommended by toxicant manufacturer.

2.2. MIX

2.2.1. Mix toxicant to manufacturer's instructions.

2.3. OTHER MATERIALS

2.3.1. Provide all other materials, not specifically described but required for complete and proper installation of this work, as selected by the contractor and subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. SURFACE CONDITIONS

3.1.1. Inspection

3.1.1.1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

3.1.1.2. Verify that concrete pavement may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards.

3.1.1.3. In the event of discrepancy, immediately notify the Architect.

3.1.1.4. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3.2.  APPLICATION

3.2.1.  Spray apply and inject toxicant in accordance with manufacturer's instructions and per referenced regulations.

3.2.2.  Apply toxicant at locations indicated in Schedule at end of Section.

3.2.3.  Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

3.2.4.  Retreat disturbed treated soil with same toxicant as original treatment.

3.2.5.  If inspection or testing identifies the presence of termites, retreat soil and retest.

3.3.  PROTECTION OF FINISHED WORK

3.3.1.  Protect finished Work under provisions of Section 01 50 00.

3.3.2.  Do not permit soil grading over treated work.

3.4.  SCHEDULES

3.4.1.  Locations:

3.4.1.1.  Under Slabs-on-Grade.

3.4.1.2.  Crawl Spaces.

3.4.1.3.  Exterior Side of Foundation Surface.

3.4.1.4.  Soil Within 5 feet of Building Perimeter for a Depth of 2 feet.

END OF SECTION
ALL CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH:

1. 2012 INTERNATIONAL BUILDING CODE AND LOCAL AMENDMENTS
2. 2012 INTERNATIONAL MECHANICAL CODE AND LOCAL AMENDMENTS
3. 2012 INTERNATIONAL PLUMBING CODE AND LOCAL AMENDMENTS

WHERE CODES CONFLICT, THE MORE STRINGENT SHALL APPLY.

CONTRACT DOCUMENTS TAKE PRECEDENCE.

ALL WORK AND MATERIALS SHALL BE IN FULL ACCORDANCE WITH THE REQUIREMENTS OF THESE CODES AND ALL APPROPRIATE LOCAL, STATE, AND FEDERAL CODES.

CODES, REGULATIONS AND ORDINANCES, CONTRACT DOCUMENTS TAKE PRECEDENCE.

THE MORE STRINGENT CODES SHALL APPLY.
1. **ALL INTERIOR FINISHES SHALL CONFORM TO THE REQUIREMENTS OF IBC CHAPTER 8.** ALL EXCEED 450, AND SHALL HAVE A CLASS I OR II FLAME SPREAD CLASSIFICATION. WALLS SHALL HAVE A FLAME-SPREAD RATING NOT TO EXCEED 25 AND A SMOKE DENSITY NOT TO

2. PIPING, THROUGH FIRE RATED WALL, FLOOR AND CEILING ASSEMBLIES SHALL BE TIGHTLY AND SOLIDLY SEALED WITH FIRESTOPPING COMPLYING WITH THE PROJECT MANUAL. WHERE ITEM

3. **NOTIFICATION OF ALL DISCREPANCIES OR CONFLICTS. DO NOT REQUIRED CORRECTIVE ACTION.**

4. **REVIEW THE ARCHITECTURAL DRAWINGS BEFORE THE INSTALLATION OF SYSTEMS SHOWN**

5. **PROVIDE AN APPROPRIATE NUMBER OF PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT**

6. **IN COORDINATION WITH THE COLLEGE REPRESENTATIVE AND CONFORMING TO THIS DETAIL OR NOTE TO EVERY LIKE CONDITION, WHETHER OR NOT THE REFERENCE IS REPEATED IN EVERY INSTANCE. VERIFY DIMENSIONS AND ORIENTATION ON PLANS.**

7. **PROVIDE TEMPORARY PASSAGES AS REQUIRED. PRIOR TO DELIVERY OF MATERIALS TO**

8. **PUBLIC ACCESS TO THE BUILDING FROM THE CONSTRUCTION DOCUMENTS. CONTRACTOR/VENDOR SHALL MAINTAIN A CLEAN UNDAMAGED SET OF CONSTRUCTION DOCUMENTS AND**

9. **ALL SALVAGED MATERIAL, I.E. SCRAP METAL, IS TO REMAIN ON PCC PREMISES FOR THE**

10. **PRIOR TO THE START OF WORK, THE CONTRACTOR MUST PROVIDE AN**

11. **ASBESTOS MEASUREMENTS TO DETERMINE THE PRESENCE OF ASBESTOS IN ANY OF THE MATERIALS THAT ARE BEING DISTURBED, PLEASE CONTACT PCC ENVIRONMENTAL**

12. **ABATEMENTS WILL BE CONDUCTED BY PCC.**

13. **NOTICE MUST BE PROVIDED PRIOR TO WORK. PLEASE CONTACT THE COLLEGE REPRESENTATIVE FOR THIS PROJECT OF PCC EH&S.**

14. **CONTRACTORS ARE TO MAINTAIN A COPY OF THIS SPECIFICATION.**

15. **PCC ENVIRONMENTAL HEALTH AND SAFETY WILL BE NOTIFIED OF ALL HOT WORK. THIS IS**

16. **SOLID VISION BARRICADES AROUND LOCATION WHERE WELDING IS BEING PERFORMED.**

17. **FOR CONTINUOUS INSPECTION, TESTING, AND OBSERVATION REQUIREMENTS, REFER TO THE**

18. **PERFORM ALL CUTTING, PATCHING, AND FINISHING NECESSARY TO RESTORE THE OWNER.**

19. **TAKE ALL MEASURES TO ACCOMPLISH THE WORK WITH THE MINIMUM OF INTERRUPTION**

20. **TRANSPORTATION FACILITIES, DEPARTMENT OF TRANSPORTATION, OR PCC DISTRICT FACILITIES PLANNING REPRESENTATIVE.**

21. **COMPLETE THE WORK AND BACK CHARGE THE CONTRACTOR.**

22. **THIS DETAIL OR NOTE TO EVERY LIKE CONDITION, WHETHER OR NOT THE REFERENCE IS REPEATED IN EVERY INSTANCE. VERIFY DIMENSIONS AND ORIENTATION ON PLANS.**

23. **THIS DETAIL OR NOTE TO EVERY LIKE CONDITION, WHETHER OR NOT THE REFERENCE IS REPEATED IN EVERY INSTANCE. VERIFY DIMENSIONS AND ORIENTATION ON PLANS.**

24. **THIS DETAIL OR NOTE TO EVERY LIKE CONDITION, WHETHER OR NOT THE REFERENCE IS REPEATED IN EVERY INSTANCE. VERIFY DIMENSIONS AND ORIENTATION ON PLANS.**

25. **CONTRACTOR SHALL INSURE ALL CONSTRUCTION SHALL REMAIN ACCESSIBLE AND FOR CONTINUOUS INSPECTION, TESTING, AND OBSERVATION REQUIREMENTS, REFER TO THE**

26. **THIS DETAIL OR NOTE TO EVERY LIKE CONDITION, WHETHER OR NOT THE REFERENCE IS REPEATED IN EVERY INSTANCE. VERIFY DIMENSIONS AND ORIENTATION ON PLANS.**

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31. **THIS DETAIL OR NOTE TO EVERY LIKE CONDITION, WHETHER OR NOT THE REFERENCE IS REPEATED IN EVERY INSTANCE. VERIFY DIMENSIONS AND ORIENTATION ON PLANS.**
1. SPECIAL INSPECTIONS SHALL BE PERFORMED AS REQUIRED BY AND IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE (IBC) CHAPTER 17.

2. SCHEDULE OF STRUCTURAL CONCRETE 28-DAY DESIGN STRENGTHS:

3. OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE PROJECT SHALL BE RESOLVED BY THE REGISTERED ENGINEER IN THE STATE OF ARIZONA.

4. PROVIDE PRECIPITATION FILTERS FOR PLUMBING AND ELECTRICAL OPENINGS IN CONCRETE BEFORE PLACING. DO NOT CUT ANY REINFORCING WHICH IS SHOWN ON THE DRAWINGS.

5. CLEAR COVER OF CONCRETE OVER REINFORCING BARS SHALL BE IN COMPLIANCE WITH THE SPECIFICATIONS.

6. IDENTIFY, LOCATE AND MAINTAIN EXISTING UTILITIES AND PROTECT THEM FROM FUMES AND NOISE.

7. REMOVE ANY ELEMENT THAT HAS NOT BEEN REMOVED.

8. REINFORCEMENT SHOULDN'T BE PLACED AT THE SAME EFFECTIVE DEPTH U.N.O. REINFORCING BARS MARKED "CONT." OR WITH LENGTH NOT SHOWN SHALL BE FULLY CONTINUOUS AND SPLICED ONLY AS SHOWN.

9. ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION FOR LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC.

10. ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING DEMOLITION.

11. THE CONTRACTOR SHALL CONFIRM THE HIGHWAY DEPARTMENT, ROAD COMMISSION, OR OTHER AUTHORITY ISSUING THE SPECIAL INSPECTION REQUIREMENTS WITHIN 15 WORK DAYS AFTER THE DATE OF PRELIMINARY REVIEW.

12. THE SPECIAL INSPECTOR IS AUTHORIZED TO STOP WORK OR REFER THE CONTRACTOR TO THE APPROVED PLANS AND SPECIFICATIONS AND THE APPLICABLE PROVISIONS OF THE CODE. THE BUILDING MEETS COMPACTION REQUIREMENTS.

13. PATCH AND REPAIR FLOOR AND WALL SURFACES IN THE NEW SPACE.

14. DISPOSAL: PROMPTLY DISPOSE OF DEMOLISHED MATERIALS. DO NOT STACK OR HEAP THE MATERIALS.

15. PROVIDE FOR DESIGN, PERMITS AND INSTALLATION OF SUCH BRACING.

16. CONSULT WITH THE BUILDING OFFICIAL FOR MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING DEMOLITION.
ROOF FRAMING PLAN

1/4" = 1'-0"
SECTION THREE
BID FORM

Date ________________________________

Bid of ________________________________________________________________,
(Name)
a corporation organized and existing under the laws of the State of ______________ ; a
partnership consisting of ________________________________________; an individual trading as
______________________________________________________________.
(Name)

PROJECT:  East Campus Art Department Expansion (E5 Overhang Project)

TO:  Pima County Community College District, hereinafter called the “Owner”

1. In compliance with your Notice Inviting Sealed Bids and Instructions to Bidders, the
undersigned hereby offers to furnish the materials and perform the work for the Owner's Project
designated above, in strict accordance with the Specifications, Schedules, Drawings, and all other
pertinent Contract Documents, and agrees, upon written notice of acceptance of this Bid at any time
within forty-five (45) days after the date of opening of the bids, that he will execute the Contract in
accordance with the Bid as accepted, and give bond, as sufficient surety, in the amount of one hundred
percent (100%) of the Contract Amount, within five (5) days after the Contract Documents are presented
for signature, for the following sums:

Base Bid - ______________________________________________________________
($______________).

Alternate No. 1 (Add)(Deduct) - ___________________________________________
($______________).

Alternate No. 2 (Add)(Deduct) - ___________________________________________
($______________).

2. Enclosed is bid security as required consisting of ________________________ in the
amount of ____________________________________________________ ($_____________). (Not less
than ten percent (10%) of the proposed Contract Amount, including all additive alternates.)

3. It is understood and agreed that the work under the Contract Documents shall be
commenced by the undersigned Bidder, if awarded the Contract for the Project, on the date specified as
the Start Date in the Notice to Proceed issued by the Owner in the manner specified in the Contract and
General Conditions, and shall be completed by the Contractor within ______________________ (____)
consecutive calendar days. If the work is not completed by that date, then the undersigned Bidder shall
pay Owner the amount of Two Hundred ($200.00) as liquidated damages for each calendar day after
expiration of the Contract Time that the work remains incomplete. An Early Completion Bonus shall be
paid to the Contractor at the rate of Two Hundred Dollars ($200.00) per calendar day the work is
Substantially Complete in advance of the expiration of the Contract time up to a maximum of Two Thousand Dollars ($2,000.00). For purposes of the Early Completion Bonus, the Contract Time(s) shall not be extended or changed for any reason.

4. The undersigned Bidder hereby acknowledges receipt of the following Addenda, if any:

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<th>Addendum No.</th>
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5. The undersigned Bidder understands that the Owner reserves the right to reject any or all Bids or to waive any formality or technicality, and to accept Alternates in any order or combination, and to determine the low bidder on the basis of the sum of the Base Bid and the Alternates selected, as determined by the Owner in its sole discretion, in any Bid in the interest of the Owner.

6. The undersigned Bidder hereby certifies and affirms that this Bid is genuine and not a sham or collusive, nor made in the interest or behalf of any person not herein named, and that the undersigned Bidder has not directly or indirectly induced or solicited any other Bidder to put in a sham bid, or any other person, firm, or corporation to refrain from bidding, and that the Bidder has not in any manner sought by collusion to secure for itself an advantage over any other Bidder.

7. The undersigned Bidder hereby discloses the name of any officer, director or agent who is also an employee of the College or any of its agencies. Further, that it has disclosed the name of any College employee who owns, directly or indirectly, an interest in the vendor or any of its branches. (Attach List)

8. Contractor's Arizona Contractor's License No(s). ________________________.

   ____________________________________________
   (Official Name of Firm)

   SEAL - If Bidder is a Corporation
   By _______________________________________
   Title ____________________________________

   (Complete Business Address)
SECTION FOUR
LIST OF SUBCONTRACTORS
(To be filled out and submitted in separate sealed envelopes as a part of the Bid.)

OWNER’S PROJECT:  East Campus Art Department Expansion (E5 Overhang Project)

In compliance with Paragraph 2 of the Instructions to Bidders, the undersigned submits the following names of Subcontractors to be used in performing the work for the Project.

Contractor must indicate any changes in the subcontractor list that would result from acceptance by the Owner of any combination of alternates by identifying the substitute Subcontractor to be used, along with the number of the alternate that would result in such substitution. No substitutions or deviations from this list shall be permitted without written consent of the Owner. If required, the Contractor shall supply each subcontractor’s License Type and Number to the owner within 24 hours of such request.

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<tr>
<th>SUBCONTRACTORS OR MATERIAL VENDOR’S WORK</th>
<th>SUBCONTRACTOR’S NAME</th>
<th>LICENCE NUMBER AND TYPE (TO BE SUPPLIED WITHIN 24 HOURS IF REQUESTED)</th>
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<td>Excavation – Grading</td>
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<td>Roofing</td>
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<td>Plumbing</td>
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<td>HVAC</td>
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<td>Electrical</td>
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<td>Fire Sprinkler System</td>
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<tr>
<td>Fire Alarm System</td>
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**SUBMITTED BY:**

______________________________________
Contractor

By___________________________________
Title_________________________________
Date_________________________________
SECTION FIVE

FORMS ATTACHED

• BID BOND
• PAYMENT BOND
• PERFORMANCE BOND
• BIDDER’S INFORMATION
• CONTRACTOR’S AFFIDAVIT OF RELEASE OF LIENS
• FEDERAL DEBARRED LIST CERTIFICATION
• AFFIDAVIT OF NON COLLUSION
BID BOND

PURSUANT TO NOTICE INVITING SEALED BIDS

(Value of this bond
must be not less than 10% of the bid amount)

KNOW ALL PERSONS BY THESE PRESENTS:

THAT, ___________________________________________ (hereinafter called the "Principal"), as Principal, and ___________________________________________, a corporation organized and existing under the laws of the State of _____________, with its principal office in the City of _____________ (hereinafter called the Surety"), as Surety, are held and firmly bound unto Pima County Community College District (hereinafter called the ("Obligee") in the amount of _________________________ Dollars ($_____________), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a contract with the Obligee in accordance with the terms of the bid and give the bonds and certificates of insurance as specified in the standard specifications with good and sufficient surety for the faithful performance of the contract and for the prompt payment of labor and materials furnished in the prosecution of the contract, or in the event of the failure of the Principal to enter into the contract and give the bonds and certificates of insurance, if the Principal pays the Obligee the difference not to exceed the penalty of the bond between the amount specified in the bid and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by the bid, then this obligation is void. Otherwise, it remains in full force and effect; provided, however, that this bond is executed pursuant to the provisions of Ariz. Admin. Code Rule R7-2-1111, and all liabilities on this bond shall be determined in accordance with the provisions of the section to the extent as if it were copied at length herein.

The prevailing party in a suit on this bond shall recover as a part of his judgment such reasonable attorneys' fees as may be fixed by a judge of the Court.

Witness our hands this ____ day of _________________, 201__.

_______________________________________
PRINCIPAL         Seal

__________________________________________
By_________________________________
Agency Address    SURETY      Seal

__________________________________________
Agency Address    AGENCY OF RECORD     Seal

__________________________________________
By_________________________________
Title____________________________

__________________________________________
By_________________________________
Title____________________________
PAYMENT BOND

(Value of this bond must be 100% of the Contract Amount)

KNOW ALL PERSONS BY THESE PRESENTS:

That, ____________________________________________, a corporation organized and existing under the laws of the State of ____________, with its principal office in the City of __________________ (hereinafter called the "Surety"), as Surety, are held and firmly bound unto Pima County Community College District, Pima County, Arizona (hereinafter called the "Obligee"), for the amount of ________________________________ Dollars ($____________________) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, entitled Contract and General Conditions Between Owner and Contractor, dated the ____ day of ________________, 201__, to construct and complete certain work described as ____________________________________________, which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the condition of this obligation is such that if the Principal promptly pays all monies due to all persons supplying labor or materials to the Principal or the Principal's subcontractors in the prosecution of the work provided for in the Contract, this obligation is void. Otherwise it remains in full force and effect.

Provided, however, that this bond is executed pursuant to the provisions of Arizona Administrative Code Rule R7-2-1112, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of said Rule, to the extent as if it were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the Court.

Witness our hands this ____ day of _________________, 201__.

PRINCIPAL

By_________________________________  Seal

Title__________________________________

AGENCY OF RECORD

By_________________________________  Seal

Title__________________________________

Agency Address

SURETY

By_________________________________  Seal

Title__________________________________
PERFORMANCE BOND

(Value of this bond must be 100% of the Contract Amount)

KNOW ALL PERSONS BY THESE PRESENTS:

That, ___________________________________________________________ (hereinafter called the "Principal"), as Principal, and ________________________________________, a corporation organized and existing under the laws of the State of ____________, with its principal office in the City of ________________ (hereinafter called the "Surety"), as Surety, are held and firmly bound unto Pima County Community College District, Pima County, Arizona (hereinafter called the "Obligee"), for the amount of ___________________________ Dollars ($____________________) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, entitled Contract and General Conditions Between Owner and Contractor, dated the ____ day of ________________, 201___ ("Contract"), to construct and complete certain work described as ____________________________________________, which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the condition of this obligation is such that if the Principal faithfully performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of the Contract during the original term of the Contract and any extension of the Contract, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and also performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of all duly authorized modifications of the Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, the above obligation is void. Otherwise, it remains in full force and effect.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the Court.

Witness our hands this ____ day of _________________, 201__.

_______________________________________
PRINCIPAL      Seal

By_____________________________________
Title____________________________

AGENCY OF RECORD
________________________________________
Agency Address

_______________________________________
SURETY       Seal

By_____________________________________
Title____________________________
BIDDER'S INFORMATION

Bidder shall state if this Proposal is submitted by an Individual, Partnership, or Corporation.

________________________________________________________________

1. IF PARTNERSHIP, list names of all partners:

________________________________________________________________

________________________________________________________________

2. IF CORPORATION, give name of State in which corporation is registered:

________________________________________________________________

Provide the names of the following Corporation officers:

President ______________________________________________

Secretary ______________________________________________

Treasurer ______________________________________________

3. If LICENSED CONTRACTOR, provide all contractor's license number(s) applicable to this Proposal:

_______________________________  __________________________

_______________________________  __________________________

_______________________________  __________________________

_______________________________  __________________________

4. Provide name of bonding company: ________________________________

Total bonding capacity: $_______________________

5. Name of Firm___________________________________________________

6. Telephone: ___________________ Fax: ___________________________
TO
Pima County Community College District
District Purchasing Services
4905D East Broadway, Room 113
Tucson, Arizona 85709-1420

PROJECT:
(Name, Address)

State of:
County of:

The undersigned, pursuant to Article _________ of the General Conditions of the Contract for Construction, hereby certifies that to the best of his knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS: (If none, write "None")

CONTRACTOR:

Attachments

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

By:

Subscribed and Sworn to before me on this ______ day of ________ 201__.

Notary Public:

My Commission expires: _____ / _____ / _____

(Signature)

If by a Corporation:
(Seal)
FEDERAL DEBARRED LIST CERTIFICATION

Certification Regarding Debarment, Suspension, Proposed Debarment, and Other Responsibility Matters (Dec 2001)

___________________  
(Date)

District Finance Office – Purchasing  
Pima Community College  
4905 E Broadway Blvd.  
Tucson, AZ 85709

In accordance with the Federal Acquisition Regulation, 52-209-5:

(a) (1) The Offeror certifies, to the best of its knowledge and belief, that-

(i) The Offeror and/or any of its Principals-

(A) (check one) Are ( ) or are not ( ) presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency; (The debarred list (List of Parties Excluded from Federal Procurement and Nonprocurement Programs) is at http://epls.arnet.gov on the Web)

(B) (check one) Have ( ) or have not ( ), within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract, violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion; or receiving stolen property; and

(C) (check one) Are ( ) or are not ( ) presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) The Offeror (check one) has ( ) or (has not ( ), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) “Principals”, for the purposes of this certification, means officers; directors’ owners’ partners’ and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager, head of a subsidiary, division, or business segment, and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.
(a) The Offeror shall provide immediate written notice to the Contracting Officer, if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(b) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(c) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(d) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(Firm) _____________________________________
(Mailing Address)

(email address) (Phone)

(Signature) (Fax)

(Print Name) (Federal Taxpayer ID Number)

(Print Title)
STATE OF: )
COUNTY OF: ) ss

(Name of Individual)
being first duly sworn upon oath deposes and says:
That he is ____________________________ (Title)
of ____________________________ (Name of Company, Firm, or Corporation)
that, pursuant to Subsection 112(c) of Title 23, United States Code and Title 44, Chapter 10, Article 1, and Title 34, Chapter 2, Article 4 of the Arizona Revised Statutes, he certifies that neither he nor anyone associated with the company, firm, or corporation mentioned above has, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of full competitive bidding in connection with the associated project:

Subscribed and sworn to before me ____________________________
this ______ day of ________ 201__. (Signature)

My commission expires: ________
(Seal)

Notary Public