Project Manual and Specifications

Our Lady of Lady Victory Parish Hall Package B

VOLUME 1

Diocese of Victoria Victoria, Texas

Project #716-0114B April 12, 2016

Set No._____



ARCHITECTS AND INTERIOR DESIGNERS

1908 N. Laurent St. Suite 540 (361) 573-1642 Victoria, Texas 77901 Fax (361) 573-2114

REQUEST FOR QUALIFICATIONS/PROPOSALS FOR

Parish Hall

Our Lady of Victory Catholic Church

Diocese of Victoria

1502 E. Airline Road Victoria, Texas 77901

PACKAGE B-

Parish Hall

DEADLINE FOR SUBMISSION

May 4, 2016, 3 P.M.



CONSTRUCTION MANAGER AT-RISK

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NOTICE TO RESPONDENTS

Qualifications/Proposals will be received by Lauger Companies Incorporated on behalf of Our Lady of Victory Catholic Church - Diocese of Victoria **until 3:00 PM CST, May 4, 2016** for the Parish Hall Package B, located at 1502 E. Airline Rd., Victoria, Texas 77901.

A Pre-Proposal meeting will be held at the project site, 1502 E. Airline Rd., Victoria, Texas 77901 (the old JC Penny's building) on April 21, 2016 at 10:30 AM CDST.

Lauger Companies Incorporated intends to subcontract with companies to provide construction services for the furnishing, fabrication, construction, and/or installation of the scope of work outlined in the construction documents. The scope of work defined by the bid documents includes, but is not limited to, demolition, drilled piers, concrete, masonry, millwork, casework, structural and miscellaneous metal fabrications, rough carpentry, dampproofing, sealants, building insulation, doors, frames, finish hardware, glazing, gypsum drywall assemblies, acoustical ceilings, painting, floor coverings, specialties, sports equipment, mechanical, plumbing, fire sprinkler, electrical, other special systems, and all related other work defined by the documents.

Plans and specifications will be available for viewing at -

Lauger Companies, Inc office, 2203 Port Lavaca Drive, Victoria, TX ABC Plan Room, Victoria, TX

For electronic viewing or download, the plans and specifications will be posted as follows-

Lauger Companies, Inc. website www.laugercompaniesinc.com Click on the "Plans" tab Virtual Builders Exchange

REQUEST FOR QUALIFICATIONS/PROPOSALS

SECTION 1 - GENERAL INFORMATION

1.1 Introduction: Lauger Companies Incorporated in conjunction with Our Lady of Victory Catholic Church - Diocese of Victoria is soliciting statements of Qualifications and Proposals for selection of firms to provide construction services for the Parish Hall, Our Lady of Victory Catholic Church-Diocese of Victoria, 1502 E. Airline Road, Victoria, Texas 77901, PACKAGE B-Parish Hall project. Selection of a highly qualified service provider(s) will be based upon past performance of similar facilities, current capabilities, and cost of services. This document provides information for interested parties to prepare and submit a response to the Request for Qualifications/Proposal (RFQ/P) for consideration by Lauger Companies Incorporated and Our Lady of Victory Catholic Church - Diocese of Victoria.

- 1.2 **Public Information:** All information, documents, and other materials submitted in response to this RFQ/P are considered non-confidential and/or non-proprietary and are subject to public disclosure under the Texas Public Information Act *(Texas Government Code, Chapter 552.01, et seq.)* after the selection process is complete and a contract awarded. Respondent's Financial Statement is exempt from disclosure under the Open Records Act.
 - 1.2.1 **Confidentiality:** The respondent may designate any portion of their Qualifications which contains trade secrets or other proprietary data which the respondent desires to remain confidential. If a respondent includes data that is not to be disclosed to the public for any purposes, the respondent shall:
 - 1.2.1.1 Mark the title page of the Qualifications with the following legend: "This proposal includes data that shall not be disclosed outside Lauger Companies Incorporated or Our Lady of Victory Catholic Church Diocese of Victoria. Portions indicated shall not be duplicated, used or disclosed for any purpose other than to evaluate this proposal."
 - 1.2.1.2 Indicate sections of the Qualifications the respondent wishes to restrict with the following statement: "Use or disclosure of data contained below is subject to the restriction indicated on the title page of this proposal. Section 1 (Section 2, Section 3, etc...)"
 - 1.2.1.3 Indicate the end of each section of restricted data with the following statement: "End of confidential/restricted information Section 2 (Section 3, Section 4, etc...)"
 - 1.2.1.4 Despite such restrictions, the disclosure of such restricted information may be required under applicable laws, including, but without limitation, applicable freedom of information laws.

1.3 **Project Description:**

Our Lady of Victory Catholic Church - Diocese of Victoria intends to renovate an existing facility, located at 1502 E. Airline Road, Victoria, TX, in order to house the new Parish Hall.

The proposed project scope consists of the following scope of work defined by the bid documents including, but is not limited to demolition, drilled piers, concrete, masonry, millwork, casework, structural and miscellaneous metal fabrications, rough carpentry, dampproofing, sealants, building insulation, doors, frames, finish hardware, glazing, gypsum drywall assemblies, acoustical ceilings, painting, floor coverings, specialties, sports equipment, mechanical, plumbing, fire sprinkler, electrical, other special systems, and all related other work defined by the documents.

Refer to the Bid Documents for a complete description of the work.

1.4 Tentative Schedule of Actions:

5.4.1	Issuance of Documents for Bid Package	April 13, 2016
5.4.2	Last day for Addenda	May 2, 2016
5.4.3	Qualifications/Proposals Deadline	May 4, 2016
5.4.4	First Negotiations with Best Value Respondent	May 5, 2016
5.4.5	Start Construction of Package B	June 6, 2016
5.4.6	Owner Accepts Substantial Completion of Construction-Pa	ackage B January 2017

- 1.5 **<u>Type of Contract</u>**: Any formal agreement resulting from the solicitation will be in the form of a Lauger Companies Incorporated's Standard Construction Contract or Purchase Order. In the event that a subcontract or purchase order is issued, upon its execution the subcontract agreement or purchase order will take precedent in all incidents and Respondents' Proposal will become non-binding.
- 1.6 **Contacts:** Any questions regarding this Request for Qualifications/Proposals shall be directed to:

Sharon Rose Fisher Lauger Companies Incorporated Victoria, Texas 77902 Phone: 361-576-0003 Fax: 361-578-1626 e-mail: sharon@laugercompaniesinc.com

1.7 <u>Submittal Deadline:</u> Lauger Companies Incorporated will accept proposals at the location listed below until 3:00 p.m, May 4, 2016.

It is the complete responsibility of the Respondent to ensure that proposals and qualifications are received at the designated submittal location by the submittal deadline. Late received proposals will be returned to the Respondent unopened.

1.8 **Submittal Location:** The submission must be received in the office of Lauger Companies Incorporated on or before the time and date specified. All copies shall be submitted to:

Sharon Rose Fisher		
Lauger Companies Incorporated	Phone:	361-576-0003
2203 Port Lavaca Dr.	Fax:	361-578-1626
PO Box 2146	e-mail:	sharon@laugercompaniesinc.com

Victoria, Texas 77902

- 1.9 Proposal Submission: Submit one (1) copy of the response to the individual and location identified in part 1.8. Proposals may be submitted by hand delivery, certified mail, fax or e-mail. It is the responsibility of the Respondent to ensure delivery and receipt of the Proposal prior to the submission deadline. <u>The deadline for submission of the proposal, qualifications, and certifications is May 4, 2016 at 3 pm.</u> All proposals received prior to May 4, 2016 must be delivered in a sealed envelope with the following clearly marked on the outside in RED ink, "<u>To remain sealed until opened by Lauger Companies Incorporated.</u>"
- 1.10 <u>Selection Criteria:</u> The respondent selected to provide construction will be the firm(s) whose experience, qualifications and cost proposal, as presented in response to this RFQ/P, establish it, in the opinion of Lauger Companies Incorporated and the Owner, as well qualified and offering the greatest benefits and experience to Our Lady of Victory Catholic Church-Diocese of Victoria.

The criteria for evaluation of proposals, and selection of the successful respondent, may be based on the following criteria:

- 1.10.1 the price
- 1.10.2 the offeror's experience and reputation
- 1.10.3 the quality of the offeror's goods and services
- 1.10.4 the offeror's safety record
- 1.10.5 the offeror's proposed personnel
- 1.10.6 whether the offeror's financial capability is appropriate to the size and scope of the project
- 1.10.7 any other relevant factor specifically listed in the request for bids, proposals, or qualifications, including but not limited to the following –

a. Respondent's References, Respondent's Quality Control Program, Respondent's Ability to Meet the Project Schedule.

b. The Respondent's past relationship with Our Lady of Victory Catholic Church-Diocese of Victoria.

c. The Respondent's past relationship with Lauger Companies Incorporated.

d. The total long-term cost to Our Lady of Victory Catholic Church - Diocese of Victoria to acquire the vendor's goods or services.

e. Respondent's ability to provide shop drawings for approval that meet the project schedule.

f. Respondent's capability and ability to furnish the outlined scope of work in a timely manner consistent with the project schedule requirements.

g. Other relevant factors that a private business entity would consider in selecting a vendor.

1.11 Clarifications and Interpretations:

- 1.11.1 Any clarifications or interpretations of this RFQ/P that materially affect or change its requirements will be issued by Lauger Companies Incorporated as an addendum. All such addenda issued by Lauger Companies Incorporated before the Proposals are due are part of the RFP, and respondents shall acknowledge receipt of and incorporate each addendum in its Proposal.
- 1.11.2 Respondents shall consider only those clarifications and interpretations that Lauger Companies Incorporated issues by addenda twenty-four (24) hours prior to the submittal deadline. Interpretations or clarifications in any other form, including oral statements, will not be binding on Lauger Companies Incorporated and should not be relied upon in preparing the Proposal.
- 1.12 **Respondent's Acceptance of Evaluation Methodology:** Submission of qualifications/proposals indicates Respondent's acceptance of the evaluation techniques and the recognition that subjective judgments must be made by Lauger Companies Incorporated during the evaluation process.

1.13 **Obligations of Parties:**

- 1.13.1 Respondent understands and acknowledges by submitting a Proposal that any and all costs incurred by the Respondent as a result of the Respondent's efforts to participate in this selection process shall be at the sole risk and obligation of the Respondent.
- 1.13.2 Lauger Companies Incorporated will not provide compensation to Respondents for any expenses incurred for proposal preparation or for any presentations made.
- 1.13.3 Lauger Companies Incorporated makes no guarantee that an award will be made as a result of this RFQ/P, and reserves the right to accept or reject any or all proposals, waive any formalities or minor technical inconsistencies, or delete any item/requirements from this RFQ/P or resulting contract when deemed to be in Lauger Companies Incorporated's best interest. Representations made within the Proposal response will be binding on responding firms.

1.14 Completeness of Proposal:

- 1.14.1 Respondent should carefully read the information contained herein, and the Program of Requirements document. It is the responsibility of the Respondent to submit a complete response to all requirements and questions.
- 1.14.2 Proposals which are qualified with conditional clauses, or alterations, or items not called for in the RFQ/P documents, or irregularities of any kind are subject to disqualification at the option of Lauger Companies Incorporated
- 1.14.3 Each Proposal should be prepared simply and economically, providing a straightforward, concise description of the firm's ability to meet the requirements of the RFQ/P. Emphasis should be on completeness, clarity of content, responsiveness to the requirements, and an understanding of the Owner and Lauger Companies Incorporated's needs.
- 1.14.4 Failure to comply with the requirements contained in this RFQ/P may cause rejection of the Proposal.

- 1.14.5 Lauger Companies Incorporated will not acknowledge or receive Qualifications that are delivered by telephone.
- 1.15 **Withdrawal or Modification:** A Proposal <u>may be</u> withdrawn and resubmitted any time <u>prior</u> to the time set for receipt of Proposals. No Proposal may be changed, amended, or modified <u>after</u> the submittal deadline. No Proposal may be withdrawn after the submittal deadline without approval by Lauger Companies Incorporated which shall be based on Respondent's written request stating reasons for withdrawing the proposal that are acceptable, in Lauger Companies Incorporated opinion.
- 1.16 **Ownership of Proposals:** Proposals and any other information submitted by Respondents shall become the property of Lauger Companies Incorporated and Our Lady of Victory Catholic Church Diocese of Victoria (the Owner); however, Lauger Companies Incorporated may return portions of the qualification/proposal information once a contract award is made at the request and expense of the respondent.
- 1.17 <u>Validity Period</u>: Proposals are to be valid for Lauger Companies Incorporated's acceptance for a minimum of 90 days from the submittal deadline date to allow time for evaluation and selection. A Proposal, if accepted, shall remain valid for the life of the Contracts resulting from this selection process.
- 1.18 **General Conditions:** By signing and submitting a Proposal, Respondent certifies that any attached or referenced conditions or documents are applicable to this procurement only to the extent that they do not conflict with the statutes or Administrative Code of the State of Texas, or the advertised contract conditions, and that they do not impose additional requirements on the Owner. Respondent further certifies that the submission of a Proposal is Respondent's good faith intent to contract with Lauger Companies Incorporated as specified herein and that such intent to contract is NOT contingent upon Lauger Companies Incorporated's acceptance or execution of any such attached or referenced conditions, or other documents.

1.19 **Proposal Format:**

- 1.19.1 <u>Content:</u> Proposals shall consist of Responses (certifications, answers to questions, and information) to requirements and questions identified in Section 2, 3, and 4 of this RFQ/P. Subcontractor own standard proposal form may be attached to the proposal form provided in section 4. Include the complete question with your Response following immediately in your Proposal package. In cases where a question does not apply or if you are unable to respond, indicate N/A (Not Applicable) or N/R (No Response) as appropriate.
- 1.19.2 <u>Cost Proposals</u> Respondents cost proposal shall be submitted on the provided form in section 4, with detailed information describing the scope of work Respondent's proposal includes. Cost Proposals shall be signed by an authorized signatory of Respondent's company.

1.19.2 a **Bid Bonds** – None are required.

1.19.2 b **Payment and Performance Bonds** – at the discretion of Lauger Companies Incorporated or the Owner, 100% Payment and Performance Bonds may be required of Respondent. Respondent shall indicate in their proposal, as a separate cost (or percentage of the cost) from the Base Proposal or any alternates, the cost associated with Respondent providing said Payment and Performance Bonds in respect to the scope of work being proposed upon.

- 1.19.3 <u>Conditional Responses:</u> Responses that are qualified with conditional clauses, alterations, or irregularities of any kind are subject to rejection by Lauger Companies Incorporated.
- 1.19.4 <u>Additional Information:</u> Additional attachments <u>may be</u> included in the Response. Any additional attachments/information deemed applicable to this RFQ/P may be provided as an attachment at the <u>end</u> of the RFQ/P. Lauger Companies Incorporated makes no guarantees nor warrants that additional information provided outside of the requested qualifications/proposals will or will not be used in the evaluation of said qualifications/proposal.
- 1.19.5 **Sales Tax:** Whereas the Our Lady of Victory Catholic Church-Diocese of Victoria is a religious organization and qualifies for exemption of payment of sales taxes on incorporated materials, this project will be exempt from sales tax. The successful respondent will receive a sales tax exemption certificate for their records.
- 1.20 <u>Preparation and Submittal Instructions:</u> Respondents must complete, sign and return Sections 2, 3, and 4 as part of their Proposal response. Subcontractors own standard proposal form may be attached to the proposal form provided in section 4. Failure to sign and return these forms may cause the Proposal to be rejected.

END OF SECTION 1

SECTION 2 - RESPONDENT'S QUALIFICATIONS

Respondents are required to submit a complete response to each requested item that follows. Qualification information submitted shall be applicable only to the company entity or branch that will perform this Work.

Provide the following Respondent firm information:

2.1

2.2

Respo	ndent's Name:		
Street	Address:		
Mailing	g Address:		
City, S	State, Zip:		
Teleph	none No.: Fax No.:		
Email:			
State (Comptroller Vendor Identification Number or F.E.I. Number:		
Gener	al:		
2.1.1	List your key personnel (Estimator, Project Manager, Foreman) and provide resume(s) in relation to providing construction services for the proposed project.		
<u>Histor</u>	<u>V:</u>		
2 2.1	State whether the Respondent firm is an individual, partnership, corporation, or a joint venture. If Respondent firm is a corporation, give state of incorporation.		
2.2.2	Give number of years Respondent firm has been in business.		
2.2.3	List all Corporate Officers, Partners and/or Owners of Organization, provide: Name, Title, and Years of Experience.		

2.2.4 Has your organization ever defaulted, failed to complete any work or otherwise been discharged prior to completion of the project? If yes, stipulate where and why.

- 2.2.5 List any judgments, claims, arbitration proceedings or suits pending or outstanding against Respondent firm or its officers.
- 2.2.6 Has Respondent firm filed any lawsuits or requested arbitration with regards to construction contracts and/or material purchase orders within the last five (5) years?

2.3 Experience:

- 2.3.1 Provide the total number of projects currently in progress:
- 2.3.2 Provide the total volume (cost value) of projects currently in progress:
- 2.3.3 Provide the total volume of work completed over last 5 years:
- 2.3.4 Provide the largest single project value completed in the last five (5) years; list value, project name, and completion date.
- 2.3.5 Provide the largest single project value currently in progress; list value, project name, and anticipated completion date.
- 2.3.6 List five (5) similar projects your organization has in-progress or completed in the last 5 years. Provide name and location of project, project value, completion date, contractor reference (Firm Name, Contact Name, Phone Number).

Please attach additional sheets, clearly identifying the question, if space provided does not allow for proper answering of the question.

SECTION 3 RESPONDENT'S COMPLIANCE CERTIFICATION

THIS SECTION MUST BE COMPLETED, SIGNED, AND RETURNED WITH RESPONDENT'S PROPOSAL. FAILURE TO SIGN AND RETURN THIS SECTION MAY RESULT IN THE REJECTION OF YOUR PROPOSAL.

- 3.3.1 By signature hereon, Respondent offers and agrees to furnish all services as described in this RFQ/P at the prices quoted and comply with all terms, conditions, and requirements set forth in the RFQ/P documents and contained herein.
- 3.3.2 By signature hereon, a corporate Respondent certifies that it is not currently delinquent in the payment of any Franchise Taxes due under Chapter 171, Texas Tax Code, or that the corporation is exempt from the payment of such taxes, or that the corporation is an out-of-state corporation that is not subject to the Texas Franchise Tax, whichever is applicable. A false certification shall be deemed a material breach of contract and, at Lauger Companies Incorporated's option, may result in cancellation of any resulting contract.
- 3.3.3 By signature hereon, the Respondent hereby certifies that neither the Respondent nor the firm, corporation, partnership or institution represented by the Respondent, or anyone acting for such firm, corporation, or institution has violated the antitrust laws of this state, codified in Section 15.01, et. seq., Texas Business and Commerce Code, or the Federal antitrust laws, nor communicated directly or indirectly the proposal made to any competitor or any other person engaged in such line of business.
- 3.3.4 By signature hereon, Respondent certifies that all statements and information prepared and submitted in response to this RFQ/P are current, complete and accurate.
- 3.3.5 By signature hereon, Respondent certifies that the individual signing this document and the documents made part of the RFQ/P is authorized to sign such documents on behalf of the company and to bind the company under any contract which may result from the submission of this proposal.
- 3.3.6 By signature hereon, Respondent certifies as follows:

"Under Section 231.006, Texas Family Code, the vendor or applicant certifies that the individual or business entity named in this contract, is not ineligible to receive payment and acknowledges that this contract may be terminated and payment may be withheld if this certification is inaccurate."

"Under Section 2155.004, Texas Government Code, the vendor or applicant certifies that the individual or business entity named in this bid or contract is not ineligible to receive the specified contract and acknowledges that this contract may be terminated and payment withheld if this certification is inaccurate."

"Under Section 2254.004, Texas Government Code, the vendor or applicant certifies that each individual or business entity proposed by Respondent as a member of its team that will engage in the practice of engineering or architecture was selected based on demonstrated competence and qualifications only."

- 3.3.7 By signature hereon, Respondent certifies that no relationship, whether as a relative, business associate, by capital funding agreement or by any other such kinship exists between Respondent and an employee of Our Lady of Victory Catholic Church-Diocese of Victoria, or Respondent has not been an employee Our Lady of Victory Catholic Church Diocese of Victoria within the immediate twelve (12) months prior to the RFQ/P response. All such disclosures will be subject to administrative review and approval prior to Lauger Companies Incorporated entering into any contract with Respondent.
- 3.3.8 By signature hereon, Respondent affirms that no compensation has been received for participation in the preparation of the specifications for this RFQ/P.

- 3.3.9 Respondent represents and warrants that all services to be provided in response to this RFQ/P will meet or exceed the safety standards established and promulgated under the Federal Occupational Safety and Health law (Public Law 91-596) and its regulations in effect as of the date of this solicitation.
- 3.3.10 By signature hereon, Respondent signifies its compliance with all federal laws and regulations pertaining to Equal Employment Opportunities and Affirmative Action.

3.3.11 HOLD BID FOR 90 DAYS.

Compliance Certification Signature:	
Submitted By: Company Name	
Printed Name/Title	
Date	
Email	
STATE OF TEXAS VIN No: -or- FEI No:	
If Sole Owner:	
SS No:	
If a Corporation:	
State of Incorporation:	
Charter No:	
Street Address	
Mailing Address	
City, State, Zip Code	
Telephone Number	
Facsimile Number	

Parish Hall Our Lady of Victory Catholic Church-Diocese of Victoria Package B Bid Date: May 4, 2016

SECTION 4 – PROPOSAL FORM

Parish Hall Our Lady of Victory Catholic Church-Diocese of Victoria Package B-Parish Hall

Bid Time May 4, 2016, At 3 PM

Phone:
e Certification Attached YES
_Dollars (\$)
_Dollars (\$)

Signature___

Subcontractor/Supplier typical bid proposal may be attached to the back of this page.

LAUGER COMPANIES, INC.

STANDARD FORM OF AGREEMENT BETWEEN CONTRACTOR AND SUBCONTRACTOR

AGREEMENT made as of the _____ day of _____ in the year _____ 2016 (In words, indicate day, month and year.)

BETWEEN the Contractor:

(Name, address and other information)

Lauger Companies, Inc. PO Box 2146 Victoria, Texas 77902 (361) 576-0003 Phone (361) 578-1626 Fax

And the Subcontractor: (*Name, address and other information*)

The Contractor has made a contract for construction (hereinafter, the Prime Contract) dated:

With the Owner: (*Name, address and other information*) The Most Reverend David E. Fellhauer Bishop of the Catholic Diocese of Victoria, in Texas, and his successors in Office for the Benefit of Our Lady of Victory Cathedral 1309 East Mesquite Lane Victoria, Texas 77901

For the following Project: (*Name, location and detailed description*) Parish Hall Package B- Parish Hall 1502 E. Airline Road Victoria, Texas 77091

The Prime Contract provides for the furnishing of labor, materials, equipment and services in connection with the construction of the Project. A copy of the Prime Contract, consisting of the Agreement Between Owner and Contractor (from which compensation amounts may be deleted) and the other Contract Documents enumerated therein, has been made available to the Subcontractor.

The Architect for the Project: Rawley McCoy & Associates, PLLC Architects and Interior Designers 1908 N. Laurent, Suite 540 Victoria, Texas 77901

LAUGER COMPANIES, INC.

The Contractor and the Subcontractor agree as follows.

TABLE OF ARTICLES

- 1 THE SUBCONTRACT DOCUMENTS
- 2 MUTUAL RIGHTS AND RESPONSIBILITIES
- 3 CONTRACTOR
- 4 SUBCONTRACTOR
- 5 CHANGES IN THE WORK
- 6 MEDIATION AND BINDING DISPUTE RESOLUTION
- 7 TERMINATION, SUSPENSION OR ASSIGNMENT OF THE SUBCONTRACT
- 8 THE WORK OF THIS SUBCONTRACT
- 9 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 10 SUBCONTRACT SUM
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- 14 TEMPORARY FACILITIES AND WORKING CONDITIONS
- 15 MISCELLANEOUS PROVISIONS
- 16 ENUMERATION OF SUBCONTRACT DOCUMENTS

ARTICLE 1 THE SUBCONTRACT DOCUMENTS

§ 1.1 The Subcontract Documents consist of (1) this Agreement; (2) the Prime Contract, consisting of the Agreement between the Owner and Contractor and the other Contract Documents enumerated therein; (3) Modifications issued subsequent to the execution of the Agreement between the Owner and Contractor, whether before or after the execution of this Agreement; (4) other documents listed in Article 16 of this Agreement; and (5) Modifications to this Subcontract as if attached to this Agreement or repeated herein. The Subcontract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Subcontract

LAUGER COMPANIES, INC.

Documents, other than Modifications issued subsequent to the execution of this Agreement, appears in Article 16.

§ 1.2 Except to the extent of a conflict with a specific term or condition contained in the Subcontract Documents, the General Conditions governing the Prime Contract shall govern.

§ 1.3 The Subcontract may be amended or modified only by a Modification. The Subcontract Documents shall not be construed to create a contractual relationship of any kind (1) between the Owner and the Subcontractor or (2) between any persons or entities other than the Contractor and Subcontractor.

§ 1.4 The Contractor shall make available the Subcontract Documents to the Subcontractor prior to execution of this Agreement, and thereafter, upon request, but the Contractor may charge the Subcontractor for the reasonable cost of reproduction.

ARTICLE 2 MUTUAL RIGHTS AND RESPONSIBILITIES

The Contractor and Subcontractor shall be mutually bound by the terms of this Agreement and, to the extent that the provisions of the Prime Contract apply to the Work of the Subcontractor, the Contractor shall assume toward the Subcontractor all obligations and responsibilities that the Owner, under such documents, assumes toward the Contractor, and the Subcontractor shall assume toward the Contractor all obligations and responsibilities which the Contractor, under such documents, assumes toward the Owner. The Contractor shall have the benefit of all rights, remedies and redress against the Subcontractor that the Owner, under such documents, has against the Contractor, and the Subcontractor shall have the benefit of all rights, remedies and redress against the Contractor that the Owner, insofar as applicable to this Subcontract. Where a provision of such documents is inconsistent with a provision of this Agreement, this Agreement shall govern.

ARTICLE 3 CONTRACTOR § 3.1 SERVICES PROVIDED BY THE CONTRACTOR

§ 3.1.1 The Contractor shall cooperate with the Subcontractor in scheduling and performing the Contractor's Work to avoid conflicts or interference in the Subcontractor's Work and shall expedite written responses to submittals made by the Subcontractor in accordance with Section 4.1 and Article 5. Promptly after execution of this Agreement, the Contractor shall, if required by the nature of the Project or at the Constractor's discretion, provide the Subcontractor copies of the Contractor's construction schedule and schedule of submittals, together with such additional scheduling details as will enable the Subcontractor to plan and perform the Subcontractor's Work properly. The Contractor shall promptly notify the Subcontractor of subsequent changes in the construction and submittal schedules and additional scheduling details.

§ 3.1.2 The Contractor shall provide suitable areas for storage of the Subcontractor's materials and equipment during the course of the Work.

§ 3.1.3 Except as provided in Article 14, the Contractor's equipment will be available to the Subcontractor only at the Contractor's discretion and on mutually satisfactory terms.

§ 3.2 COMMUNICATIONS

§ 3.2.1 The Contractor shall promptly make available to the Subcontractor information, including information received from the Owner, that affects this Subcontract and that becomes available to the Contractor subsequent to execution of this Subcontract.

LAUGER COMPANIES, INC.

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§ 3.2.2 The Contractor shall not give instructions or orders directly to the Subcontractor's employees or to the Subcontractor's Sub-subcontractors or material suppliers unless such persons are designated as authorized representatives of the Subcontractor.

§ 3.2.3 If hazardous substances of a type of which an employer is required by law to notify its employees are being used on the site by the Contractor, a subcontractor or anyone directly or indirectly employed by them (other than the Subcontractor), the Contractor shall, prior to harmful exposure of the Subcontractor's employees to such substance, give written notice of the chemical composition thereof to the Subcontractor in sufficient detail and time to permit the Subcontractor's compliance with such laws.

§ 3.2.5 The Contractor shall furnish to the Subcontractor within 30 days after receipt of a written request, or earlier if so required by law, information necessary and relevant for the Subcontractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property, usually referred to as the site, on which the Project is located and the Owner's interest therein.

§ 3.2.6 If the Contractor asserts or defends a claim against the Owner that relates to the Work of the Subcontractor, the Contractor shall promptly make available to the Subcontractor all information relating to the portion of the claim that relates to the Work of the Subcontractor.

§ 3.3 CLAIMS BY THE CONTRACTOR

§ 3.3.1 Liquidated damages for delay, if provided for in Section 9.3 of this Agreement, shall be assessed against the Subcontractor only to the extent caused by the Subcontractor or any person or entity for whose acts the Subcontractor may be liable, and in no case for delays or causes arising outside the scope of this Subcontract.

§ 3.3.2 The Contractor's claims for the costs of services or materials provided due to the Subcontractor's failure to execute the Work shall require.

- .1 seven days' written notice prior to the Contractor's providing services or materials, except in an emergency; and
- .2 written compilations to the Subcontractor of services and materials provided by the Contractor and charges for such services and materials no later than the fifteenth day of the month following the Contractor's providing such services or materials.

§ 3.4 CONTRACTOR'S REMEDIES

If the Subcontractor defaults or neglects to carry out the Work in accordance with this Agreement and fails within five working days after receipt of written notice from the Contractor to commence and continue correction of such default or neglect with diligence and promptness, the Contractor may, by appropriate Modification, and without prejudice to any other remedy the Contractor may have, make good such deficiencies and may deduct the reasonable cost thereof from the payments then or thereafter due the Subcontractor.

ARTICLE 4 SUBCONTRACTOR § 4.1 EXECUTION AND PROGRESS OF THE WORK

§ 4.1.1 For all Work the Subcontractor intends to subcontract, the Subcontractor shall enter into written agreements with Sub-subcontractors performing portions of the Work of this Subcontract by which the Subcontractor and the Sub-subcontractor are mutually bound, to the extent of the Work to be performed by the Sub-subcontractor, assuming toward each other all obligations and responsibilities that the Contractor and Subcontractor and having the benefit of all rights, remedies and redress each against the other that the Contractor and Subcontractor have by virtue of the provisions of this Agreement.

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§ 4.1.2 The Subcontractor shall supervise and direct the Subcontractor's Work, and shall cooperate with the Contractor in scheduling and performing the Subcontractor's Work to avoid conflict, delay in or interference with the Work of the Contractor, other subcontractors, the Owner, or separate contractors.

§ 4.1.3 The Subcontractor shall promptly submit Shop Drawings, Product Data, Samples and similar submittals required by the Subcontract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Contractor or other subcontractors.

§ 4.1.4 The Subcontractor shall furnish to the Contractor periodic progress reports on the Work of this Subcontract as mutually agreed, including information on the status of materials and equipment that may be in the course of preparation, manufacture, or transit.

§ 4.1.5 The Subcontractor agrees that the Contractor and the Owner each have the authority to reject Work of the Subcontractor that does not conform to the Prime Contract. The Contractor's and Owner's's decisions on matters relating to aesthetic effect shall be final and binding on the Subcontractor if consistent with the intent expressed in the Prime Contract.

§ 4.1.6 The Subcontractor shall pay for all materials, equipment and labor used in connection with the performance of this Subcontract through the period covered by previous payments received from the Contractor, and shall furnish satisfactory evidence, when requested by the Contractor, to verify compliance with the above requirements.

§ 4.1.7 The Subcontractor shall take necessary precautions to protect properly the work of other subcontractors from damage caused by operations under this Subcontract.

§ 4.1.8 The Subcontractor shall cooperate with the Contractor, other subcontractors, the Owner, and separate contractors whose work might interfere with the Subcontractor's Work. The Subcontractor shall participate in the preparation of coordinated drawings in areas of congestion, if required by the Prime Contract, specifically noting and advising the Contractor of potential conflicts between the Work of the Subcontractor and that of the Contractor, other subcontractors, the Owner, or separate contractors.

§ 4.2 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 4.2.1 The Subcontractor shall give notices and comply with applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on performance of the Work of this Subcontract. The Subcontractor shall secure and pay for permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Subcontractor's Work, the furnishing of which is required of the Contractor by the Prime Contract.

§ 4.2.2 The Subcontractor shall comply with Federal, state and local tax laws, social security acts, unemployment compensation acts and workers' compensation acts insofar as applicable to the performance of this Subcontract.

§ 4.3 SAFETY PRECAUTIONS AND PROCEDURES

§ 4.3.1 The Subcontractor shall take reasonable safety precautions with respect to performance of this Subcontract, shall comply with safety measures initiated by the Contractor and with applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities for the safety of persons and property in accordance with the requirements of the Prime Contract. The Subcontractor shall report to the Contractor within three days an injury to an employee or agent of the Subcontractor which occurred at the site.

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§ 4.3.2 If hazardous substances of a type of which an employer is required by law to notify its employees are being used on the site by the Subcontractor, the Subcontractor's Sub-subcontractors or anyone directly or indirectly employed by them, the Subcontractor shall, prior to harmful exposure of any employees on the site to such substance, give written notice of the chemical composition thereof to the Contractor in sufficient detail and time to permit compliance with such laws by the Contractor, other subcontractors and other employers on the site.

§ 4.3.3 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a hazardous material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Subcontractor, the Subcontractor shall, upon recognizing the condition, immediately stop Work in the affected area and promptly report the condition to the Contractor in writing. When the material or substance has been rendered harmless, the Subcontractor's Work in the affected area shall resume upon written agreement of the Contractor and Subcontractor. The Subcontract Time shall be extended appropriately and the Subcontract Sum shall be increased in the amount of the Subcontractor's reasonable additional costs of demobilization, delay and remobilization, which adjustments shall be accomplished as provided in Article 5 of this Agreement.

§ 4.3.4 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Subcontractor, the Subcontractor's Sub-subcontractors, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 4.3.3 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 4.3.5 The Subcontractor shall indemnify the Contractor for the cost and expense the Contractor incurs 1) for remediation of a material or substance brought to the site and negligently handled by the Subcontractor or 2) where the Subcontractor fails to perform its obligations under Section 4.3.3, except to the extent that the cost and expense are due to the Contractor's fault or negligence.

§ 4.4 CLEANING UP

§ 4.4.1 The Subcontractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations performed under this Subcontract. The Subcontractor shall not be held responsible for conditions caused by other contractors or subcontractors.

§ 4.4.2 As provided under Section 3.3.2, if the Subcontractor fails to clean up as provided in the Subcontract Documents, the Contractor may charge the Subcontractor for the Subcontractor's appropriate share of cleanup costs.

§ 4.5 WARRANTY

The Subcontractor warrants to the Owner and Contractor that materials and equipment furnished under this Subcontract will be of good quality and new unless the Subcontract Documents require or permit otherwise. The Subcontractor further warrants that the Work will conform to the requirements of the Subcontract Documents and will be free from defects, except for those inherent in the quality of the Work the Subcontract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Subcontractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Subcontractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Contractor, the Subcontractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

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§ 4.6 INDEMNIFICATION

§ 4.6.1 To the fullest extent permitted by law, the Subcontractor shall indemnify and hold harmless the Owner, Contractor, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the Subcontractor's Work under this Subcontract, provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Subcontractor, the Subcontractor's Subsubcontractors, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 4.6.

§ 4.6.2 In claims against any person or entity indemnified under this Section 4.6 by an employee of the Subcontractor, the Subcontractor's Sub-subcontractors, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 4.6.1 shall not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for the Subcontractor or the Subcontractor's Sub-subcontractors under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 5 CHANGES IN THE WORK

§ 5.1 The Owner may make changes in the Work by issuing Modifications to the Prime Contract. Upon receipt of such a Modification issued subsequent to the execution of the Subcontract Agreement, the Contractor shall promptly notify the Subcontractor of the Modification. Unless otherwise directed by the Contractor, the Subcontractor shall not thereafter order materials or perform Work that would be inconsistent with the changes made by the Modification to the Prime Contract.

§ 5.2 The Subcontractor may be ordered in writing by the Contractor, without invalidating this Subcontract, to make changes in the Work within the general scope of this Subcontract consisting of additions, deletions or other revisions, including those required by Modifications to the Prime Contract issued subsequent to the execution of this Agreement, the Subcontract Sum and the Subcontract Time being adjusted accordingly. The Subcontractor, prior to the commencement of such changed or revised Work, shall submit promptly to the Contractor written copies of a claim for adjustment to the Subcontract Sum and Subcontract Time for such revised Work in a manner consistent with requirements of the Subcontract Documents.

§ 5.3 The Subcontractor shall make all claims promptly to the Contractor for additional cost, extensions of time and damages for delays or other causes in accordance with the Subcontract Documents. A claim which will affect or become part of a claim which the Contractor is required to make under the Prime Contract within a specified time period or in a specified manner shall be made in sufficient time to permit the Contractor to satisfy the requirements of the Prime Contract. Such claims shall be received by the Contractor not less than two working days preceding the time by which the Contractor's claim must be made. Failure of the Subcontractor to make such a timely claim shall bind the Subcontractor to the same consequences as those to which the Contractor is bound.

ARTICLE 6 MEDIATION AND BINDING DISPUTE RESOLUTION \S 6.1 MEDIATION

§ 6.1.1 Any claim arising out of or related to this Subcontract, except those waived in this Subcontract, shall be subject to mediation as a condition precedent to binding dispute resolution.

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§ 6.1.2 The parties shall endeavor to resolve their claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to this Subcontract and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section, the parties may nonetheless proceed to the selection of the arbitrators(s) and agree upon a schedule for later proceedings.

§ 6.1.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 6.2 BINDING DISPUTE RESOLUTION

For any claim subject to, but not resolved by mediation pursuant to Section 6.1, the method of binding dispute resolution shall be as follows:

(Check the appropriate box. If the Contractor and Subcontractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, claims will be resolved by litigation in a court of competent jurisdiction.)

- [X] Arbitration pursuant to Section 6.3 of this Agreement
- [] Litigation in a court of competent jurisdiction
- [] Other (*Specify*)

§ 6.3 ARBITRATION

§ 6.3.1 If the Contractor and Subcontractor have selected arbitration as the method of binding dispute resolution in Section 6.2, any claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Subcontract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration be demanded.

§ 6.3.2 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for meditation but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the claim.

§ 6.3.3 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation; (2) the arbitrations to be consolidated substantially involve common questions of law or fact; and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s). § 6.3.4 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder.

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Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a claim not described in the written consent.

§ 6.3.5 The Contractor and Subcontractor grant to any person or entity made a party to an arbitration conducted under this Section 6.3, whether by joinder or consolidation, the same rights of joinder and consolidation as the Contractor and Subcontractor under this Agreement.

§ 6.3.6 This agreement to arbitrate and any other written agreement to arbitrate with an additional person or persons referred to herein shall be specifically enforceable under applicable law in any court having jurisdiction thereof. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

ARTICLE 7 TERMINATION, SUSPENSION OR ASSIGNMENT OF THE SUBCONTRACT § 7.1 TERMINATION BY THE SUBCONTRACTOR

The Subcontractor may terminate the Subcontract for the same reasons and under the same circumstances and procedures with respect to the Contractor as the Contractor may terminate with respect to the Owner under the Prime Contract. In the event of such termination by the Subcontractor for any reason which is not the fault of the Subcontractor, Sub-subcontractors or their agents or employees or other persons performing portions of the Work under contract with the Subcontractor, the Subcontractor shall be entitled to recover from the Contractor payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery.

§ 7.2 TERMINATION BY THE CONTRACTOR

§ 7.2.1 If the Subcontractor repeatedly fails or neglects to carry out the Work in accordance with the Subcontract Documents or otherwise to perform in accordance with this Subcontract and fails within a tenday period after receipt of written notice to commence and continue correction of such default or neglect with diligence and promptness, the Contractor may, by written notice to the Subcontractor and without prejudice to any other remedy the Contractor may have, terminate the Subcontract and finish the Subcontract Sum exceeds the expense of finishing the Subcontractor's Work and other damages incurred by the Contractor and not expressly waived, such excess shall be paid to the Subcontractor. If such expense and damages exceed such unpaid balance, the Subcontractor shall pay the difference to the Contractor.

§ 7.2.2 If the Owner terminates the Prime Contract for the Owner's convenience, the Contractor shall promptly deliver written notice to the Subcontractor.

§ 7.2.3 Upon receipt of written notice of termination, the Subcontractor shall

- .1 cease operations as directed by the Contractor in the notice;
- .2 take actions necessary, or that the Contractor may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing Sub-subcontracts and purchase orders and enter into no further Sub-subcontracts and purchase orders.

§ 7.2.4 In case of such termination for the Owner's convenience, the Subcontractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination.

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§ 7.3 SUSPENSION BY THE CONTRACTOR FOR CONVENIENCE

§ 7.3.1 The Contractor may, without cause, order the Subcontractor in writing to suspend, delay or interrupt the Work of this Subcontract in whole or in part for such period of time as the Contractor may determine. In the event of suspension ordered by the Contractor, the Subcontractor shall be entitled to an equitable adjustment of the Subcontract Time and Subcontract Sum.

§ 7.3.2 An adjustment shall be made for increases in the Subcontract Time and Subcontract Sum, caused by suspension, delay or interruption. No adjustment shall be made to the extent that

- .1 performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Subcontractor is responsible; or
- .2 an equitable adjustment is made or denied under another provision of this Subcontract.

§ 7.4 ASSIGNMENT OF THE SUBCONTRACT

§ 7.4.1 In the event the Owner terminates the Prime Contract for cause, this Subcontract is assigned to the Owner pursuant to Section 5.4 of A201–2007 provided the Owner accepts the assignment.

ARTICLE 8 THE WORK OF THIS SUBCONTRACT

The Subcontractor shall execute the following portion of the Work described in the Subcontract Documents, including all labor, materials, equipment, services and other items required to complete such portion of the Work, except to the extent specifically indicated in the Subcontract Documents to be the responsibility of others.

Subcontractor shall execute all ______ as indicated and in accordance with plans and specifications prepared by Lauger Companies, Inc. and as noted on submitted proposal dated ______

ARTICLE 9 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 9.1 Subcontract Time is the period of time, including authorized adjustments, allotted in the Subcontract Documents for Substantial Completion of the Work described in the Subcontract Documents. The Subcontractor's date of commencement is the date from which the Subcontract Time of Section 9.3 is measured; it shall be the date of this Agreement, as first written above, unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Contractor.

§ 9.2 Unless the date of commencement is established by a notice to proceed issued by the Contractor, or the Contractor has commenced visible Work at the site under the Prime Contract, the Subcontractor shall notify the Contractor in writing not less than five days before commencing the Subcontractor's Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

(Insert below any requirements for earlier substantial completion of certain portions of the Subcontractor's Work, if not stated elsewhere in the Subcontract Documents.)

9.3 The Work of this Subcontract shall be substantially completed not later than _____ () days after the Subcontractor's Date of Commencement.

Substantial Completion Date:

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, subject to adjustments of this Subcontract Time as provided in the Subcontract Documents. (*Insert provisions, if any, for liquidated damages relating to failure to complete on time.*)

§ 9.4 With respect to the obligations of both the Contractor and the Subcontractor, time is of the essence of this Subcontract.

§ 9.5 No extension of time will be valid without the Contractor's written consent after claim made by the Subcontractor in accordance with Section 5.3.

ARTICLE 10 SUBCONTRACT SUM

§ 10.2 The Subcontract Sum is based upon the following alternates, if any, which are described in the Subcontract Documents and have been accepted by the Owner and the Contractor: (*Insert the numbers or other identification of accepted alternates.*)

NA

§ 10.3 Unit prices, if any:

(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price Per Unit
NA	NA	NA

§ 10.4 Allowances included in the Subcontract Sum, if any: (Identify allowance and state exclusions, if any, from the allowance price.)

Item NA **Price** NA

ARTICLE 11 PROGRESS PAYMENTS

§ 11.1 Based upon applications for payment submitted by the Contractor to the Owner, the Contractor shall make progress payments on account of the Subcontract Sum to the Subcontractor as provided below and elsewhere in the Subcontract Documents. Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor and Subcontractor for Work properly performed by their contractors and suppliers shall be held by the Contractor and Subcontractor for those contractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor or Subcontractor for which payment was made to the Contractor by the Owner or to the Subcontractor by the Contractor, as applicable. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor or Subcontractor, shall create any fiduciary liability or tort liability on the part of the Contractor or Subcontractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor or Subcontractor for breach of the provision.

§ 11.2 The period covered by each application for payment shall be from the 25^{th} calendar day of one month ending on the 25^{th} day of the following month.

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§ 11.3 Provided an application for payment is received by the Contractor not later than the $_25^{th}$ day of the month, the Contractor shall include the Subcontractor's Work covered by that application in the next application for payment which the Contractor is entitled to submit to the Owner. The Contractor shall pay the Subcontractor each progress payment no later than ten working days after the Contractor receives payment from the Owner.

§ 11.4 If the Subcontractor's application for payment is received by the Contractor after the application date fixed above, the Subcontractor's Work covered by it shall be included by the Contractor in the next application for payment submitted to the Owner.

§ 11.5 The Subcontractor shall submit to the Contractor a schedule of values prior to submitting the Subcontractor's first Application for Payment. Each subsequent application for payment shall be based upon the most recent schedule of values submitted by the Subcontractor in accordance with the Subcontract Documents. The schedule of values shall allocate the entire Subcontract Sum among the various portions of the Subcontractor's Work and be prepared in such form and supported by such data to substantiate its accuracy as the Contractor may require. This schedule, unless objected to by the Contractor, shall be used as a basis for reviewing the Subcontractor's applications for payment.

§ 11.6 Applications for payment submitted by the Subcontractor shall indicate the percentage of completion of each portion of the Subcontractor's Work as of the end of the period covered by the application for payment.

§ 11.7 Subject to the provisions of the Subcontract Documents, the amount of each progress payment shall be computed as set forth in the sections below.

§ 11.7.1 Take that portion of the Subcontract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Subcontractor's Work by the share of the total Subcontract Sum allocated to that portion of the Subcontractor's Work in the schedule of values, less that percentage actually retained, if any, from payments to the Contractor on account of the Work of the Subcontractor. Pending final determination of cost to the Contractor of changes in the Work that have been properly authorized by the Contractor, amounts not in dispute shall be included to the same extent provided in the Prime Contract, even though the Subcontract Sum has not yet been adjusted;

§ 11.7.2 Add that portion of the Subcontract Sum properly allocable to materials and equipment delivered and suitably stored at the site by the Subcontractor for subsequent incorporation in the Subcontractor's Work or, if approved by the Contractor, suitably stored off the site at a location agreed upon in writing, less the same percentage retainage required by the Prime Contract to be applied to such materials and equipment in the Contractor's application for payment;

§ 11.7.3 Subtract the aggregate of previous payments made by the Contractor; and

§ 11.7.4 Subtract amounts, if any, calculated under Section 11.7.1 or 11.7.2 that are related to Work of the Subcontractor for which the Owner has withheld or nullified, in whole or in part, a certificate of payment for a cause that is the fault of the Subcontractor.

§ 11.8 Upon the partial or entire disapproval by the Contractor of the Subcontractor's application for payment, the Contractor shall provide written notice to the Subcontractor. When the basis for the disapproval has been remedied, the Subcontractor shall be paid the amounts withheld.

ARTICLE 12 FINAL PAYMENT

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§ 12.1 Final payment, constituting the entire unpaid balance of the Subcontract Sum, shall be made by the Contractor to the Subcontractor when the Subcontractor's Work is fully performed in accordance with the requirements of the Subcontract Documents and the Contractor has received payment from the Owner. (*Insert provisions for earlier final payment to the Subcontractor, if applicable.*)

§ 12.2 Before issuance of the final payment, the Subcontractor, if required, shall submit evidence satisfactory to the Contractor that all payrolls, bills for materials and equipment, and all known indebtedness connected with the Subcontractor's Work have been satisfied. Acceptance of final payment by the Subcontractor shall constitute a waiver of claims by the Subcontractor, except those previously made in writing and identified by the Subcontractor as unsettled at the time of final application for payment.

ARTICLE 13 INSURANCE AND BONDS

§ 13.1 The Subcontractor shall purchase and maintain insurance of the following types of coverage and limits of liability as will protect the Subcontractor from claims that may arise out of, or result from, the Subcontractor's operations and completed operations under the Subcontract:

Type of insurance or bond	Limit of liability or bond amount (\$ 0.00)
Workers' Compensation	Statutory; to comply with all applicable laws, including those
	of the state in which the Project is constructed and the State
	of Subcontractor's principal place of business.
Commercial General Liability	 \$1,000,000 Each Occurrence Limit \$1,000,000 Personal & Advertising Limit \$50,000 Fire Damage (any one fire) \$5,000 Medical Expense Limit-any on person \$1,000,000 Products-Completed Operations Aggregate \$2,000,000 General Aggregate
Commercial Automobile Liability	Property Damage, \$1,000,000 Each Occurrence; covering Subcontractor's owned, non-owned and Personal Injury and Death \$1,000,000 Each Person, hired motor vehicles \$1,000,000 Each Occurrence
Umbrella	\$1,000,000 Occurrence \$2,000,000 Aggregate

§ 13.2 Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Subcontractor's Work until the date of final payment and termination of any coverage required to be maintained after final payment to the Subcontractor, and, with respect to the Subcontractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Prime Contract.

§ 13.3 Certificates of insurance acceptable to the Contractor shall be filed with the Contractor prior to commencement of the Subcontractor's Work. These certificates and the insurance policies required by this Article 13 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Contractor. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final application for

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payment as required in Article 12. If any information concerning reduction of coverage is not furnished by the insurer, it shall be furnished by the Subcontractor with reasonable promptness according to the Subcontractor's information and belief.

§ 13.4 The Subcontractor shall cause the commercial liability coverage required by the Subcontract Documents to include: (1) the Contractor and the Owner as additional insured for claims caused in whole or in part by the Subcontractor's negligent acts or omissions during the Subcontractor's operations; and (2) the Contractor as an additional insured for claims caused in whole or in part by the Subcontractor's negligent acts or omissions during the

§ 13.5 The Contractor shall furnish to the Subcontractor satisfactory evidence of Contractor under the Prime Contract.

§ 13.6 The Contractor shall promptly, upon request of the Subcontractor, furnish a copy made of any bond covering payment of obligations arising under the Subcontract.

§ 13.7 Performance Bond and Payment Bond:

(If the Subcontractor is to furnish bonds, insert the specific requirements here.)

Bond type	Bond amount (\$ 0.00)	Bond delivery date	Bond form
NA	NA	NA	NA

§ 13.8 PROPERTY INSURANCE

§ 13.8.1 When requested in writing, the Contractor shall provide the Subcontractor with copies of the property and equipment policies in effect for the Project. The Contractor shall notify the Subcontractor if the required property insurance policies are not in effect.

§ 13.8.2 If the required property insurance is not in effect for the full value of the Subcontractor's Work, then the Subcontractor shall purchase insurance for the value of the Subcontractor's Work, and the Subcontractor shall be reimbursed for the cost of the insurance by an adjustment in the Subcontract Sum.

§ 13.8.3 Property insurance for the Subcontractor's materials and equipment required for the Subcontractor's Work, stored off site or in transit and not covered by the Project property insurance, shall be paid for through the application for payment process.

§ 13.9 WAIVERS OF SUBROGATION

The Contractor and Subcontractor waive all rights against (1) each other and any of their subcontractors, subsubcontractors, agents and employees, each of the other, and (2) the Owner, separate contractors, and any of their subcontractors, sub-subcontractors, agents and employees for damages caused by fire or other causes of loss to the extent covered by property insurance provided under the Prime Contract or other property insurance applicable to the Work, except such rights as they may have to proceeds of such insurance held by the Owner as a fiduciary. The Subcontractor shall require of the Subcontractor's Sub-subcontractors, agents and employees, by appropriate agreements, written where legally required for validity, similar waivers in favor of the parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

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ARTICLE 14 TEMPORARY FACILITIES AND WORKING CONDITIONS

§ 14.1 The Contractor shall furnish and make available at no cost to the Subcontractor the Contractor's temporary facilities, equipment and services, except as noted below:

Temporary Facility, Equipment or Service Cost, if any (\$ 0.00) NA

§ 14.2 Specific working conditions:

(Insert any applicable arrangements concerning working conditions and labor matters for the Project.)

ARTICLE 15 MISCELLANEOUS PROVISIONS

§ 15.1 Where reference is made in this Subcontract to a provision of another Subcontract Document, the reference refers to that provision as amended or supplemented by other provisions of the Subcontract Documents.

§ 15.2 Payments due and unpaid under this Subcontract shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located. (*Insert rate of interest agreed upon, if any*.)

Per annum

§ 15.3 Retainage and any reductions thereto is as follows:

10% retainage on entire Subcontract Sum

§ 15.4 The Contractor and Subcontractor waive claims against each other for consequential damages arising out of or relating to this Subcontract, including without limitation, any consequential damages due to either party's termination in accordance with Article 7.

ARTICLE 16 ENUMERATION OF SUBCONTRACT DOCUMENTS

§ 16.1 The Subcontract Documents, except for Modifications issued after execution of this Subcontract, are enumerated in the sections below.

§ 16.1.1 This executed Standard Form of Agreement Between Contractor and Subcontractor.

§ 16.1.2 The Prime Contract, consisting of the Agreement between the Owner and Contractor dated as first entered above and the other Contract Documents enumerated in the Owner-Contractor Agreement.

§ 16.1.3 The following Modifications to the Prime Contract, if any, issued subsequent to the execution of the Owner-Contractor Agreement but prior to the execution of this Agreement:

Modification	Date
N/A	N/A

§ 16.1.4 Additional Documents, if any, forming part of the Subcontract Documents:

LAUGER COMPANIES.	INC.

.1 Other documents:

Subcontractor Proposal Dated: Notice to Proceed Dated:

This Agreement entered into as of the day and year first written above.

CONTRACTOR (Signature)	SUBCONTRACTOR (Signature)
Craig Lauger, President	
(Printed name and title)	(Printed name and title)
(Date)	(Date)
(Witnessed)	(Witnessed)

Section 6 – Lauger Companies Incorporated Purchase Order Terms and Conditions

LAUGER COMPANIES, INC.

PURCHASE ORDER TERMS AND CONDITIONS

Vendor shall comply with the following upon acceptance and agreement to the Purchase Order issued by Lauger Companies, Inc.:

- 1. Terms of Payment: On or before the twenty-fifth (25th) day of each month, or otherwise as may be directed by Contractor, Supplier shall present to Contractor an invoice for the materials and/or labor delivered/provided to the job address, or designated shipping address for the project, during the preceding month, and said invoice, if approved by Contractor, Architect, and /or Owner, shall be paid out in funds paid to Contractors by Owner within seven (7) days after receipt by Contractor of payment thereof from Owner, provided progress of the work and payments for labor used and materials purchased by Supplier have been rendered satisfactory. Payments will be made in US Dollars by check.
- 2. Vendor shall supply to the Contractor no later the 5 days after the receipt of this purchase order a copy of their completed W-9 and tax ID number (or 1099 and social security number if an individual) and a copy of their insurance certificates including workers compensation and general liability. No payments shall be made until these documents are received by Contractor.
- 3. This Purchase Order and Vendor's rights hereunder are expressly made subject to any and all provisions of renegotiations, revisions, cancellation or termination, whether in whole or in part to any such instance of the Contract between Contractor and the Owner of the Project, whether such provisions are contained in such Contract or arise by operation of other law.
- 4. The prices and amounts set out in this Purchase Order are the total prices and amounts to be paid by Contractor; no sales taxes or other taxes or charges of any kind not shown on this Purchase Order will be paid by Contractor. Sales taxes are included in the prices shown unless other specified on the Purchase Order.
- 5. This Purchase Order, when signed and accepted, constitutes the entire agreement between Contractor and Vendor. All previous quotations, correspondence, negotiations, etc., are completely superseded by this Purchase Order.
- 6. Render SEPARATE invoices for each and EVERY shipment to the job site or designated shipping address.
- 7. Indicate under date of invoice whether "Partial Billing" or "Final Billing". Provide a tally of total Purchase Order price less prior and current billings, if partial, with balance clearly indicated.
- 8. MAKE NO CHANGES to this Purchase Order as to quantities, descriptions, prices, and f.o.b. points, etc., except upon direct authority of Contractor.
- 9. Vendor acknowledges that "time is of the essence" and the critical nature of the Project Schedule. Should liquidated damages be assessed to Contractor due to late supply by Vendor for whatsoever reason not previously brought to the attention of and approved by the Contractor, Vendor agrees to pay to the Contractor the portion of such damages for which he has been responsible.
- 10. If goods be shipped by other than Vendor, mark Vendor's name and Purchase Order Number on all tallies or memos. Mark the Exterior of all packages with Purchase Order Number and/or Project Title. Enclose tally or shipping memo in each package.
- 11. If Vendor is making a jobsite delivery by other than common carrier, he shall furnish Insurance Certificates with minimum insurance requirements to be carries by this Vendor that coincide with those required in the Project Documents.
- 12. All submittals and shop drawings as required by the Contract Documents shall be submitted as required by the Project Specifications or as directed by Contractor.

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LAUGER COMPANIES INC, FRONT END

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END OF SECTION 00 01 15

SECTION 01 00 00 - SPECIAL REQUIREMENTS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

CONTRACT FORMS

A. The following standard forms issued by the American Institute of Architects will be used on this project:

1.	Standard Form of Agreement Between		
	Owner and Construction Manager as Constructor	A 133	2009
2.	Application and Certificate for Payment	G 702	1992
3.	Continuation Sheet	G 703	1992
4.	Change Order	G 701	2001
5.	Certificate of Substantial Completion	G 704	2000
6.	Contractor's Affidavit of Payment of		
	Debts and Claims	G 706	1994
7.	Consent of Surety Company to Final Payment	G 707	1994
8.	Consent of Surety Company to Reduction in		
	or Partial Release of Retainage	G 707A	1994

B. The above forms remain subject to final negotiation and revision prior to execution.

ADVERTISING

A. The Contractor or any Subcontractors shall not advertise or publish without the Owner's prior consent, the fact that the Owner has entered into this contract, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state or local government.

RIGHT OF ENTRY

- A. The Owner reserves the right of entry to the property at all times for inspection of the work.
- B. The Owner may perform collateral work or have work under separate contracts performed on the property. Owner must coordinate work performed under separate contracts with the Contractor and must grant the Contractor time extensions to his contract if such additional work causes delays.

PROGRESS MEETINGS

A. The Contractor shall meet with the Architect and Owner's representative as often as necessary to maintain communications between all parties as may be necessary to maintain scheduling and execution of the work in a manner that is least disruptive to the Owner.

MAINTENANCE MANUALS

- A. Furnish the Owner four (4) copies of maintenance recommendations for all work installed.
- B. Maintenance recommendations shall be furnished in a form approved by the Architect and shall be neatly typewritten and bound.

MANUFACTURER'S DIRECTIONS

A. All manufactured articles, materials, appliances and equipment shall be applied, installed, connected, erected, used, cleaned, conditioned and placed in operation as directed by the representative manufacturers, insofar as these directions are applicable to this particular project and are not in conflict with superior requirements in the specifications.

ASBESTOS

- A. The General Contractor shall provide certification from himself, all Subcontractors, vendors, suppliers, entities, etc. stating that materials and/or equipment used in the construction of the project do not contain asbestos in any form or concentration. **MSDS sheets on all materials used must be provided.**
- B. The Owner will provide copies of existing asbestos surveys of the existing Schools and if no surveys have been done, will contract with a licensed individual or company to have a survey done.

RECORD DRAWINGS, AS-BUILT DRAWINGS

- A. The Contractor shall provide as-built drawings which clearly show all differences between the contract work as drawn and as actually installed, as well as work added to the contract which is not indicated on the contract drawings.
- B. Special attention should be paid to precisely documenting changes to concealed work, meaning work installed underground or in areas which can not be readily inspected by use of access panels, inspection plates or other removable features.
- C. The Contractor shall maintain a set of record drawings at the job site. These drawings shall be kept legible and current and shall be available for inspection at all times by the Architect.
- D. Upon substantial completion of the work, transfer the changes noted on the record drawings to the as-built drawings.
- E. As-built drawings shall be prepared on Xerox copies paid for by the Contractor from the as-built drawing allowance. As-builts shall be provided for all sheets of the drawings.
- F. In showing changes in the work or added work, use the same legends as used on the contract drawings. The as-built drawings shall consist of a complete set of Xerox copies. If no changes are made on a particular as-built drawing, a notation reading "No Change" shall be made in the lower right hand corner of the drawing.
- G. As-built drawings shall contain the names, addresses and phone numbers of all the Subcontractors and shall be signed by the Contractor.
- H. Upon completion of the as-built drawings, submit one set of as-built copies to the Architect for approval. Any changes required by the Architect must be made and upon receipt of approval of modified drawings, deliver the as-built Xerox copies plus one additional set of as-built copies. The additional set of as-built copies shall be at Contractor's expense and are not part of the as-built drawing allowance.

I. The Architect shall be the sole judge of acceptability of the as-built drawings. Final payment on the project will not be made until the as-built drawings and copies as described above are delivered to and accepted by the Architect.

END OF SECTION 01 00 00

SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. A. Change procedures.
- B. B. Defect assessment.

1.2 GENERAL

A. A. Coordinate requirements of this Section with the requirements of the General Conditions of the Contract concerning change procedures.

1.3 CHANGE PROCEDURES

- A. Submittals: Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. Minor Changes: The Architect/Engineer may advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on Minor Change form or by other similar documents in the form issued by the Architect.
- C. Change Proposal Request: The Architect may issue a Change Proposal Request (CPR) or other similar request for proposal in the form issued by the Architect, including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change and the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate in the form of a Change Proposal so as to not cause delays in the Project.
- D. Use of allowances must be approved by issuance of Allowance Expenditure Authorization (AEA) by Architect prior to modification of the schedule of values. The AEA may be comprised of a single executed Change Proposal, an accumulation of executed Change Proposals, or other similar documentation in the form allowed by the Architect in accordance with the General Conditions of the Contract.
- E. Contractor may propose changes which, in his opinion, will provide value to the Owner, by submitting a request for change to Architect, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors. If accepted by Architect and approved by Owner, submit a Change Order in accordance with the requirements of this Section. This request will not be considered a substitution except as defined by Section 01 25 13, Product Substitution Procedures. Owner is not obligated to accept this request.
- F. Construction Change Directive: Architect/Engineer may issue directive, on AIA Form G713 Construction Change Directive or other similar document in the form issued by the Architect, and signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and

designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.

- G. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.
- H. Change Order Forms: AIA G701 Change Order.
- I. Execution of Change Orders: The Architect will prepare and sign the Change Order, the contractor shall sign the Change Order indicating acceptance of the change, and then the Owner will execute the Change Order.
- J. Correlation Of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
 - 2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 - 3. Promptly enter changes in Project Record Documents.

1.4 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements at no additional cost to the Owner.
- B. If, in the opinion of the Architect/Engineer or Owner, it is not practical to remove and replace the Work, the Architect will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but sum/price will be adjusted to new sum/price at the discretion of Architect or Owner.
- D. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.
- E. Authority of Architect/Engineer, or other appropriate agent identified to perform assessment by the Architect/Engineer or Owner, to assess defects and identify payment adjustments, is final.
- F. Non-Payment For Rejected Products: In addition to replacement of rejected Work, payment will not be made for rejected products for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from transporting vehicle.
 - 4. Products placed beyond lines and levels of required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected products.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

A. Not Used.

END OF SECTION 01 26 00

SECTION 01 30 00 – ADMINISTRATIVE REQUIREMENTS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

ADVERTISING

A. The Contractor or any Subcontractors shall not advertise or publish without the Owner's prior consent, the fact that the Owner has entered into this contract, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state or local government.

CONTRACT FORMS

A. The following standard forms issued by the American Institute of Architects will be used on this project:

 Standard Form of Agreement Between 		
Owner and Contractor	A 101	2007
2. Performance Bond and Payment Bond	A 312	1992
Application and Certificate for Payment	G 702	1992
4. Continuation Sheet	G 703	1992
5. Change Order	G 701	2001
6. Certificate of Substantial Completion	G 704	2000
Contractor's Affidavit of Payment of		
Debts and Claims	G 706	1994
8. Contractor's Affidavit of Release of Liens	G 706A	1994
9. Consent of Surety Company to Final Payment	G 707	1994
10. Consent of Surety Company to Reduction in		
or Partial Release of Retainage	G 707A	1994

SCHEDULING THE WORK

- A. The work shall be carefully scheduled and executed in a manner that will cause the least possible interference with the Owner's operations and property.
- B. Prior to beginning the actual work, the Architect, Contractor and Owner's representative will meet on site to discuss the final scheduling and coordination of the work.

RIGHT OF ENTRY

- A. The Owner reserves the right of entry to the property at all times for inspection of the work.
- B. The Owner may perform collateral work or have work under separate contracts performed on the property. Owner must coordinate work performed under separate contracts with the Contractor and must grant the Contractor time extensions to his contract if such additional work causes delays.

PROGRESS MEETINGS

A. The Contractor shall meet with the Architect and Owner's representative as often as necessary to maintain communications between all parties as may be necessary to maintain scheduling and execution of the work in a manner that is least disruptive to the Owner.

MAINTENANCE MANUALS

- A. Furnish the Owner four (4) copies of maintenance recommendations for all work installed.
- B. Maintenance recommendations shall be furnished in a form approved by the Architect and shall be neatly typewritten and bound.

MANUFACTURER'S DIRECTIONS

A. All manufactured articles, materials, appliances and equipment shall be applied, installed, connected, erected, used, cleaned, conditioned and placed in operation as directed by the representative manufacturers, insofar as these directions are applicable to this particular project and are not in conflict with superior requirements in the specifications.

ASBESTOS

- A. The General Contractor shall provide certification from himself, all Subcontractors, vendors, suppliers, entities, etc. stating that materials and/or equipment used in the construction of the project do not contain asbestos in any form or concentration. **MSDS sheets on all materials used must be provided.**
- B. The Owner is having existing construction surveyed for asbestos containing material (ACM). If asbestos containing material is discovered in this survey the Owner will abate, encapsulate or otherwise deal with the ACM under a separate contract.

END OF SECTION 01 30 00

SECTION 01 32 16 – CONSTRUCTION PROGRESS SCHEDULE

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.1 SUBMITTALS

- A. Schedules:
 - 1. Preliminary Analysis: Within ten (10) days after receipt of Award of Contract, submit a preliminary construction schedule for review by Owner and Architect.
 - 2. Construction Schedule: Within fourteen (14) days after receipt of Notice to Proceed, submit one (1) reproducible and four (4) prints of the approved construction schedule.
 - 3. Updated Construction Schedule(s): Within 48 hours (2 working days) of request, provide Architect one (1) copy of revised construction schedule congruent with actual construction activity as scheduled. These updates are for the Architect to confirm construction activities are on schedule.
 - 4. Recovery Schedule: In the event of significant schedule slippage, as determined by the Architect, within 48 hours (2 working days) the Contractor shall provide a project recovery schedule indicating how the Work is to be completed to return to the original project schedule.

1.2 RELIANCE UPON SCHEDULE

A. The construction schedule as approved by the Architect will be an integral part of the contract and will establish conditions for various activities and phases of constructions.

1.3 CONSTRUCTION SCHEDULE

- A. Diagram: Graphically show the order of all activities necessary to complete the work and the sequence in which each activity is to be accomplished. Indicate critical path.
- B. In addition to project construction, activities shown on the diagram shall include but not necessarily be limited to:
 - 1. Project mobilization
 - 2. Submittals and approvals of shop drawings and samples
 - 3. Phasing of construction
 - 4. Procurement of equipment and critical materials
 - 5. Fabrication and installation of special material and equipment
 - 6. Final clean-up
 - 7. Final inspection and testing
- C. The construction schedule shall be maintained and current at all times and shall be submitted with each Application for Payment.
- D. Provide a current "three week look ahead" based on the overall project schedule at each project meeting.

1.4 CONSTRUCTION SCHEDULE LIMITATIONS

- A. A. Work performed under this Contract shall be done in accordance with the following paragraphs:
 - 1. All work may proceed immediately upon Notice to Proceed and continue uninterrupted.

- 2. Under the Base Proposal only, the successful Offeror will be 1) entitled to certain extensions of time and 2) subject to liquidated damages for work not completed beyond the agreed date which the Contractor shall require for Substantial Completion of the work included in this contract. Refer to Supplementary Conditions for additional requirements and liquidated damages.
- 3. Failure to complete and close-out project after substantial completion may result in liquidated damages. Refer to Supplementary Conditions for additional requirements and liquidated damages.
- 4. Certificate of Substantial Completion will be issued for any of the above mentioned areas of work which are complete prior to the completion of the entire project.
- 5. The Owner may at his discretion approve changes recommended by the successful Offeror to the above-mentioned schedule provided that the Owner's use of newly completed areas are not disrupted.

PART 2 - PRODUCTS

A. Not Used

PART 3 - EXECUTION

A. Not Used

END OF SECTION 01 32 16

SECTION 01 33 00 – SUBMITTAL PROCEDURES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 SUBMITTAL PROCEDURES

- A. Transmit to the Architect/Engineer each item indicated in individual specification sections with approved form identifying:
 - 1. Date of submission and dates of any previous submissions.
 - 2. Project title and number
 - 3. Contract identification
 - 4. Names of Contractor, Supplier, Manufacturer
 - 5. Pertinent drawing sheet and detail number, and specification section number, as appropriate
 - 6. Deviations from Contract Documents.
- B. Contractor shall be responsible for initial review prior to submittal to Architect/Engineer to verify adequacy and conformance to contract requirements. Lack of review by Contractor shall be grounds for rejection.
- C. Apply Contractor's stamp, signed, to each item submitted, certifying that review and verification of products, field dimensions, adjacent construction work and coordination of information is in accordance with the requirements of the work and Contract Documents.
- D. Transmit each item in accordance with approved schedule, and in such sequence as to cause no delay in the work or in the work of any other contractor. Allow minimum of ten (10) days for adequate Architect/Engineer/Owner review of each submittal. Time may vary according to scope and complexity of item under review. Allow adequate time in schedule for revisions and resubmittal as deemed necessary.
- E. Submit one (1) print copy of the entire submittal package and electronic copy of the same to the Architect. Transmit the printed copy of consultant and engineering submittals directly to respective consultants with a transmittal and the electronic original to the Architect. The Architect and Consultant will make up the printed copy and return to the Contractor upon completion of review. It will be the Contractor's responsibility to scan and distribute the necessary quantity of copies of the reviewed submittal to all concerned parties.
- F. Submit each item according to individual specification sections and identified by Division, Section, and individual submittal number. Maintain log according to each Division.
- G. Revise and resubmit submittal as required; identify all changes made since previous submittal.
 - 1. Make any corrections or changes in the submittals required by the Architect/Engineer and resubmit until approved.
 - 2. Submit new submittal as required for initial submittal.

1.2 PROPOSED PRODUCTS LIST

- A. Within 30 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.3 PRODUCT DATA

- A. Submit to Architect for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Submit the number of copies of product data and samples which the Contractor and his subcontractors need for their use PLUS two (2) additional sets for the Architect, one (1) additional set for the Owner and one (1) additional set for each of the Architect's consultants involved with the particular Section of Work.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project

1.4 MSDS SHEETS

- A. The Texas Asbestos Health Protection Rules (Title 25. Health Services, Part I. Texas Department of Health Chapter 295 - Occupational Health, Subchapter C - Texas Asbestos Health Protection) were approved and became effective on October 20, 1992, and amended March 27, 2003. The Rules established the procedures and means to implement the provisions of Senate Bill 1341 and House Bill 79.
- B. Pursuant to the above referenced Rules, submit MSDS Sheets showing that materials used in the Project, contain 1.0 percent or less asbestos. This requirement pertains to every material in every Section of the Specifications, as applicable to the Project, whether written therein, or not. Submit MSDS Sheets for materials, including, but not limited to the following, as applicable to the Project.
 - 1. Surfacing Materials:
 - a. acoustical plaster;
 - b. decorative plaster/stucco;
 - c. textured paint/coating;
 - d. spray applied insulation;
 - e. blown-in insulation
 - f. fire proofing insulation;
 - g. joint compound; and
 - h. spackling compounds
 - 2. Thermal System Insulation:
 - a. taping compounds (thermal)
 - b. HVAC duct insulation;
 - c. boiler insulation;
 - d. breaching insulation;
 - e. pipe insulation; and
 - f. thermal paper products
 - 3. Miscellaneous Material:
 - a. cement wallboard/siding;
 - b. asphalt/vinyl floor tile
 - c. vinyl sheet flooring/vinyl wall coverings;
 - d. floor backing;
 - e. construction mastic;
 - f. ceiling tiles/lay-in ceiling panels;
 - g. packing materials;
 - h. h. high temperature gaskets;
 - i. laboratory hoods/table tops
 - j. fire blankets/curtains;
 - k. elevator equipment panels;
 - I. elevator brake shoes;

- m. ductwork flexible fabric connections;
- n. cooling towers;
- o. heating and electrical ducts;
- p. electrical panel partitions;
- q. electrical cloth/electrical wiring insulation;
- r. chalkboards;
- s. roofing shingles/tiles;
- t. roofing felt;
- u. base flashing;
- v. fire doors;
- w. caulking/putties;
- x. adhesives/mastics; and
- y. wallboard

1.5 SHOP DRAWINGS

- A. Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Submit one (1) opaque print of the shop drawing for the Architect plus one (1) additional opaque print for each of the Architect's consultants involved in the particular Section of Work plus two (2) additional opaque prints for the Owner.
- D. All dimensions indicated on the drawings are based on the specific models and manufacturers of products, equipment, fixtures and miscellaneous items specified. If the Contractor uses an approved product by another listed manufacturer which is different than the specific model and manufacturer listed in these specifications, then the Contractor shall be solely responsible for the coordination of any dimensional changes required, including structural, relocation of walls, equipment, fixtures, ceilings and miscellaneous items. When dimensional changes are required in these situations, the Contractor shall submit a proposed modification drawing to the Architect for approval prior to proceeding with the work. All causes and effects of the dimensional change shall be indicated on the Contractor's drawing submittal.

1.6 SAMPLES

- A. Submit for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Submit for aesthetic, color, or finish selection. Submit full range of manufacture's standard colors, textures, and patterns for Architect's selection.
- C. Submit samples to illustrate functional characteristics of the Product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.
- D. Submit the number specified in respective Specification Section; minimum of two (2), of which one (1) will be retained by Architect.
- E. Reviewed samples which may be used in the Work are indicated in individual specification sections.
- F. Samples will not be used for testing purposes unless specifically stated in specification section.

1.7 DESIGN DATA

- A. When required, submit for Architect/Engineer's knowledge as contract administrator or for Owner.
- B. Submit design data for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.8 TEST REPORTS

- A. In accordance with Section 014100, Testing Laboratory Services, submit test reports for Architect/Engineer's knowledge as contract administrator or for Owner. Architect will determine whether corrective action is required.
- B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect, in quantities specified.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect and Owner.
- D. Submit required certificates in duplicate.

1.10 GUARANTEES

- A. When specified in individual specification sections, submit warranties by manufacturer, installation/application subcontractor, fabricator, or Contractor to Architect, in quantities specified.
- B. Submit warranties in accordance with Section 01 77 00, Project Closeout.

1.11 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect for delivery to Owner in quantities specified.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- C. Submit required instructions in duplicate.

1.12 MANUFACTURER'S FIELD REPORTS

- A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.
- B. Submit report in quantity specified or required within ten (10) days of observation to Architect for information. Architect will determine whether corrective action is required.
- C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.13 ERECTION DRAWINGS

A. When required, submit drawings for Architect/Engineer's benefit or for Owner.

- B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner. Architect will determine whether corrective action is required.

1.14 COORDINATION DRAWINGS

A. Areas where multiple trades and disciplines have concurrent or sequenced work, the Contractor shall submit coordination drawings indicating coordination of the work among all trades to reduce conflicts. All coordination, review and approval shall be complete prior to the beginning of installation of any work in these areas. Failure to coordinate work in these areas shall be grounds for disapproval of any requests for change orders, substitution requests, alternate means to achieve desired result or schedule modifications. Areas include, but are not limited to, above ceilings in corridors, chase walls, and any other condition where sequencing and conflicts among trades may arise.

1.15 CONSTRUCTION PHOTOGRAPHS

- A. Provide photographs monthly of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Architect/Engineer.
- B. Photographs: digital; sent to Architect via email, or provide on non-rewritable compact disk. Along with Application for Payment, include one (1) reproducible copy of contact sheet of all photographs taken during that period indicating Work completed and identified as stated below.
- C. Photograph project conditions five (5) days maximum prior to submitting indicating relative progress of the Work. Do not photograph conditions previously photographed if no work has proceeded. As able, take photographs from same position indicating same view in successive installments.
- D. Take photographs as evidence of existing project conditions as follows:
 - 1. Site: Take four (4) site photographs at project corners
 - 2. Interior views: Take two (2) minimum interior photographs of each space under construction from differing directions or as required.
 - 3. Exterior views: Take two (2) photographs of each elevation.
 - 4. Details: Take as required to document concealed conditions, including, but not limited to, underground construction, utility penetrations and installation, steel erection, concrete and masonry reinforcing, waterproofing and flashing, and roofing installation.
 - 5. Cavity wall: Provide photographic evidence that cavity wall was maintained clean and free of debris and excess mortar.
 - 6. Photos of underground items, including but not limited to:
 - a. Vapor barrier under slabs clearly showing proper penetration preparation
 - b. Irrigation piping
 - c. Valves
 - d. Spray heads
 - e. Grease interceptor
 - f. Below grade dampproofing and waterproofing around building perimeter for suspended slab
- E. Identify each photograph with name of Project, room or view, and date.

PART 2 - PRODUCTS

A. Not Used

PART 3 - EXECUTION

A. Not Used

END OF SECTION 01 33 00

SECTION 01 41 00 - TESTING LABORATORY SERVICES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General Conditions and other Division-1 Specification Sections apply to work specified in this Section.

PROCEDURE

A. Owner's Testing Laboratory:

An independent testing laboratory will be selected and furnished by the Owner to inspect and test the materials and methods of construction as hereinafter specified for compliance with the specification requirements of the Contract Documents and to perform such other specialized technical services as required by the Owner or his representative. All testing lab services shall be paid for by the owner.

QUALIFICATIONS OF TESTING LABORATORY

- A. The Testing Laboratory selected shall meet the basic requirements of ASTM E329 "Standard of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction", and shall submit to the Contractor, Owner, Architect, and Engineer, a copy of the report of inspection of their facilities made by the Materials Reference Laboratory of the National Bureau of Standards during the most recent tour of such inspections, and shall submit a memorandum stating steps taken to remedy all deficiencies reported by this inspection.
- B. The Testing Laboratory selected shall meet "Recommended Requirements for Independent Laboratory Qualification", latest edition, as published by the American Council of Independent Laboratories.
- C. Testing machines shall be calibrated at intervals not exceeding 12 months by devices of accuracy traceable to the National Bureau of Standards or accepted values of natural physical constants. The Testing Laboratory shall submit a copy of certificate of calibration made by an accredited calibration agency.
- D. Tests and inspections shall be conducted in accordance with specified requirements, and if not specified, in accordance with the applicable standards of the American Society for Testing and Materials or other recognized and accepted authorities in the field.

AUTHORITIES AND DUTIES OF THE LABORATORY

A. Attending Preconstruction Conferences:

The Owner's Testing Laboratory shall obtain and review the project plans and specifications with the Architect and Engineer as soon as possible prior to the start of construction. The Owner's Laboratory shall attend preconstruction conferences with the Architect, Engineer, Project Manager, General Contractor, and Material Suppliers as required to coordinate materials

inspection and testing requirements with the planned construction schedule. The Owner's Laboratory will participate in such conferences throughout the course of the project.

B. Outline Testing Program:

The Owner's Testing Laboratory shall be responsible for outlining a written detailed testing program conforming to the requirements as specified in the Contract Documents and in consultation with the Owner, Contractor, Architect, and Engineer. The testing program shall contain an outline of inspections and tests to be performed with reference to applicable sections of the specifications or drawings and a list of personnel assigned to each portion of the work. Such testing program shall be submitted to the Owner, Contractor, Architect, and Engineer five weeks in advance of the start of construction so as not to delay the start of construction. It shall be the Testing Laboratory's responsibility that such program conforms to the requirements of the Specifications and drawings and falls within the budget for testing laboratory services. If the allocated budget is not sufficient to cover the services as outlined in the Specifications, it shall be the testing Laboratory to notify the Contractor, Architect, Engineer, and Owner so that the Laboratory services can be modified accordingly prior to the start of construction. Furthermore, the Testing Laboratory shall monitor its expenditures throughout the course of the job and notify immediately the Owner, Contractor, Architect, and Engineer, of any significant deviation from the planned testing program and budget.

C. Cost Proposal:

The Testing Laboratory's proposal to the Owner shall contain the outlined testing program based on a unit price basis for tests and inspections and on an hourly basis for personnel. A total estimated price shall also be submitted.

D. Cooperation with Design Team:

The Laboratory shall cooperate with the Architect, Engineer, and Contractor and provide qualified personnel promptly on notice.

- E. The Laboratory shall perform the required inspections, sampling, and testing of materials as specified under each section and observe methods of construction for compliance with the requirements of the Contract Documents.
- F. Inspections Required by Government Agencies:

The Testing Laboratory shall perform all inspections and submit all reports and certifications as required by all government agencies.

G. Notification of Deficiencies in the Work:

The Laboratory shall notify the Architect, Engineer, and Contractor first by telephone and then in writing of observed irregularities and deficiencies of the work and other conditions not in compliance with the requirements of the Contract Documents.

- H. Reports:
 - 1. Information on Reports:

The Laboratory shall submit copies of all reports of inspections and tests promptly and directly to the parties named below. All reports shall contain at least the following information:

- a. Project Name
- b. Date report issued
- c. Testing Laboratory name and address
- d. Name and signature of inspector
- e. Date of inspection and sampling
- f. Date of test
- g. Identification of product and Specification section
- h. Location in the project
- i. Identification of inspection or test
- j. Record of weather conditions and temperature (if applicable)
- k. Results of test regarding compliance with Contract Documents.
- 2. Copies:

The Laboratory shall send certified copies of test and inspection reports to the following parties:

- a. 2 copies to the Owner or his representative
- b. 2 copies to the General Contractor
- c. 1 copy to the Architect
- d. 1 copy to the Engineer of responsibility
- e. 1 copy to the Supplier of the material tested
- I. Accounting:

The Testing Laboratory shall be responsible for separating and billing costs attributed to the Owner and cost attributed to the Contractor.

J. Obtaining Product and Material Certifications:

The Testing Laboratory shall be responsible for obtaining all product and material certifications from manufacturers and suppliers as specified in the Specifications.

K. Limitations of Authority:

The Testing Laboratory is not authorized to revoke, alter, relax, enlarge upon, or release any requirements of the Specifications or to approve or accept any portion of the work or to perform any duties of the General Contractor and his Subcontractors.

CONTRACTORS RESPONSIBILITY

A. Cooperation with Design Team:

The owner shall pay for all testing lab services. The Contractor shall cooperate with laboratory personnel, provide access to the work, and to manufacturers operations.

B. Furnishing Samples:

The Contractor shall provide to the laboratory representative, samples of materials proposed for use in the work in quantities sufficient for accurate testing as specified.

C. Furnishing Casual Labor, Equipment and Facilities:

The Contractor shall furnish casual labor, equipment, and facilities as required for sampling and testing by the Laboratory and otherwise facilitate all required inspections and tests.

D. Advance Notice:

The Contractor shall be responsible for notifying the Testing Laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

E. Payment for Substitution Testing:

The Contractor shall arrange with the Testing Laboratory and pay for any additional samples and tests above those required by the Contract Documents as requested by the Contractor for his convenience in performing the work.

F. Payment for Retesting:

The Contractor shall pay for any additional inspections, sampling, testing, and retesting as required when initial tests indicate work does not comply with the requirements of the Contract Documents.

G. Payment by Contractor:

The Contractor shall furnish and pay for the following items:

- 1. Soil survey of the locations of borrow soil materials, samples of existing soil materials, and delivery to the Testing Laboratory.
- 2. Samples of concrete aggregates and delivery to the Testing Laboratory.
- 3. Concrete mix designs as prepared by his concrete supplier or by his Testing Laboratory.
- 4. Concrete coring, tests of below strength concrete, and load tests, if ordered by the Owner, Architect, or Engineer.
- 5. Certification of welders.
- 6. Tests, samples and mock-ups of substitute material where the substitution is requested by the Contractor and the tests are necessary in the opinion of the Owner, Architect, or Engineer to establish equality with specified items.
- 7. Any other tests when such cost are required by the Contract Documents to be paid by the Contractor.
- H. Notification of Source Change:

The Contractor shall be responsible for notifying the Owner, Architect, Engineer, and Testing Laboratory when the source of any material is changed after the original tests or inspections have been made.

I. Tests for Suspected Deficient Work:

If in the opinion of the Owner, Architect, or Engineer any of the work of the Contractor is not satisfactory, the Contractor shall make all tests that the Owner, Architect, or Engineer deem advisable to determine its proper construction. The owner shall pay all costs if the tests prove the questioned work to be satisfactory.

PAYMENT OF TESTING LABORATORY

A. The Owner will pay for all Laboratory services for testing of materials for compliance with the requirements of the Contract Documents. The Contractor will pay for testing and retesting of materials that do not comply with the requirements of the Contract Documents and all other items as specified in these Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

SCOPE OF WORK

A. The work to be performed by the Testing Laboratory shall be as specified in this Section of the Specification and the contract drawings, and as determined in meetings with the Contractor, Owner, Architect, and Engineer.

CONCRETE MATERIALS AND POURED IN PLACE CONCRETE

A. Concrete Mix Designs:

The Contractor shall submit for approval by the Engineer and Owner's Testing Laboratory at least 15 days prior to the start of construction, concrete mix designs for each class of concrete indicated on the structural drawings and in the Specifications. The Contractor shall not begin work until the applicable mix design has been approved.

- 1. The Contractor acting in conjunction with his Concrete Supplier and the Testing Laboratory shall submit in writing with his mix designs, whether the concrete is to be proportioned by either of the following methods as outlined in ACI 318:
 - a. Field Experience Method
 - b. Laboratory Trial Batch Method

When field experience methods are used to select concrete proportions, establish proportions as specified in ACI 301 and ACI 211. When Laboratory trial batches are used to select concrete proportions, the procedure as outlined in ACI 318 shall be followed. Prepare test specimens in accordance with ASTM C192 and conduct strength tests in accordance with ASTM C39.

- 2. Required types of concrete and compressive strengths shall be as indicated on the Structural Drawings and as specified in the various sections of the Specifications.
- 3. All mix designs shall state the following information:
 - a. Mix design number or code designation by which the Contractor shall order the concrete from the Supplier
 - b. Structural member for which the concrete is designed (i.e. columns, shear walls, footings, etc.)
 - c. Type of concrete whether normal weight or lightweight
 - d. 28 day compressive strength
 - e. Aggregate type, source, size, gradation, fineness modulus
 - f. Cement type and brand
 - g. Fly ash (NOT ALLOWED)
 - h. Admixtures including air entrainment, water reducers, accelerators, and retarders
 - i. Slump
 - j. Proportions of each material used
 - k. Water cement ratio and maximum allowable water content
 - I. Method by which the concrete is intended to be placed (bucket, chute, or pump)
- 4. Concrete Suppliers Record of Quality Control:

The concrete supplier's past record of quality control shall be used in the design of the concrete mixes to determine the amount by which the average concrete strength fcr should exceed the specified strength f'c as outlined in ACI 318. If a suitable record of test results is not available, the average strength must exceed the design strength by 1200 PSI as specified in ACI 318. After sufficient data becomes available from the job, the statistical methods of ACI 214 may be used to reduce the amount by which the average strength must exceed f'c as outlined in ACI 318.

- 5. Admixtures:
 - a. Admixtures to be used in concrete shall be subject to the approval of the Engineer and Testing Laboratory.
 - b. Quantities of admixtures to be used shall be in strict accordance with the manufacturers instructions.
 - c. Admixtures containing chloride ions shall not be used in prestressed concrete, in concrete containing galvanized or aluminum embedments, or in metal deck floors or roofs.
 - d. Air entraining admixtures shall conform to "Specification for Air Entraining Admixtures for Concrete" ASTM C260.
 - e. Water reducing admixtures, retarding admixtures, accelerating admixtures, water reducing and retarding admixtures, and water reducing and accelerating admixtures shall conform to "Specification for Chemical Admixtures for Concrete" ASTM C494.
 - f. Fly ash not allowed.

- g. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities of admixtures as required to maintain quality control.
- 6. Slump Limits:

Unless shown otherwise on the structural drawings, proportion and design mixes to result in concrete slump at the point of placement as follows:

- a. Ramps and Sloping surfaces 3" ± 1"
- b. Foundation concrete $-4-1/2" \pm 1-1/2"$
- c. All other concrete $-4" \pm 1"$

When increased workability, pumpability, lower water-cement ratio, shrinkage reduction, or permeability reduction is required, then a superplasticizer admixture shall be considered for use. The maximum slump with the use of superplasticizers shall be 8 inches unless approved otherwise by the Architect/Engineer and Testing Laboratory.

Any deviation from these values (such as concrete design to be pumped) shall be submitted to the Engineer and Testing Laboratory for approval.

7. Adjustments of Concrete Mixes:

Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Such mix design adjustments shall be provided at no additional cost to the Owner. Any adjustments in approved mix designs including changes in admixtures shall be submitted in writing to the Engineer and Testing Laboratory for approval prior to field use.

8. Shrinkage:

All concrete shall be proportioned for a maximum allowable unit shrinkage of 0.03% at 28 days as determined by ASTM C 157.

9. Chloride Ion Content:

A written submittal shall be made with each mix design proposed for use on the project that the chloride ion content from all ingredients including admixtures will not exceed the limits specified in the Cast-In-Place section of the Specifications.

- B. Concrete Test Cylinders by the Testing Laboratory:
 - 1. Molding and Testing:

Cylinders for strength tests shall be molded and Laboratory cured in accordance with ASTM C31 "Method of Making and Curing Concrete Test Cylinders in the Field" and tested in accordance with ASTM C39 "Method of Testing for Compressive Strength of Cylindrical Concrete Specimens".

2. Field Samples:

Field samples for strength tests shall be taken in accordance with ASTM C172 "Method of Sampling Fresh Concrete".

3. Frequency of Testing:

Each set of test cylinders shall consist of a minimum of four standard test cylinders. A set of test cylinders shall be made according to the following frequency guidelines:

- a. One set for each class of concrete taken not less than once a day.
- b. A minimum of one set for each 150 cubic yards or fraction thereof.
- c. No more than one set of cylinders at a time shall be made from any single truck.
- d. If the total volume of concrete is such that the frequency of testing as specified above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.
- e. The above frequencies assume that one batch plant will be used for each pour. If more than one batch plant is used, the frequencies cited above shall apply for each plant used.

The cylinders shall be numbered, dated, and the point of concrete placement in the building recorded. Of the four cylinders per set break one at seven days, two at 28 days, and one automatically at 56 days only if either 28 day cylinder break is below required strength.

4. Cylinder Storage Box:

The Contractor shall be responsible for providing a protected concrete cylinder storage box at a point on the jobsite mutually agreeable with the Testing Laboratory for the purpose of storing concrete cylinders until they are transported to the Laboratory.

5. Transporting Cylinders:

The Testing Laboratory shall be responsible for transporting the cylinders to the Laboratory in a protected environment such that no damage or ill effect will occur to the concrete cylinders.

6. Information on Concrete Test Reports:

The Testing Laboratory shall make and distribute concrete test reports after each job cylinder is broken. Such reports shall contain the following information:

- a. Truck number and ticket number
- b. Concrete Batch Plant
- c. Mix design number
- d. Accurate location of pour in the structure
- e. Strength requirement
- f. Date cylinders made and broken
- g. Technician making cylinders
- h. Concrete temperature at placing
- i. Air temperature at point of placement in the structure
- j. Amount of water added to the truck at the batch plant and at the site and whether it exceeds the amount allowed by the mix design
- k. Slump
- I. Unit weight

- m. Air content
- n. Cylinder compressive strengths with type of failure if concrete does not meet Specification requirements. Seven day breaks are to be flagged if they are less than 60% of the required 28 day strength. 28 day breaks are to be flagged if either cylinder fails to meet Specification requirements.
- C. Other Required Tests of Concrete by the Testing Laboratory (unless noted otherwise):
 - 1. Slump Tests:

Slump Tests (ASTM C143) shall be made at the beginning of concrete placement for each batch plant and for each set of test cylinders made.

2. Air Entrainment:

Air entrainment (ASTM C233) tests shall be made at the same time slump tests are made as cited above.

3. Concrete Temperature:

Concrete temperature at placement shall be measured at the same time slump tests are made as cited above.

4. Chloride lons:

The Contractor shall have the laboratory verify in a written submittal with the mix designs that the chloride ion concentration will not exceed the limits specified.

Tests shall be run for each class of concrete according to AASHTO Designation T 260-82 Sampling and Testing for Total Chloride Ion in Concrete and Concrete Raw Materials to determine that the maximum chloride ion content does not exceed the limits stated in the concrete section of the specifications. One test shall be run for each set of cylinders specified to be taken for each class of concrete.

- D. Evaluation and Acceptance of Concrete:
 - 1. Strength Test:

A strength test shall be defined as the average strength of two 28 day cylinder breaks from each set of cylinders.

2. Quality Control Charts and Logs:

The Owner's Testing Laboratory shall keep the following quality control logs and charts for each class of concrete containing more than 2,000 cubic yards. The records shall be kept for each batch plant and submitted on a weekly basis with cylinder test reports:

- a. Number of 28 day strength tests made to date.
- b. 28 day strength test results containing the average of all strength tests to date, the high test result, the low test result, the standard deviation, and the coefficient of variation.
- c. Number of tests under specified 28 day strength.

- d. A histogram plotting the number of 28 day cylinders versus compressive strength.
- e. Quality control chart plotting compressive strength test results for each test.
- f. Quality control chart plotting moving average for strength where each point plotted is the average strength of three previous test results.
- g. Quality control chart plotting moving average for range where each point plotted is the average of 10 previous ranges.
- 3. Acceptance Criteria:

The strength level of an individual class of concrete shall be considered satisfactory if both of the following requirements are met:

- a. The average of all sets of three consecutive strength tests equal or exceed the required f'c.
- b. No individual strength test (average of two 28 day cylinder breaks) falls below the required f'c by more than 500 PSI.

If either of the above requirements is not met, the Testing Laboratory shall immediately notify the Engineer by telephone. Steps shall immediately be taken to increase the average of subsequent strength tests.

- E. Investigation of Low Strength Concrete Test Results:
 - 1. Contractor Responsibility for Low Strength Concrete:

If any strength test of Laboratory cured cylinders falls below the required f'c by more than 500 psi, the Contractor shall take steps immediately to assure that the load carrying capacity of the structure is not jeopardized.

2. Nondestructive Field Tests:

The Testing Laboratory shall under the direction of the Engineer perform nondestructive field tests of the concrete in question using Swiss Hammer, Windsor Probe, or other appropriate methods as approved by the Engineer and report the results in the same manner as for cylinder test reports.

3. Core Tests:

If the likelihood of low strength concrete is confirmed and computations indicate that the load carrying capacity of the structure has been significantly reduced, tests of cores by the Testing Laboratory, drilled from the area in question under the direction of the Engineer, will be required in accordance with ASTM C42 "Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete". In such case, three cores shall be taken for each strength test more than 500 PSI below required f'c. If concrete in the structure will be dry under service conditions, cores shall be air dried (temperature 60° to 80°F, relative humidity less than 60 percent) for 7 days before test and shall be tested dry. If concrete in the structure will be more than superficially wet under service conditions, cores shall be immersed in water for at least 48 hours and tested wet. The Contractor shall fill all holes made by drilling cores with an approved drypack concrete.

4. Acceptance Criteria for Core Tests:

Concrete in an area represented by core tests shall be considered structurally adequate if the average of three cores is equal to at least 85% of f'c and if no single core is less than 75% of f'c. If approved by the Engineer, locations of erratic core strengths may be retested to check testing accuracy.

5. Load Test:

If the above criteria are not met and the structural adequacy remains in doubt, the Engineer may order a load test as specified in ACI 318 for the questionable portion of the structure.

6. Strengthening of the Structure or Demolition:

If the structural adequacy of the affected portion of the structure remains in doubt, the Engineer may order the structure to be strengthened by an appropriate means or demolished and rebuilt.

7. Cost of Investigations for Low Strength Concrete:

The costs of all investigations of low strength concrete shall be borne by the Contractor.

F. Jobsite Inspection:

The scope of the work to be performed by the inspector on the jobsite shall be as follows:

- 1. Verify that air temperatures at the point of placement in the structure are within acceptable limits defined above prior to ordering of concrete by the Contractor.
- 2. Inspect concrete upon arrival to verify that the proper concrete mix number, type of concrete, and concrete strength is being placed at the proper location.
- 3. Inspect plastic concrete upon arrival at the jobsite to verify proper batching. Observe mix consistency and adding of water as required to achieve target slumps in mix designs. Record the amount of water added and note if it exceeds that allowed in the mix design. The responsibility for adding water to trucks at the jobsite shall rest only with the Contractor's designated representative. The Contractor is responsible that all concrete placed in the field is in conformance to the Contract Documents.
- 4. Obtain concrete test cylinders.
- 5. Perform slump tests and air entrainment tests.
- 6. Record information for concrete test reports.
- 7. Verify that all concrete being placed meets job Specifications. Report concrete not meeting the specified requirements and immediately notify the Contractor, Batch Plant Inspector, Contractor, Architect, Engineer, and Owner.
- 8. Pick up and transport to Laboratory, cylinders cast the previous day.

- 9. Check concrete placing techniques to determine that concrete deposited is uniform and that vertical drop does not exceed six feet.
- 10. The jobsite inspector shall report any irregularities that occur in the concrete at the jobsite or test results to the Contractor, Architect, Owner, and Engineer.
- G. Causes for Rejection of Concrete:

The Contractor shall reject all concrete delivered to the site for any of the following reasons:

- 1. Wrong class of concrete (incorrect mix design number).
- 2. Air temperature:

Air temperature limits shall be as follows:

- a. Cold Weather: Air temperature must be 40°F and rising
- b. Hot Weather: Air temperature must be cooler than 100°.

Concrete may be placed at other air temperature ranges only with approval of the job inspector for the Testing Laboratory or other duly appointed representative.

- 3. Concrete with temperatures exceeding 95°F may not be placed in the structure.
- 4. Air contents outside the limits specified in the mix designs.
- 5. Slumps outside the limits specified in the mix designs.
- 6. Excessive Age:

Concrete shall be discharged within 90 minutes of plant departure or before it begins to set if sooner than 90 minutes unless approved by the Laboratory job inspector or other duly appointed representative.

The Contractor is responsible that all concrete placed in the field is in conformance to the Contract Documents.

H. Concrete Batch Trip Tickets:

All concrete batch trip tickets shall be collected and retained by the Contractor. Compressive strength, slump, air, and temperature tests shall be identified by reference to a particular trip ticket. All tickets shall contain the information specified in ASTM C 94. Each ticket shall also show the amount of water that may be added in the field for the entire batch that will not exceed the specified water cement ratio for the design mix. The Contractor and Testing Laboratory shall immediately notify the Architect/Engineer and each other of tickets not meeting the criteria specified.

MASONRY

- A. Prism Tests (by the Owner's Testing Laboratory):
 - 1. Scope:

Prism tests shall be made for each class of masonry (hollow masonry, grouted masonry, or composite masonry) on the project using an assembly of actual masonry units, mortar, and grout (if specified) as planned in the work.

2. Compressive Strength Test:

Test shall be run according to the requirements of ASTM E447 "Test Methods for Compressive Strength of Masonry Prisms." Each strength test shall be defined as the average of three test prisms from the same class of masonry.

- 3. Frequency of Testing:
 - a. Exterior Walls and All Load bearing Walls: One strength test shall be run for each 5,000 square feet of wall area but not less than one strength test for each day's operation for each class of wall. An additional test should be run whenever there is a change in mortar or grout proportions.
- B. Mortar Test:
 - 1. Scope:

Mortar cube test shall be required only for loadbearing masonry construction (hollow or grouted) for the purpose of measuring uniformity of field batching.

2. Compressive Strength Test:

Tests shall be run according to the requirements of ASTM C780 "Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry." Each strength test shall be defined as the average of three cube specimens two inches in dimension tests at 28 days.

3. Frequency of Testing:

One strength test shall be run for each 5,000 square feet of wall but not less than one strength test for each day's operation for each class of wall. An additional test should be run whenever there is a change in mix proportions.

- C. Grout Tests:
 - 1. Scope:

Grout prism tests shall be required for all grout used in masonry construction.

2. Compressive Strength Test:

Specimens shall be $3\frac{1}{2}x3\frac{1}{2}x7$ " or 3x3x6" cast in molds with a flat nonabsorbent base and masonry units having the same moisture condition as those being laid forming the sides of the specimens. Specimens shall be capped according to ASTM C617 and tested according to ASTM C39. Each strength test shall be defined as the average of two 28 day prisms.

3. Frequency of Testing:

Four grout prisms shall e made for each 30 cubic yards of grout but not less than one set for each day's operation. An additional set should be made whenever the grout mix is changed. One prism shall be tested at 7 days, two at 28 days, and one at 56 days only if either 28 day test is low.

- D. Hollow Load Bearing Concrete Masonry Units (by the Owner's Testing Laboratory):
 - 1. Scope:

Hollow masonry units shall be tested only for load bearing masonry construction.

2. Compressive Strength Test:

Three units from each 10,000 units or fraction thereof shall be tested according to the requirements of ASTM C140 "Sampling and Testing Concrete Masonry Units." Compressive strengths shall meet the requirements of ASTM C90 as specified on the drawings.

E. Experience Requirement:

Field inspection of masonry construction by the Owner's Testing Laboratory as herein described shall be performed by qualified technicians with a minimum of ten years experience in masonry testing and inspection.

F. Field Inspection Requirements:

The duties and responsibilities of the Testing Laboratory Inspector in the field shall be as follows: 1. Review and become familiar with project drawings and specifications.

- 2. Review all masonry materials used in the field for conformance to project specifications. This shall include masonry units, mortar, grout, portland cement, masonry cement, sand, lime, horizontal joint reinforcement, ties, masonry anchoring devices, to the structure, and control joint strips.
- 3. Review proper horizontal joint reinforcement size and spacing. Review size and spacing of wall ties.
- 4. Review proper masonry construction practices for mortar including requirements for high and low lift grouting. Check conformance with hot and cold weather construction requirements.
- 5. Verify proper mortar batching proportions.
- 6. Confirm clean outs for high lift grouting.
- 7. Verify construction tolerances.

- 8. Review and confirm installation of reinforcing steel size, spacing, and splices in all walls, lintels, pilasters, and columns.
- 9. Confirm number and size of dowels in the foundation to walls and columns.
- 10. Take mortar, grout, and prism samples as specified.

END OF SECTION 01 41 00
SECTION 01 45 00 – QUALITY CONTROL

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Quality Assurance: Requirements for material and product quality and control of installation.
- B. Tolerances
- C. References and Standards
- D. Mock-ups
- E. Testing Laboratory Services
- F. Inspection Services
- G. Manufacturers' field services

1.2 RELATED SECTIONS

- A. Section 014100 Testing and Inspecting Services
- B. Section 013300 Submittal Procedures
- C. Section 023200 Geotechnical Investigations
- D. The Work of this Section shall be included as a part of all Sections of Work, whether referenced therein or not.

1.3 DESCRIPTION OF REQUIREMENTS

- A. Unless specifically noted otherwise, perform all Work shown, mentioned, or reasonably inferred and comply with all work restrictions.
- B. Many of the requirements specified elsewhere are included herein for reference and convenience. Where a conflict occurs between the Contract Documents, either within themselves or each other, the more stringent requirement or the most expensive combination of materials and workmanship shall prevail.
- C. Contractor shall:
 - 1. perform Work in accordance with the General Conditions, as specified herein, and with the quality control requirements of each Specification Section;
 - 2. perform Work in the highest quality workmanship, unless specified otherwise;
 - 3. join materials with a uniform and accurate fit so they meet with neat straight lines, free of smears, overlaps or irregularities, as applicable to the work;
 - 4. install all exposed materials appropriately level, plumb, and at accurate angles as shown and flush with adjoining materials;
 - 5. attach materials with sufficient strength, and with number and spacing of fasteners and attachments that will not fail until materials joined are broken or permanently deformed;
 - 6. use concealed fasteners, unless shown or directed otherwise.

1.4 QUALITY ASSURANCE AND CONTROL OF INSTALLATION

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

1.5 TOLERANCES

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

1.6 REFERENCES AND STANDARDS

- A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Owner-Contractor Agreement except where specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- E. Neither contractual relationships, duties, responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.7 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be the comparison standard for remaining Work.
- D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Architect.

- E. Mock-up may be approved in phases as portions are completed.
- F. Project Mock-up Requirements: Provide an actual sample panel with the following properties:
 - 1. Building Portion Size: Minimum 10 feet wide by full height of building tall at typical standard building section as determined by Architect. Mock up shall include the construction of wall to include all membrane air barriers, transitions, flashings, standard windows, prefinished aluminum canopy/ louver, etc. used in Project. Size may vary according to specific project requirements. Brace and support as required to withstand structural windloads.
 - 2. Materials: actual exterior finishes including, but not limited to face brick, cast stone, and plaster, actual building materials and assemblies indicating brick patterns on masonry and stud back-up as occurs with dampproofing and flashing as detailed, actual portion of aluminum storefront indicating jam, sill and head attachment and flashing details, and where appropriate, provide mock-up of special finish details, insets and reliefs, reveals, expansion and control joints, brick ledges, brick head and sills, pipe penetrations and waterproofing materials. Provide roof edge flashing and gutter section (as applicable) in pre-finished color as selected by Architect to cap the mock-up panel. Include a sealant joint at least 16 inches long. Brick and Mortar color shall be selected by Architect prior to mock-up assembly.
 - 3. Drawing: Contractor shall submit mock-up diagram for approval of minimum project requirements.

1.8 TESTING SERVICES

- A. Owner will appoint, employ, and pay for specified services of an independent firm to perform testing.
- B. The independent firm will perform tests and other services specified in individual specification sections and as required by the Architect/Engineer, Owner, or authority having jurisdiction.
- C. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Architect/Engineer or the Owner.
- D. Reports will be submitted by the independent firm to the Owner, Architect/Engineer, and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations requiring services, or as specified in individual specification sections.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required.
- F. Testing does not relieve Contractor to perform Work to contract requirements.
- G. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Sum/Price.
- H. Refer to Section 014100, Testing Laboratory Services, for additional information concerning testing, and submittal procedures and requirements for Testing Reports.

1.9 INSPECTION SERVICES

A. Owner will appoint, employ, and pay for specified services of an independent firm to perform inspection.

- B. The independent firm will perform inspections and other services specified in individual specification sections and as required by the Architect/Engineer, Owner, or authority having jurisdiction.
- C. Inspecting may occur on or off the project site. Perform off-site inspecting as required by the Architect/Engineer or the Owner.
- D. Reports will be submitted by the independent firm to the Owner, Architect/Engineer, and Contractor, indicating inspection observations and indicating compliance or non-compliance with Contract Documents.
- E. Cooperate with independent firm; furnish safe access and assistance by incidental labor as requested.
 - 1. Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations requiring services, or as specified in individual specification sections.
- F. Inspecting does not relieve Contractor to perform Work to contract requirements.
- G. Refer to Section 014100, Testing Laboratory Services, for additional information concerning inspections, and submittal procedures and requirements for Inspection Reports.

1.10 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as required, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect/Engineer within ten (10) days after receipt of Notice to Proceed, in advance of required observations. Observer subject to approval of Architect/Engineer and Owner.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to Section 013300, Submittal Procedures, for additional information concerning submittal procedures and requirements for Manufacturers Field Reports.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

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

END OF SECTION 01 45 00

SECTION 01 50 00 - TEMPORARY FACILITIES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

TEMPORARY SERVICES - GENERAL

A. Provide all temporary services and facilities as specified below, and as required for the proper and expeditious prosecution of the work. Provide all labor, materials, equipment and appliances necessary for the complete installation, operation and maintenance of all temporary service systems and facilities as may be required during work on the project.

UTILITIES

A. The Contractor shall provide all temporary electrical and water as may be required to complete work on the project as per Paragraphs 10.9.1 and 10.9.2 of the General Conditions.

TOILETS

- A. Temporary toilet shall be enclosed, weatherproof and kept in sanitary condition at all times. Connect to sanitary sewer.
- B. Portable self-contained units are acceptable if serviced periodically and not allowed to become overfilled.

STORAGE

- A. Each Contractor shall provide suitable means to protect all stored material subject to damage from the weather.
- B. Contractors may use portions of existing parking lots for storage if approved in advance by Owner. Contractors must protect these areas and return them to their original condition upon completion of the work.

HEATING, COOLING & LIGHTING

- A. Adequate lighting must be provided throughout the project.
- B. The permanent A/C system should be put in operation as soon as possible and shall be used to dry out the building and to provide suitable conditions for finish work.

FENCES

- A. Contractors shall provide temporary fencing and other barricades to protect stored materials on the site and provide a secure and safe work area around the project.
- B. Coordinate size and location of all fenced storage and work areas with the Owner and Architect prior to erection.
- C. Fencing should be chain link, minimum 6'-0" tall, with lockable metal gates.

OFFICES

- A. Each Contractor shall provide his own office on the premises, maintain it, and remove it when directed to by either the Owner or the General Contractor. The General Contractor shall furnish office space for the Architect as well as for himself.
- B. Coordinate size and location of all offices with the Owner and Architect prior to erection or placement on the premises.

PROTECTION OF PROPERTY & PERSONS

- A. Protect existing streets leading to the work site. All damage caused by the Contractor or any Subcontractors shall be made good at the expense of the Contractor.
- B. Provide necessary barricades to protect persons entering, leaving or walking around construction areas during the course of the work or during periods when no work is in progress but when conditions around the construction areas could pose a danger.

END OF SECTION 01 50 00

SECTION 01 77 00 - PROJECT CLOSEOUT

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

GENERAL

A. Comply with all requirements of the contract. Send notices, furnish certificates, affidavits and other requirements to complete contract.

SUBSTANTIAL COMPLETION

- A. When entire project has reached Substantial Completion as defined in the General Conditions, Paragraph 9.7.1, the Contractor shall send written notice and a comprehensive list of items to be completed or corrected to the Architect as fully described in Paragraph 9.7.2.
- B. The Architect will then make a preliminary inspection to determine the status of completion and prepare a supplementary list of items requiring completion or correction in addition to Contractor's list for use of the Contractor. This combined list shall constitute the "punch list" for the project.
- C. When all requirements of Section 9.7 of the General Conditions of the Contract for Construction have been achieved then the Architect will prepare and issue a Certificate of Substantial Completion, AIA Document G 704, to be signed by the Owner and Contractor. This document will be accompanied by a list of any items remaining to be completed on the "punch list" prepared by the Contractor, supplemented by and approved by the Architect.

OPERATIONS INSTRUCTIONS, MANUALS, CERTIFICATIONS & RECORD DRAWINGS

- A. Instruct Owner's representatives in the operation of all mechanical, electrical, plumbing and other building systems as specified. All such instructions shall be coordinated with the Owner's Representative and their completion verified in writing.
- B. Deliver keys to Owner along with typed keying schedules and additional master keys, submasters or special keys.
- C. Deliver to the Architect all required written guarantees and warranties prepared and bound in duplicate for his review and delivery to Owner.
- D. Deliver to the Architect all required certificates of inspection prepared and bound in duplicate for his review and delivery to Owner.
- E. Deliver to the Architect all required bound operational manuals for his review and delivery to Owner.
- F. Deliver to the Architect all required hazardous material certifications, **including MSDS sheets**, prepared and bound in duplicate for his review and delivery to Owner.
- G. Deliver to the Architect required Record Drawings for his review and delivery to Owner.

CLOSEOUT LEGAL DOCUMENTS

A. The following AIA Documents must be completed and delivered to the Architect for review and delivery to the Owner.

- 1. Contractor's Affidavit of Payment of Debts and Claims, G706, for General Contractor and all major Sub-Contractors and Suppliers.
- 2. Consent of Surety Company to Final Payment, G707.
- 3. Consent of Surety Company to Reduction in or Partial Release of Retainage, G707A, if necessary.
- 4. Maintenance Bond.
- B. In addition to documents specifically listed above, other documents as may be defined or identified in the Owner-Contractor Agreement, General Conditions, or elsewhere in the contract documents must also be provided.

FINAL INSPECTION

- A. Contractor shall notify the Architect when project is finally complete and all of the above requirements have been met.
- B. Architect will then notify Owner and make a final inspection.

FINAL PAYMENT

- A. Contractor shall submit the final Application and Certificate for Payment to the Architect after elapse of time stipulated in the contract, indicating all contract sum adjustments.
- B. The Architect will approve and deliver to the Owner the final Application and Certificate for Payment upon completion of the final inspection and receipt and approval of all required closeout documentation.

GUARANTEE/WARRANTY INSPECTION

A. The Contractor shall be required to join the Architect and Owner, if notified to do so, in a walkthrough of the project within 30 days of the expiration of the general one (1) year project guarantee/warranty to determine if any work is still required under the terms of the guarantee/warranty.

END OF SECTION 01 77 00

SECTION 02 41 00 – DEMOLITION

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SECTION INCLUDES

A. Partial demolition of existing building as required to accommodate additions and renovations as shown on the drawings or required. Include removal of existing utilities as indicated or encountered; removal of metal roofing, siding, and mechanical, electrical, and plumbing items as indicated or required.

SUBMITTALS

- A. Submit the following items.
 - 1. Itemized Demolition Schedule.
 - 2. Detail all demolition methods to be used.

PERMITS

A. Procure and pay for all necessary permits or certificates required to complete the work specified. Make any and all required notifications and comply with all applicable Federal, State and local ordinances.

QUALITY ASSURANCE

- A. Provide at least one (1) person who shall be present and in charge of the Demolition Work at all times and who shall be thoroughly familiar with all phases of all work performed under this Section.
- B. Comply with all pertinent codes and regulations applying to this work.

JOB CONDITIONS

- A. Use all means necessary to prevent the spread of dust during performance of this work. Provide additional clean filters for the existing air handling system serving those areas to remain to protect them from construction dust.
- B. Use all means necessary to protect the existing building to remain from all types of damage, including fire, water damage, and unnecessary interruption of utility services. In the event of damage of any kind, immediately make all repairs and replacements necessary to the approval of the Owner at no additional cost to the Owner.
- C. Motor driven equipment shall have functional mufflers.
- D. Visit the site and examine the existing structure. Note all conditions as to the character and extent of work involved.

GENERAL

- A. Provide all barricades, shoring, and bracing necessary to protect the tenants, workmen, and Public from danger. Barricades shall be sufficiently designed to protect and or exclude the public from all hazards.
- B. All other materials, not specifically described but required for proper completion of Work of this Section, shall be as selected by the Contractor subject to the approval of the Owner.

DEMOLITION WORK

- A. Perform demolition work in manner so as to allow Owner's use of existing facility.
- B. Perform demolition work in order to maintain Owner's construction schedule.

REMOVAL OF PARTITIONS, COLUMNS AND STRUCTURE

- A. Existing floors shall be properly protected with plywood on both sides of a partition to be demolished.
- B. Wherever necessary for protection of workmen, walls, partitions, roofs or floors of structure being demolished or to remain shall be shored or braced.
- C. Structural or load-supporting members shall not be cut or removed adjacent to existing structures to remain until all loads carried by members have been removed or adequately supported.
- D. No masonry walls shall be removed until it has been determined that the walls to be removed do not support the roof. To determine this, all adjacent materials such as finish ceilings shall be removed to provide adequate views of existing structure. Provide temporary shoring as needed. The Contractor shall take all precautions necessary to ensure the safety of the demolition workers.
- E. Where access holes in existing ceilings or removal of existing ceilings are required, minimize the access in order to minimize the repair work and repair or replace removed or damaged work to match adjacent undamaged work.
- F. Cut and tooth new openings in masonry where required, of correct size to permit installation of frames and anchors for new doors.

ASBESTOS CONTAINING MATERIAL

- A. To the best of the Owner's knowledge none of the materials indicated on the plans or in the specifications to be removed under various contracts or otherwise disturbed contain asbestos.
- B. Under no circumstances shall any contractor working on the project disturb asbestos containing materials or suspected asbestos containing materials.

C. If asbestos containing materials are discovered or if any Contractor suspects that materials scheduled to be removed on the project might contain asbestos, they should contact the Architect or Owner immediately.

EXECUTION

DEMOLITION

- A. Before commencing the Work of this Section, verify with the Owner that all items to be removed by the Owner have been removed. Schedule the work in a careful manner with all necessary consideration for the Public and the Owner. All items of existing equipment and materials or any other item of value to the Owner shall be salvaged by the Owner prior to demolition.
- B. All material removed under this Contract, which is not to be salvaged or reused, shall become the property of the Contractor and be promptly removed from the site. At all times use movable debris boxes, covered, to convey the material through the building. Do not store or permit debris to accumulate on the site. Dumpsters shall not overflow and shall be emptied on a regular basis. Remove all debris from the building premises and leave the construction site "Clean" each day. All debris shall be dumped in an approved disposal facility and all fees for this shall be paid by the Contractor. Contractor is responsible for completely removing all demolished materials from the site and disposing of them in accordance with all local, State and Federal Regulations. If Contractor fails to remove debris promptly, Owner reserves the right to have debris removed at Contractor's expense.
- C. Conduct operations so as not to interfere with adjacent occupied spaces, roads, streets, drives, walks, service lines and the like.
- D. Keep all pedestrian areas clear for passage at all times.

PROTECTION OF STRUCTURES, PROPERTY

- A. Execute demolition work to ensure adjacent property no damage from falling debris or other causes.
- B. Take precautions to guard against movement, settlement, or be liable for such movement, settlement, or collapse; repair promptly such damage when so ordered.
- C. Repair damage to Owner's property or any other person or persons on or off premises by reason of required work.

END OF SECTION 02 41 00

SECTION 03 11 00 - CONCRETE FORMING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

STRUCTURAL RESPONSIBILITY

A. The structural adequacy of the forms, ties, shoring and bracing shall conform to the requirements of ACI Standard 347. Any requirements given herein are minimum requirements for appearance purposes only, and are not to be considered as structural design.

DESIGN OF FORMS

- A. Forms shall conform to shapes, lines and dimensions of the members as called for on the plans and shall be sufficiently tight to prevent leakage of mortar. Properly brace and tie forms together so as to maintain position and shapes. Conform to CRSI, Code of Standard Practice, MSP-2-81.
- B. Design formwork assemblies to take into account the pouring rate, temperature, vibrating and retarding admixtures so all portions of the assembly withstand the concrete pressure without deformation beyond the design tolerances.

FORM MATERIALS

- A. Side and soffit forms may be coated plywood, hardboard, wood or steel.
- B. Coat form surfaces with two coats of a chemical type, non-staining form release agent. Acceptable manufacturer's and products are:
 - 1. "Pre-Form", the Nox-Crete Company.
 - 2. "Form-Saver", Sonneborn Building Products.
 - 3. "Uni-Kote", Burke Concrete Accessories.
 - 4. or equal
- C. Carton forms shall be thickness and in width or combinations of widths as required to produce voids beneath concrete structures as shown on the drawings. Refer to notes on structural drawings for additional information.

FORM CONSTRUCTION

- A. Forms shall be set to allow for variations in elevations, as required for various finish materials, depressions and slopes to drains in slabs, and slope for drainage in exterior flat work as indicated on the drawings or required by the nature of the work. Thickness of structural members and slabs as shown on the drawings shall be maintained by offsetting underside of members as required.
- B. When conduits are placed in concrete slabs, the maximum conduit size shall not exceed 1/3 of the slab thickness without approval of the structural Engineer. Thicken slab at conduits, if approved by Engineer, to maintain minimum coverage requirements. Conduits must run beneath top layer of reinforcing.
- C. Install chamfer strips at all angles of concrete exposed to view, unless shown otherwise on the plans.

- D. Form removal shall be accomplished in a manner to prevent damage to surface and breaking of corners on concrete work. Pinch bars and similar devices shall not be inserted between forms and corners of concrete, most particularly at concrete which will be exposed to view and finished. Do not remove forms until the following criteria is met:
 - 1. Side forms for beams shall be left in place for a minimum of 24 hours.
 - 2. Soffit forms for structural beams, girders and slabs shall be left in place until concrete reaches 75% of psi design strength.

ACCURACY

- A. Completed concrete surfaces exposed to view on exterior or in finished interior spaces shall meet the following requirements:
 - 1. Visually plumb, level, straight and smooth except for irregularities that may be removed in the finishing process.
 - 2. Sufficiently accurate to accommodate the details of abutting work.
 - 3. Measurable to an accuracy such that the maximum deviation in any plane is not over 3/8 inch in 16 feet.

END OF SECTION 03 11 00

SECTION 03 20 00 - CONCRETE REINFORCING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

REFERENCE SPECIFICATIONS

- A. This work shall be governed by the current edition of the following to the extent they are applicable:
 - 1. ACI Manual of Standard Practice for Detailing Reinforced Concrete Structures (ACI 315).
 - 2. Specifications for Structural Concrete for Buildings (ACI 301).
 - 3. Building Code Requirements for Reinforced Concrete (ACI 318).
 - 4. Notations on the structural drawings supersede these specifications in case of conflict.
 - 5. Recommendations of the Concrete Reinforcing Steel Institute.

MATERIALS

- A. Reinforcing bars shall be of sizes as shown on drawings. All reinforcing steel shall conform to the "Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement," ASTM A615 Grade 60 unless noted otherwise on the drawings. All reinforcing steel required to be welded shall conform to ASTM A 706 "Standard Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement". Bars #4 and larger shall be ASTM A615 grade 60 and bars #3 and smaller shall be ASTM A615 grade 40.
- B. Welded smooth wire fabric for concrete reinforcement shall conform to the "Standard Specification for Welded Steel Wire Fabric for Concrete Reinforcement," ASTM A 185 with a yield strength of 65,000 PSI. Welded deformed wire fabric for concrete reinforcement shall conform to the "Standard Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement," ASTM A 497 with a yield strength of 70,000 PSI. All welded wire fabric shall be furnished in flat sheets only.
- C. Supports for Reinforcement:

Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations.

- 1. Slabs-on-Grade: Use supports with sand plates or horizontal runners.
- 2. Slabs-on-Carton Forms: Use supports with feet/bases which will not cut into or punch through cartons.

SUBMITTALS

- A. Shop drawings shall include complete diagrams, schedules and details of the following:
 - 1. Layout plans

- 2. Details
- 3. Sizes
- 4. Spacing
- 5. Supports

DESIGN

- A. Bar supports shall be of type and spacing as per reference specifications.
- B. Concrete cover shall be as per reference specifications unless shown otherwise on plans.
- C. When it is necessary to splice reinforcement other than as shown on the plans, the character of the splice shall be decided upon by the Architect on the basis of allowable bond and stress in the reinforcement at the splice. Splicing shall not be made at points of maximum stress, nor shall adjacent bars be spliced at the same point.

FABRICATION

- A. Form to dimensions and bends shown on plans.
- B. Use cold forming methods that will not injure the material. Heating steel to aid in fabrication shall not be permitted without specific approval of the Architect.
- C. Bars with kinks or bends not shown on the plans are prohibited.

PLACING

- A. Accurately position and secure reinforcement against displacement by using annealed wire of not less than no. 16 gauge or suitable clips at intersections. Support reinforcement in a manner that will keep all metal away from the exposed surfaces.
- B. Support bar reinforcing on plastic chairs. Brick batts allowed for slab on grade..
- C. Metal reinforcement, before being placed, shall be thoroughly cleaned of dirt and loose rust scales and of coatings that destroy or reduce the bond. Reinforcement appreciably reduced in section shall be rejected. Where there is delay in depositing the concrete, reinforcement shall be re-inspected, and when necessary, re-cleaned.
- D. Place and fasten all inserts, sleeves, reglets, anchor bolts, weld plates, ties, structural steel members and similar items required to secure the work of other trades to concrete work. Maintain these items in their proper positions during the placement of concrete.
- E. Necessary splices not shown on the drawings or otherwise noted shall be lapped sufficiently to develop the strength of the bar by bond, but not less than 40 bar diameters. Unless shown otherwise, welded wire mesh shall be lapped 1 1/2 meshes with a minimum lap of 8 inches.
- F. Unless shown otherwise on the plans, at corners, angle bends and at junctions with other beams, provide four 80 diameter corner bars of size no. 6 (2 top & 2 bottom). For deep beams with

scheduled intermediate bars, provide matching 80 diameter corner bars of the same size. At "T" intersections, place all corner bars so that one leg is in outside face of outside beam.

G. Refer to Section 03 11 00 for notes concerning the placement of conduits in slabs.

END OF SECTION 03 20 00

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

DESCRIPTION OF WORK

- A. Extent of concrete work is shown on drawings, including schedules, notes and details which show size and location of members and type of concrete to be poured. Furnish all labor, materials, services, equipment and hardware required in conjunction with or related to the forming, delivery and pouring of all poured-in-place concrete work.
- B. Architectural Concrete is specified in other Division-3 sections.

QUALITY ASSURANCE

- A. The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.
- B. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 301 "Specifications for Structural Concrete for Buildings".
 - 2. ACI 302 "Guide for Concrete Floor and Slab Construction".
 - 3. ACI 304- "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
 - 4. ACI 305 "Recommended Practice for Hot Weather Concreting".
 - 5. ACI 306 "Recommended Practice for Cold Weather Concreting".
 - 6. ACI 318 "Building Code Requirements for Reinforced Concrete".
- C. Document Precedence: In case of conflict among documents, including architectural and structural drawings and specifications, notify the Architect prior to submitting proposal. In case of conflict between the structural drawings and specifications, the strictest interpretation shall govern.
- D. Materials and installed work may require testing and retesting, as directed by the Architect/Engineer, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests, not specifically indicated to be done at the Owner's expense, including retesting of rejected materials and installed work, shall be done at the Contractor's expense. See Testing Laboratory section of the Specifications.
- E. Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

SUBMITTALS

A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including admixtures, patching compounds, epoxies, grouts, waterstops, joint systems, curing compounds, dry-shake finish materials, hardeners, sealers and others as requested by Architect/Engineer.

- B. Samples: Submit samples of materials specified if requested by Architect/Engineer, including names, sources and descriptions.
- C. Laboratory Test Reports and Mix Designs: Submit laboratory test reports for concrete materials and mix designs as specified in the Testing Laboratory section of the Specifications.
- D. Construction Joints: There shall be no construction joints for slab on grade, structural floors, roofs and walls, where they are not indicated on the drawings.

PROVISION FOR OTHER WORK

A. Provide for installation of inserts, hangers, metal ties, anchors, bolts, angle guards, dowels, thimbles, slots, nailing strips, blocking, grounds and other fastening devices required for attachment of work. Properly locate in cooperation with other trades and secure in position before concrete is poured. Do not install sleeves in any concrete slabs, beams or columns except where shown on the drawings or upon written approval of the Architect/Engineer.

PART 2 - PRODUCTS

CONCRETE MATERIALS

- A. Refer to the drawings for classes and strengths of concrete required.
- B. Portland Cement: ANSI/ASTM C 150, Type I or Type III, unless otherwise approved by the Architect/Engineer. Use one brand of cement, for each class of concrete, throughout the project, unless approved otherwise by the Architect/Engineer and the Owner's Testing Laboratory.
- C. Normal Weight Aggregates: ANSI/ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
- D. Water: Clean, fresh, drinkable, free of oils, acids or organic matter.
- E. Air-Entraining Admixture: ANSI/ASTM C 260. Provide air entrainment in all concrete used for vehicular traffic and parking or concrete permanently exposed to the weather as specified in Table 4.5.1 of ACI 318.

Subject to compliance with requirements, provide one of the following products and manufacturers:

- 1. "Air-Tite"; Gifford-Hill & Co.
- 2. "Darex-AEA"; W. R. Grace & Co.
- 3. "MB-VR"; Master Builders
- 4. "Protex AES", Protex Industries, Inc.
- 5. "Sika AER"; Sika Corp.
- 6. "Air Mix" or "Perma Air"; The Euclid Chemical Company, Inc.
- 7. "Boral Air-Series", Boral Material Technologies

Submit manufacturer's certification that product conforms to the requirements specified.

F. Water-Reducing Admixture: ANSI/ASTM C 494, Type A. See maximum permissible chloride ion content in concrete specified below.

Subject to compliance with requirements, provide one of the following products and manufacturers:

- 1. "PSI Series"; Gifford-Hill & Co., Inc.
- 2. "Pozzolith 300-N Series"; Master Builders.
- 3. "Plastocrete 161"; Sika Chemical Corp.
- 4. "Eucon Series"; The Euclid Chemical Company, Inc.
- 5. "Boral R Series", Boral Material Technologies

Submit manufacturer's certification that product conforms to the requirements specified.

G. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G. See maximum permissible chloride ion content in concrete specified below.

Subject to compliance with requirements, provide one of the following products and manufacturers:

- 1. "PSI Super"; Gifford-Hill & Co., Inc.
- 2. "WRDA-19"; W.R. Grace & Co.
- 3. "Pozzolith 400 Series"; Master Builders.
- 4. "PSF Series"; Protex Industries Inc.
- 5. "Sikament"; Sika Chemical Corp.
- 6. "Eucon 37"; The Euclid Chemical Company, Inc.
- 7. "Boral SP Series", Boral Material Technologies

Submit manufacturer's certification that product conforms to the requirements specified.

H. Water-Reducing, Accelerator Admixture (Non-Corrosive, Non-Chloride): ASTM C 494, Type C or E. See maximum permissible chloride ion content in concrete specified below.

Subject to compliance with requirements, provide one of the following products and anufacturers:

- 1. "PSI Series"; Gifford-Hill & Co., Inc.
- 2. "Pozzolith 500-A"; Master Builders.
- 3. "NCA II"; Protex Industries, Inc.
- 4. "Accelguard 80"; The Euclid Chemical Company, Inc.
- 5. "AcN-Series", Boral Material Technologies

Submit manufacturer's certification that product conforms to the requirements specified.

I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D. See maximum permissible chloride ion content in concrete specified below.

Subject to compliance with requirements, provide one of the following products and manufacturers:

- 1. "PSI Series"; Gifford-Hill & Co., Inc.
- 2. "Daratard-17"; W.R. Grace & Co.
- 3. "Pozzolith 300-R"; Master Builders.
- 4. "Plastiment"; Sika Chemical Co.

- 5. "Eucon Series"; The Euclid Chemical Company, Inc.
- 6. "Boral W-Series", Boral Material Technologies

Submit manufacturer's certification that product conforms to the requirements specified.

- J. Specification for Pozzolan Admixtures: Fly ash not allowed.
- K. Admixtures containing Chloride Ions: Admixtures containing chloride ions shall not be used in prestressed concrete, concrete containing galvanized or aluminum embedments, concrete containing high early strength cement (Type III), concrete on metal deck floors or roofs, or concrete exposed to sulfate containing solutions such as soils with a water soluble sulfate content more than 0.20 percent by weight and all water with a sulfate content more than 1500 parts per million. Admixtures containing more than 0.05% chloride ions shall not be permitted. The maximum chloride ion content in concrete for corrosion protection shall be as follows:

Max. Water Soluble Chloride Ion in Concrete

Type of Member of Cement at 28 Days, % by weight

Reinforced Concrete and other structures, which may be exposed to chloride in service0.15

Reinforced Concrete in buildings and other structures that will be dry or protected from moisture in service1.00 All other concrete construction 0.30

The Contractor shall have the Concrete Supplier's Testing Laboratory verify in a written submittal to the Architect/Engineer and Owner's Testing Laboratory that the chloride ion content in all concrete mix designs used on the project will not exceed limits stated above.

- L. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted.
- M. Certification: Written conformance to the above mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Engineer.

RELATED MATERIALS

- A. Moisture Barrier: Provide moisture barrier cover over prepared base material where indicated. Use only materials, which are resistant to decay when tested in accordance with ANSI/ASTM E 154, as follows:
 - 1. Refer to Section 07 25 00 Underslab Vapor Retarder.
- B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- C. Moisture-Retaining Cover:

One of the following, complying with ANSI/ASTM C 171:

- 1. Waterproof paper.
- 2. Polyethylene film.
- 3. White-burlap-polyethylene sheet.
- D. Chemical Hardener Sealer: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lb. of fluosilicates per gal.

Products: Subject to compliance with requirements, provide one of the following:

- 1. "Burk-o-Lith"; The Burke Co.
- 2. "Surfhard"; Euclid Chemical Co.
- 3. "Lithoplate"; Protex Industries, Inc.
- 4. "Lapidolith"; Sonneborn Building Products

Submit manufacturer's certification that product conforms to the requirements specified.

E. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type for use in cosmetic nonstructural repairs.

Products: Subject to compliance with requirements, provide one of the following:

- 1. "Acrylic Bondcrete"; The Burke Co.
- 2. "J-40" Bonding Agent; Dayton Superior
- 3. "Euco Weld"; Euclid Chemical Co.
- 4. "Daraweld C"; W. R. Grace.
- 5. "Everbond"; L & M Construction Chemicals.
- 6. "Weldcrete"; Larsen Products.
- 7. "Masterpatch"; Master Builders
- 8. "Sikatop"; Sika Chemical Co.
- 9. "Sonocrete"; Sonneborn Building Products
- 10. "Thorite"; Thoro System Products
- F. Epoxy Products:

Two component material suitable for use on dry or damp surface, complying with ASTM C 881, for use in all structural concrete repairs.

- 1. Products for Crack Repair:
 - a. "Fx-751 LV Hydro-Ester Epoxy"; Fox Industries
 - b. "Product R303, Concrete Injection Resin"; Rescon Technology Corp.
 - c. "Sikadur Hi Mod LV"; Sika Chemical Company
- 2. Products for Epoxy Mortar Patches:
 - a. "Concresive 3007"; Adhesive Engineering Company.
 - b. "FX-763 Hydro-Ester Trowel Grade Epoxy"; Fox Industries.
 - c. "Product R616, Concrete Bonder" or "Product R404, Epoxy Mortar Resin"; Rescon

Technology Corp.

- d. "Sikadur Lo-Mod LV"; Sika Chemical Corporation.
- 3. Products for Epoxying Bolts or Reinforcing Steel into Concrete:
 - a. "FX-763 Hydro-Ester Trowel Grade Epoxy" (horizontal use); Fox Industries, Inc.
 - b. "FX-775 LM Hydro-Ester Low Modulus Epoxy" (vertical use); Fox Industries, Inc.
 - c. "Product R606, Concrete Bonder"; Rescon Technology Corp.
 - d. "Sikadur 31 Hi-Mod Gel"; Sika Corporation.
- 4. Products for Epoxying Steel Plates to Concrete:
 - a. "FX-763 Hydro-Ester Trowel Grade Epoxy"; Fox Industries.
 - b. "Product R626, Concrete Bonder"; Rescon Technology Corp.
 - c. "Sikadur 31 Hi-Mod Gel"; Sika Chemical Corporation.

Substitutions may be considered provided complete technical information and job references are furnished to the Engineer for approval prior to commencement of work.

- G. Self-Leveling Mortars for Slab Fill Repair: Products: Unless specified otherwise, provide one of the following:
 - 1. "Ardex K-15"; Ardex, Inc.
 - 2. "Set Latex Cement"; Master Builders
 - 3. "Sikatop 111"; Sika Chemical Co.
- H. Expansion Bolts in Concrete:
 - 1. ICBO Approval: Only concrete anchors approved by the International Conference of Building Officials (ICBO) with a published Research Report shall be approved for use.
 - 2. Type: All expansion bolts in concrete shall be only wedge type expansion bolts.
 - 3. Interior Use: All expansion bolts, nuts and washers for use in interior conditioned environments free of potential moisture shall be manufactured from carbon steel zinc plated in accordance with Federal Specification QQ-Z-325C, Type II, Class 3.
 - 4. Exterior or Exposed Use: All expansion bolts, nuts and washers for use in exposed or potentially wet environments, or for attachment of exterior cladding materials shall be hot dipped galvanized or stainless steel. Galvanized bolts, nuts and washers shall conform to ASTM A 153. Stainless steel bolts shall be manufactured from 300 series stainless steel and nuts and washers from 300 series or Type 18-8 stainless steel.
 - 5. Nuts and Washers: Nuts and washers shall be furnished from the manufacturer and used with the bolts.
 - 6. Acceptable Products and Manufacturers:
 - a. "Kwik-Bolt" or "Super Kwik-Bolt"; Hilti Fastening Systems.
 - b. "Parabolt"; Molly Fastener Group.
 - c. "Trubolt"; Ramset Fastening Systems.

d. "Red Head Wedge Anchors"; ITT Phillips Drill Division.

Other manufacturers will be acceptable only if approved by ICBO with an ICBO Research Report submitted for Engineer review.

- I. Adhesive Bolts in Concrete:
 - 1. Type: Adhesive bolts in concrete shall consist of a threaded steel rod meeting the requirements of ASTM A 307 and a sealed glass capsule containing polyester resin, quartz sand aggregate and a hardener.
 - Exterior Use: Adhesive bolts used in exterior, exposed, potentially wet environments and for attachment of exterior cladding materials shall have threaded rods manufactured from ASTM A 153 galvanized steel or 300 series stainless steel. Nuts and washers shall also be galvanized or stainless steel.
 - 3. Nuts and Washers: Nuts and washers shall be furnished from the manufacturer and used with the bolts.
 - 4. Acceptable Products: "HVA Adhesive Anchor"; Hilti Fastening Systems. "Parabond Capsule Anchor"; Molly Fastener Group.

Other manufacturers will be acceptable only if approved by ICBO with an ICBO Research Report submitted for Engineer review.

PROPORTIONING AND DESIGN OF MIXES

A. Refer to Testing Laboratory section of the Specifications.

CONCRETE MIXES

A. Ready-Mix Concrete: Comply with requirements of ANSI/ASTM C 94, "Ready Mixed Concrete" and Testing Laboratory section of the specifications.

PART 3 - EXECUTION

JOINTS IN CONCRETE

- A. Construction Joints: Locate and install construction joints only where indicated on the drawings.
 - 1. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings, accepted bulkheads designed for this purpose may be used for slabs. See details on the drawings.

INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

PREPARATION OF FORM SURFACES

- A. Clean reused forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
- B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- C. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

CONCRETE PLACEMENT

- A. Pre-placement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
- B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
- C. Comply with ACI 304, Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete, and as herein specified.
 - Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
 - 2. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - 3. Consolidate placed concrete by mechanical vibrating equipment supplemented by handspading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309 recommended practices.
 - 4. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

- 5. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- 6. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- 7. Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedges, bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- 8. Maintain reinforcing in proper position during concrete placement operations.

FINISH OF FORMED SURFACES

- A. Rough Form Finish: Provide rough form finish for formed concrete surfaces not exposed-to-view in the finish work unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish: Provide smooth form finish for formed concrete surfaces exposed-to-view, unless noted otherwise, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces, which have received smooth form finish treatment.
 - 1. Combine one part portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will closely match adjacent surfaces.
 - 2. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. Related Unformed Surfaces: At tops of walls, horizontal offsets surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

MONOLITHIC SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo and other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to tolerance specified below. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance as specified below. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, Polyacrylate Modified thin-set terrazzo or other thin-film finish coating system. After floating, begin first trowel finish operation using power- driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a level surface to a tolerance as specified below. Grind smooth surface defects, which would telegraph through applied floor covering system.
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified above, then immediately follow with slightly scarifying surface by fine brooming.
- E. Non-Slip Broom Finish: Apply non-slip broom finish to ramps less than 6% exterior concrete platforms, steps and elsewhere as indicated. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- F. Rake Finish: Provide a rake finish to all ramps exceeding a 6% slope. Finish shall be applied perpendicular to direction of traffic.
- G. Chemically Hardened Sealed Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3-strength. Evenly apply each coat and allow 24 hours for drying between coats.

Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

CONCRETE FINISH MEASUREMENT AND TOLERANCES

- A. Definitions:
 - 1. Flatness A measure of a concrete surfaces curvature or deviation from a planar surface. Concrete surfaces that are not flat are wavy or bumpy.
 - 2. Levelness A measure of a concrete surfaces tilt or inclination from a horizontal plane. Concrete surfaces that are not level are sloped or tilted.
 - 3. FF Flatness F-Number The flatness F-Number FF measures floor curvature or flatness and for any floor section or overall floor area is defined as follows:

4.57 FF = 3 x Sq + q

Where q- is the mean value and Sq the standard deviation of all floor q readings. A q reading is defined as the difference in slope between three successive points along any test measurement line on the floor surface that are twelve inches apart.

4.FL Levelness F-Number - The levelness F-Number FL measures floor inclination from a horizontal plane and for any floor section or overall area is defined as follows:

12.5FL = 3 x Sz + z

Where z- is the mean value and Sz the standard deviation of all floor z readings. A z reading is defined as the difference in elevation between two successive points along any test measurement line on the floor surface that are 10 feet (120") apart.

Measurement of FL is not applicable for floors that are intentionally inclined or cambered, for elevated structural floors that can deflect from the time the floor is poured to the time it is measured, and for unshored form surfaces.

- B. Measurement Standard: All floors should be measured for flatness and levelness according to ASTM E 1155 "Standard Test Method for Determining Floor Flatness and Levelness Using the F-Number System".
- C. Time Period for Measurement and Reporting: Measurement of the finished concrete surface profile for any test section shall be made when requested by the Owner's Representative at his option. All measurements shall be made by the Owner's Testing Laboratory or designated party within 24 hours after completion of finishing operations. For structural elevated floors measurement shall also be made prior to removal of forms and shores. The Contractor shall be notified immediately after the measurements of any section are complete and a written report of the floor measurement results shall be submitted within 72 hours after finishing operations are complete. The Contractor shall take immediate action to correct any work that is outside specified tolerances as outlined later in this section.
- D. Measuring Equipment: The concrete surface profile shall be measured using equipment manufactured for the purpose such as a Dipstick Floor Profiler as manufactured by the Edward

W. Face Company in Norfolk, Virginia, optical or laser means or other method specified in ASTM E 1155.

- E. Two-Tiered Measurement Standard: Each floor test section and the overall floor area shall conform to the two-tiered measurement standard as specified herein.
 - 1. Minimum Local Value (MLV). The minimum local FF/FL values represent the absolute minimum surface profile that will be acceptable in any one floor test section.
 - 2. Specified Overall Value (SOV). The specified overall FF/FL values represent the minimum values acceptable for all combined floor test sections representing the overall floor.

SOV and MLV FF/FL values are specified later in this section for each portion of the structure.

- F. Floor Test Sections: For purposes of this specification a floor test section is defined as the smaller of the following areas:
 - 1. The area bounded by column and/or wall lines.
 - 2. The area bounded by construction and/or control joint lines.
 - 3. Any combination of column lines and/or control joint lines.

Test sample measurement lines within each test section shall be multidirectional along two orthogonal lines as defined by ASTM E 1155. The precise layout of each test section shall be determined by the Owner's testing agency and shall be submitted for Architecture/Engineer review and approval.

- G. Tolerance on Floor Elevations: Construction tolerance on absolute floor elevation from the specified elevation as shown on the drawings shall be as specified below, taken from ACI 117:
 - 1. Slab-on-Grade Construction + 3/4"
 - 2. Top surfaces of all other slabs + 3/4"

The tolerance on relative elevation difference between points on the floor shall be defined by the FL Levelness F-Number as prescribed below.

- H. Construction Requirements to Achieve Specified Floor Finish Tolerances:
 - 1. Forms shall be properly leveled, in good condition and securely anchored including special attention to ends and transitions.
 - 2. Bearing surfaces for straightedges such as form edges or previously poured slabs shall be kept clean of laitance, sand, gravel, or other foreign elements.
 - 3. Screeds shall be maintained in good condition with true round rolling wheels and level cutting edges. The use of optical sighting equipment such as lasers is recommended for checking levelness and straightness. The Contractor shall promptly adjust or replace equipment when test results indicate substandard work.
 - 4. Highway straightedges are recommended for use in lieu of bullfloats for all slab placement and finishing operations.
- I. Concrete Floor Finish Tolerance for Slab-on-Grade Construction:
 - 1. Concrete Placement: Concrete shall be placed and screeded to predetermined marks set to elevations prescribed on the drawings.

- 2. Tolerance:
 - a. Slabs with Scratch Finish:

Specified Overall Value - FF15/FL13 Minimum Local Value - FF13/FL10

b. Slabs with Float Finish or Other Finish Not Specified Herein:

Specified Overall Value - FF18/FL15 Minimum Local Value - FF13/FL10

c. Slabs with Trowel Finish:

Specified Overall Value - FF20/FL15 Minimum Local Value - FF15/FL10

- J. Concrete Floor Finish Tolerance Unshored Composite Metal Deck and Beam Floor Construction:
 - Concrete Placement: Concrete over metal deck shall be placed and screeded level and flat to the tolerance specified below, maintaining at least the minimum slab thickness at all locations as specified on the drawings. The Contractor shall increase the slab thickness as required to compensate for metal deck deflection, residual beam camber and beam deflection in order to achieve a level and flat floor.
 - 2. Tolerance:
 - a. Slabs with Scratch Finish:

Specified Overall Value - FF15 Minimum Local Value - FF13

b. Slabs with Float Finish or Other Finish Not Specified Herein:

Specified Overall Value - FF18 Minimum Local Value - FF13

c. Slabs with Trowel Finish:

Specified Overall Value - FF20 Minimum Local Value - FF15

Slabs specified to slope shall have a tolerance from the specified slope of 3/8" in 10 feet at any point as required by ACI 117.

- 3. Extra Concrete: The contractor shall include in his bid any additional concrete required to achieve the specified slab surface finish tolerance and to compensate for metal deck, deflection beam camber and beam deflection.
- 4. Concrete Placement at Column Bays Supported on Transfer Girders or Trusses: Concrete in floor areas supported by transfer girders or trusses shall be placed and screeded to

predetermined marks placed over the metal deck slab conforming to elevations as specified on the drawings. At least the minimum slab thickness, as specified on the drawings, shall be maintained throughout the slab surface. The Contractor shall conform to the FF values specified above.

- K. Concrete Floor Finish Tolerance Composite Metal Deck and Shored Beam Construction:
 - 1. Concrete Placement: Concrete over metal deck shall be placed and screeded level and flat to the tolerance specified below, maintaining at least the minimum slab thickness at all locations as specified on the drawings. The Contractor shall increase the slab thickness as required to compensate for metal deck deflection in order to achieve a level and flat floor.
 - 2. Tolerance:
 - a. Slabs with Scratch Finish:

Specified Overall Value - FF15 Minimum Local Value - FF13

b. Slabs with Float Finish or Other Finish Not Specified Herein:

Specified Overall Value - FF18 Minimum Local Value - FF13

c. Slabs with Trowel Finish:

Specified Overall Value - FF20 Minimum Local Value - FF15

Slabs specified to slope shall have a tolerance from the specified slope of 3/8" in 10 feet at any point as required by ACI 117.

- 3. Extra Concrete: The contractor shall include in his bid any additional concrete required to achieve the specified slab surface finish tolerance and to compensate for metal deck deflection.
- 4. Concrete Placement at Column Bays Supported by Unshored Transfer Girders or Trusses: Concrete over metal deck shall be placed and screeded level and flat to the tolerance specified below, maintaining at least the minimum slab thickness at all locations as specified on the drawings. The Contractor shall increase the slab thickness as required to compensate for metal deck deflection, residual beam camber and beam deflection in order to achieve a level and flat floor.
- L. Remedial Measures for Slab Finish Construction Not Meeting Specified Tolerances:
 - Application of Remedial Measures. Remedial measures specified herein are required whenever either or both of the following occur:
 - a. The composite overall values of FF or FL of the entire floor installation measure less than specified values.

- b. Any individual test section measures less than the specified absolute minimum FF or FL value.
- 2. Modification of Existing Surface:
 - a. If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work can be repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately undertake the approved repair method.
 - b. The Contractor shall submit for review and approval a detailed work plan of the proposed repair showing areas to be repaired, method of repair and time to effect the repair.
 - c. Repair method(s), at the sole discretion of the Architect/Engineer or Owner's Representative, may include grinding (floor stoning), planing, retopping with self leveling grout or polymer concrete, or any combination of the above.
 - d. The Architect/Engineer or Owner's Representative maintains the right to require a test repair section using the approved method of repair for review and approval to demonstrate a satisfactory end product. If, in the opinion of the Architect/Engineer or Owner's Representative, the repair is not satisfactory an alternate method of repair shall be submitted or the defective area shall be replaced.
 - e. The judgment of the Architect/Engineer or Owner's Representative on the appropriateness of a repair method and its ability to achieve the desired end product shall be final.
 - f. All repair work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.
- 3. Removal and Replacement:
 - a. If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work cannot be satisfactorily repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately commence to remove and replace the defective work.
 - b. Replacement section boundaries shall be made to coincide with the test section boundaries as previously defined.
 - c. Sections requiring replacement shall be removed by sawcutting along the section boundary lines to provide a neat clean joint between new replacement floor and existing floor.
 - d. The new section shall be reinforced the same as the removed section and doweled into the existing floor as required by the Engineer. No existing removed reinforcing steel may be used. All reinforcing steel shall be new steel.
 - e. Replacement sections may be retested for compliance at the discretion of the Architect/Engineer or Owner's Representative.
 - f. The judgment of the Architect/Engineer or Owner's Representative on the need for replacement shall be final.
g. All replacement work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

CONCRETE CURING AND PROTECTION

- A. General:
 - Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Maintain concrete with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of concrete.
 - 2. Curing shall commence as soon as free water has disappeared from the concrete surface after placing and finishing. The curing period shall be 7 days for all concrete except high early strength concrete, which shall be cured for 3 days minimum, unless test cylinders, made and kept adjacent to the structure and cured by the same methods, are tested with the average compressive strength equal to 70% of the specified 28 day strength. Curing may also be terminated when the temperature of the concrete is maintained at least 50°F for the same length of time that laboratory cured cylinders, representative of the concrete in place, require to achieve 85% of the 28 day compressive strength.
 - 3. Curing shall be in accordance with ACI 301 procedures. Avoid rapid drying at the end of the curing period.
- B. Curing Methods: Perform curing of all concrete horizontal and vertical surfaces (including columns, shear walls and basement walls) by one of the methods specified or by combinations thereof, as herein specified. The Contractor shall choose a curing method that is compatible with the requirements for subsequent material usage on the concrete surface
 - 1. Provide moisture curing by one of the following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
 - 2. Provide moisture-cover curing as follows: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- C. Curing Formed Surfaces: Where wooden forms are used, cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. When forms are removed, continue curing by methods specified above, as applicable.

HOT WEATHER CONCRETING

A. Definition:

- 1. Conditions warranting hot weather concreting practices are defined as any combination of high air temperature, low relative humidity and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise result in abnormal properties.
- 2. The maximum acceptable concrete temperature at the truck discharge point shall be 95°F.
- B. Specification: Hot weather concreting practices required to limit the concrete temperature at the truck discharge point to 95°F or lower shall be followed according to ACI 305 "Hot Weather Concreting."
- C. Records: Under hot weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature at truck discharge and general weather conditions.
- D. Hot Weather Concreting Requirements: The following items, all or in part as required, should be followed to limit the concrete temperature to 95°F or lower:
 - 1. Design the concrete mixes specifically for hot weather conditions replacing some cement with fly ash or other pozzolan and using a water reducing retarding admixture (ASTM C 494 Type D).
 - 2. Use the largest size and amount of coarse aggregate compatible with the job.
 - 3. Use sunshades and/or windbreaks.
 - 4. Delay construction of indoor slabs-on-grade until the walls and roof are constructed.
 - 5. Cool and shade aggregate stockpiles.
 - 6. Use ice as part of the mixing water or cool the water with liquid nitrogen.
 - 7. Limit the number of revolutions at mixing speed to 125 maximum.
 - 8. Paint mixers and storage bins or silos white to minimize heat absorption.
 - 9. Reduce time between mixing and placing as much as possible.
 - 10. Do not add water to ready-mixed concrete at the job site unless it is part of the amount required initially for the specified water-cement ratio and the specified slump.
 - 11. Schedule concrete placement for early morning, late afternoon, or night.
 - 12. Have all forms, equipment and workers ready to receive and handle concrete.
 - 13. Maintain one standby vibrator for every three vibrators used.
 - 14. Keep all equipment cool by spraying with water including chutes, conveyors, pump lines, tremies, reinforcement and buggies.
 - 15. Dampen the subgrade and side forms with cool water.
 - 16. Protect slab concrete at all stages against undue evaporation by applying a fog spray or mist above the surface or applying a monomolecular film. Where high temperatures and/or placing conditions dictate, use water-reducing retarding admixture (Type D) in lieu of the waterreducing admixture (Type A) as directed by the Owner's Testing Laboratory.
 - 17. Provide continuous curing, preferably with water, during the first 24 hours using wet burlap, cotton mats, continuous spray mist, or by applying a curing compound meeting ASTM C 309. Continue curing for 3 days minimum.
 - 18. Spray exteriors of forms to keep them cool.
 - 19. As soon as possible, loosen forms and run water down the inside. When forms are removed, provide a wet cover to newly exposed surfaces.

COLD WEATHER CONCRETING

A. Definition:

- 1. Concrete shall not be placed on any day when the outside air temperature is 40°F or less and falling unless cold weather concreting practices are followed as specified below.
- 2. Cold weather concreting practices should be followed whenever the mean daily temperature drops below 40°F for more than three successive days.
- 3. The temperature of concrete mixed and delivered to the job site shall conform to the following requirements:

Air Temperature	Min. Concrete Temperature
Above 30°F	60°F
0°F to 30°F	65°F
Below 0°F	70°F

- 4. The minimum temperature of concrete during placement and curing shall be 55°F.
- 5. The maximum concrete temperature heated by artificial means at point of placement shall not exceed 90°F.
- B. Specification: Cold weather concreting practices required to limit the concrete temperatures as specified above shall be followed according to ACI 306R-78 "Cold Weather Concreting".
- C. Records: Under cold weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature as placed and general weather conditions.
- D. Cold Weather Concreting Requirements: The following items, all or in part as required, should be followed to assure acceptable concrete in cold weather conditions:
 - 1. Design the concrete mix suitable for cold weather. Use air entrainment and obtain high early strength by using a higher cement content, a high early strength cement (Type III), or an accelerator (ASTM C 494 Type C and E).
 - 2. Protect the concrete during curing period using insulating blankets, insulated forms, enclosures and/or heaters.
 - 3. Concrete cured in heated enclosures shall have heaters vented to prevent exposure of concrete and workmen to noxious gases.
 - 4. Frozen subgrade shall be thawed prior to concrete placement and snow and ice shall be removed from forms.
 - Concrete shall be protected and cured at 55°F for three days minimum if normal concrete (Type I cement) is used and for two days minimum if high early strength concrete (concrete with Type III cement, 100 pounds cement added per cubic yard concrete, or an accelerator added).
 - 6. Concrete not loaded during construction shall be protected a minimum of 3 days for normal concrete and 2 days for high early strength concrete to obtain safe form stripping strength. Concrete fully loaded during construction shall be protected for whatever time period is required to obtain the required strength as determined by nondestructive strength tests (Windsor probe, Swiss Hammer Test) on the in-place concrete.
 - 7. Heat the mixing water and then blend hot and cold water to obtain concrete no more than 10°F above the required temperature.
 - 8. Heat the aggregates by circulating steam in pipes placed in the storage bins for air temperatures consistently below 32°F. When either water or aggregate is heated to over

140°F combine them in the mixer first to obtain a maximum temperature of the mixture not to exceed 140°F in order to prevent flash set of the concrete.

- 9. Uniformly thaw aggregates far in advance of batching to prevent moisture variations in the stockpile.
- 10. Cover warmed stockpiles with tarps to retain heat.
- 11. Place air entraining admixture in the batch after the water temperature has been reduced by mixing with cooler solid materials.
- 12. Use wind screens to protect concrete from rapid cooling.
- 13. Place vertical pump lines inside the building, if possible, for concrete being pumped.
- 14. Maintain artificial heat as low as possible to reduce temperature stresses during cooling.
- 15. Avoid water curing of concrete except for parking garage structures. Apply the required curing compound to unformed surfaces as soon as possible to prevent drying of concrete from heated enclosures.
- 16. Delay form stripping as long as possible to help prevent drying from heated enclosures and to reduce damage to formed surfaces caused by premature stripping.
- 17. Provide triple thickness of insulating materials at corners and edges vulnerable to freezing.
- 18. Wrap protruding reinforcing bars with insulation to avoid heat drain from the warm concrete.
- 19. Gradually reduce the heat at the end of the heating period to reduce likelihood of thermal shock.

MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

CONCRETE SURFACE REPAIRS

A. Definition - Defective Areas:

1. Formed Surfaces: Concrete surfaces requiring repairs shall include all honeycombs, rock pockets and voids exceeding 1/4" in any dimension, holes left by tie rods or bolts, cracks in excess of 0.01" and any other defects that affect the durability or structural integrity of the concrete.

- 2. Unformed Surfaces: Concrete surfaces requiring repair shall include all surface defects such as crazing, cracks in excess of 0.01" wide or cracks which penetrate to reinforcement or through the member, popouts, spalling and honeycombs.
- B. Classification:

- 1. Structural Concrete Repair: Major defective areas in concrete members that are load carrying (such as shear walls, beams, joists and slabs), are highly stressed, and are vital to the structural integrity of the structure shall require structural repairs. Structural concrete repairs shall be made using a two part epoxy bonder and/or epoxy mortar. Location of structural concrete repairs shall be determined by the Engineer.
- 2. Cosmetic Concrete Repair: Defective areas in concrete members that are non-load carrying and minor defective areas in load carrying concrete members shall require cosmetic concrete repair. Cosmetic concrete repairs may be made using a non-epoxy non-shrink patching mortar and bonding agent. The location of cosmetic concrete repair required shall be determined by the Engineer. Cosmetic concrete repair in exposed-to- view surfaces will require Architect's approval prior to patching operation.
- 3. Slab Repairs: High areas in concrete slabs shall be repaired by grinding after concrete has cured at least 14 days. Low areas shall be filled using self-leveling mortars. Repair of slab spalls and other surface defects shall be made using epoxy products as specified above and as determined by the Engineer.

QUALITY CONTROL TESTING DURING CONSTRUCTION

A. See Testing Laboratory Services section of these Specifications for concrete materials and castin-place concrete inspection and test requirements.

END OF SECTION 03 30 00

SECTION 03 63 00 - EPOXY GROUTING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

SCOPE OF WORK

A. Installation of epoxy grouted dowels or reinforcing steel, and bonding fresh concrete to hardened concrete. Such work shall be done by the Contractor in strict conformance to these specifications.

QUALITY ASSURANCE

- A. Applicable Standards
 - 1. American Society for Testing and Materials (ASTM)

C881-90 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

2. American Concrete Institute (ACI)

ACI 503 R-89 Use of Epoxy Compounds with Concrete

ACI 503.1-79 Revised 1986, Standard Specification for Bonding, Hardened Concrete, Steel, Wood, Brick, and Other Materials to Hardened Concrete with a Multi-Component Epoxy Adhesive

ACI 503.2-79 Revised 1986, Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive

ACI 503.3-79 Reapproved 1986, Standard Specification for Producing a Skid-Resistant Surface on Concrete by the Use of Multi-Component Epoxy System

ACI 503.4-79 Revised 1986, Standard Specification for Repairing Concrete with Epoxy Mortars

B. Manufacturer's Qualifications

Companies furnishing the epoxy materials shall have a proven track record of at least five years. Furthermore, they shall have in existence a program of training, certifying and supporting a nationally organized program of approved contractors. Evidence of this shall be made available to the Engineer/Architect upon request.

C. Contractor's Qualifications: Contractor performing the work shall be an approved contractor by the manufacturer furnishing the epoxy materials, and shall have no less than five years experience in the various types of epoxy related work required in this project. A notarized certification from the manufacturer attesting to the training shall be submitted to the Engineer/Architect along with the proposal to do the work.

PART 2 - PRODUCTS

GENERAL REQUIREMENTS FOR EPOXY MATERIALS

- A. All epoxy material shall be new and manufactured within the shelf life limitations set forth by the manufacturer.
- B. Epoxy shall be a two-part epoxy adhesive material, and shall be of epichlorohydrin/amine type. Polysulphide epoxies are not acceptable.
- C. Epoxy used shall be insensitive to the presence of water and moisture, and shall be capable of application and of strength development even when applied to damp surfaces having a temperature of 40° or above.
- D. Epoxy used shall develop a minimum strength of 2000 psi in tension and 4000 psi in compression at the end of seven days.
- E. Epoxies used shall not deteriorate under approximately 200 freeze thaw cycles.
- F. Epoxies used shall be 100% solids without solvents.
- G. Bonding and strength characteristics of epoxies shall be stable when exposed to ultraviolet rays.

ADDITIONAL REQUIREMENTS FOR EPOXY MORTARS

- A. Epoxy mortar used for bonding, patching, and resurfacing, shall have the following additional properties:
 - 1. Epoxy mortar shall be non-sagging.
 - 2. Sand used in preparing mortar shall be graded oven dry quartzite and furnished in bags.
 - 3. The epoxy mortar patch material shall match the existing texture and color of exposed concrete without giving a blotchy appearance. A test patch shall be applied for approval prior to final acceptance of the mortar. Size of test patch shall be approximately equal to the size of the average mortar patch to be used on the project.

GENERAL REQUIREMENTS FOR POLYMER MODIFIED CEMETITIOUS MORTARS

- A. Mortar used for bonding, patching, and resurfacing in exposed or exterior environmental conditions with large cyclic temperature changes shall have the following properties:
 - 1. Mortar shall be non-sagging.
 - 2. Coefficient of thermal expansion shall be comparable with that of concrete (5.5 x 10-6 in/in/°F).
 - 3. Sand used in preparing mortar shall be graded oven dry quartzite furnished in bags.

4. The mortar patch material shall match the existing texture and color of applied for approval prior to final acceptance of the mortar. Size of test patch shall be approximately equal to the size of the average mortar patch to be used on the project.

PRODUCTS AND MANUFACTURERS

- A. Epoxy Injection Work
 - 1. Master Builders Technologies: Concresive 1380
 - 2. E-Poxy Industries: Eva-Pox Injection Resin No. 4
 - 3. Rescon Technology Corp.: Product R303, Concrete Injection Resin
 - 4. Sika Chemical Corporation: Sikadur Hi-Mod LV or Sikadur 52 Injection Resin
 - 5. Thermal-Chem, Inc.: Thermal-Chem Injection Resin, Product No. 2
 - 6. Hilti: HIT HY 150/ HIT-ICE, HIT RE500
- B. Epoxy Mortar Patch
 - 1. Master Builders Technologies: Concresive 1411 or 1482.
 - 2. E-Poxy Industries: Eva-Pox Mortar Mix No. 3
 - 3. Rescon Technology Corp.: Product No. R616, Concrete Bonder or Product No. R404, Epoxy Mortar Resin.
 - 4. Sika Chemical Corporation: Sikadur 31 Hi-Mod Gel or Sikadur 35 Hi-Mod LV.
 - 5. Thermal-Chem, Inc.: Thermal-Chem Mortar Resin Product No. 3, Thermal-Chem Fibrous Mortar Resin, Product No. 306 or Thermal-Chem Mortar Resin Gel, Product No. 304.
- C. Epoxy for Bonding Fresh Concrete to Hardened Concrete
 - 1. Master Builders Technologies: Concresive Liquid (LPL) or Concressive 3007.
 - 2. E-Poxy Industries: Eva-Pox Fresh Concrete Bonder No. 2.
 - 3. Rescon Technology Corp.: Product R649, Fresh Concrete Bonder.
 - 4. Sika Chemical Corporation: Sikadur 32 Hi-Mod.
 - 5. Thermal-Chem, Inc.: Thermal-Chem Wet Concrete Bonder, Product No. 5 or 501.
- D. Epoxy for Grouting Bolts, Dowels or Reinforcing Steel
 - 1. Master Builder Technologies: Concressive Liquid (LPL), Concressive 3007, Concressive Paste (LPL) for horizontal use in conditioned spaces.

- 2. E-Poxy Industries: Eva-Pox Cold Cure Bonder No. 41.
- 3. Rescon Technology Corp.: Product No. R606, Concrete Bonder.
- 4. Sika Corporation: Sikadur 31 Hi-Mod Gel, (horizontal use); Sikadur 32 Hi-Mod or Sikadur 35 Hi-Mod LV (vertical use).
- 5. Thermal-Chem, Inc.: Thermal-Chem Bonder, Product No. 4, Normal Cure or Rapid Cure.
- 6. Hilti: HSE 2421

Substitutions may be considered provided complete technical information and job references are furnished to the Architect/Engineer and approved prior to commencement of work.

Changes in products required to suit temperature and environmental conditions at the time of epoxy application shall be specified as separate line items by the Contractor showing credit or additions to the price for the various tasks.

In using the above products, follow strictly the manufacturer's specifications and directions for mixing and application. Also heed all label warnings manufacturer. Make application in accordance with applicable safety laws.

PART 3 - EXECUTION

EPOXY MORTAR

- A. Applicator's Qualifications
 - 1. Epoxy mortar repair work shall only be performed by contractors who have successfully used this process on at least three similar structural repairs of equal scope which have performed successfully for a minimum period of five years.
 - 2. Only adequately trained and experienced personnel shall be used on the job.
- B. Surface Preparation
 - 1. Concrete surface to which the epoxy mortar is to be applied shall be exposed parent concrete free of loose and unsound materials. Surface preparation shall be done by abrasive blasting, water blasting or as otherwise required by the manufacturer.
 - Necessary approvals shall be obtained by the Contractor from authorizing governmental or other agencies prior to abrasive blasting. Abrasive blasting operations shall comply with the requirements of OSHA and NIOSH (National Institute for Occupational Safety and Health) Standard PB-246-697.
 - 3. Surfaces shall be free of any deleterious materials such as laitance, dust, dirt, and oil.
 - 4. Any exposed reinforcing steel shall also be cleaned and be free of rust and other contaminants. Cleaning shall be accomplished by mechanical means. Use powered wire brushes in locations where reinforcing steel cannot be cleaned by abrasive-blasting or water-

blasting. All exposed reinforcing steel shall be coated with a corrosion inhibiting product specified elsewhere in this specification prior to mortar application.

- 5. Prime the cleaned surface with primer as required by the manufacturer.
- C. Concrete Surface Inspection
 - 1. Ensure that the surface temperature is at least 40°F to permit wetting of concrete surface by epoxy coating.
 - 2. The Contractor shall evaluate the moisture content of concrete surface receiving epoxy mortar. This shall be done by determining if moisture will collect at bond lines between concrete and epoxy mortar before epoxy has cured. Evaluate this by taping a piece of polyethylene sheet to the concrete. If moisture collects on underside of the polyethylene sheet before epoxy would cure, then allow concrete to dry sufficiently to prevent the possibility of moisture between old concrete and new epoxy.
- D. Mortar Application
 - 1. Condition epoxy compound components to a temperature between 65°-80°F unless otherwise recommended by the manufacturer. Epoxies beyond this range of temperature shall not be used.
 - 2. Stir each of the two parts of epoxy separately before mixing. Then mix in a clean container free of contaminants.
 - 3. Thoroughly blend epoxy components and sand with Jiffy mixers (made by The Jiffy Mixer Co., Irvine, California) to a uniform and homogenous mixture. Small batches of one quart or less may be mixed by spatulas, palette knives or similar devices.
 - 4. Mixing should be accomplished well within the pot life of epoxy (three minutes required for application).
 - 5. Apply mortar by trowel or other means suitable for the consistency of the epoxy-sand mortar mix.
 - 6. Build up the repair area in layers with mortar thicknesses within those specified by the manufacturer (1/4" maximum per layer).
 - 7. Consolidate the mortar thoroughly to remove entrapped air.
 - 8. Finish surface of mortar to match the texture and contours of existing concrete.
 - 9. Allow mortar to cure in accordance to manufacturers recommendations.
- E. Cleanup
 - 1. Protect surfaces surrounding the work areas against spillage.
 - 2. Epoxy and epoxy mortar spillages shall be cleaned before they set and

become difficult to remove.

3. Cleanup all portions of the existing structure that are soiled or stained in the process of epoxy mortar repair work.

EPOXY GROUTED BOLTS, DOWELS OR REINFORCING STEEL

- A. Applicator's Qualifications
 - 1. Epoxy grouting of bolts, dowels or reinforcing steel shall only be performed by contractors who have had successful experience on a minimum of three projects of similar scope.
 - 2. Only adequately trained epoxy applicators shall be used on the job. Furnish current certificate of training on request.
- B. Surface Preparation
 - All bolts, dowels and reinforcing bars shall be abrasive blasted no more than eight hours before the grouting. If evidence of oxidation exists on the surface, the bolts, reinforcing bars and dowels shall be re-cleaned. Blast-clean surfaces using Steel Structures Painting Council, Surface Preparation No. 6, to give a surface condition corresponding to ASa2, BSa2, CSa2 of SSPC Vis 1, depending on the initial surface condition of the steel surface. Prior to blastcleaning, clean surfaces to conform to SSPC SP1, SP2, and SP3, as required.
 - 2. All holes shall be clean of dust, debris, and contaminants. Use compressed air from an oiland-water-free compressed air source prior to epoxy application.
- C. Drilling Holes for Embedment
 - 1. Use only rotary-percussion type drills for drilling holes.
 - 2. Drills shall be fitted with bits having single tooth that produce large cuttings, and hollow stem drill rods that permit simultaneous blowing of compressed air providing immediate expulsion of the cuttings from the hole.
 - Do not cut through any reinforcing steel unless indicated otherwise on the drawings. Use small diameter exploratory holes to detect presence of reinforcing steel prior to drilling holes for grouting.
 - 4. Core drilling equipment, and electric impact hammers or other tools which do not provide for immediate expulsion of the drill cuttings shall not be used.
 - 5. Unless noted otherwise on the drawings, depth of hole used for embedding the bolts, bars or dowels shall be at least fifteen times their diameter.
 - 6. Unless noted otherwise on the drawings, the center to center distance between the embedded bolts, bars or dowels shall be at least twelve times their diameter.
 - 7. Unless noted otherwise on the drawings, the edge distance shall be at least six times the diameter of the bolt, bar or dowel.

- 8. Hole diameter shall normally be 1/4" larger than the outside diameter of the embedded item. In no case shall the hole diameter be 3/8" larger than the diameter of the embedded item.
- D. Epoxy Application
 - Condition epoxy compound materials at a temperature between 65°-80°F unless otherwise recommended by the manufacturer. Epoxies beyond this range of temperature shall not be used.
 - 2. Mix epoxy materials in a clean container free of contaminants.
 - 3. Thoroughly blend epoxy components with mechanical mixers to a uniform and homogenous mixture. Mix small batches (up to 1 quart) by use of spatulas, palette knives, or similar devices. Take care to use proper proportions of the epoxy components when using small batches.
 - 4. Mixing shall be accomplished well within the pot life of the epoxy after allowing for time required for application.
 - 5. Partially fill the hole with epoxy. Then insert the bolt, dowel or reinforcing bar into the hole such that the resin material oozes out around the embedded item, ensuring complete contact. Twist the bolt, dowel or bar slightly as it is inserted in the hole to ensure complete contact.
 - 6. As an alternative to inserting the embedded item after the epoxy is poured in the hole, the bolt, dowel, or bar may be positioned in the hole and filled up with epoxy by hand caulking guns or injected with an in-head mixing equipment. In either case, the nozzle shall be provided with a hose or tube of sufficient length to reach the bottom of the hole being filled.
 - 7. Where the holes are horizontal or overhead, the opening shall be covered by a masking or a duct tape. Make a split in the tape and insert the epoxy injection tube through the split. Fill hole completely with epoxy and then insert the embedded item through the split tape. Amount of epoxy should be such that a small amount of material oozes through the split. Twist the bolt, dowel or bar slightly as it is inserted in the hole to ensure complete contact.
 - 8. Do not apply epoxy in the rain or in the presence of standing water.
- E. Cleanup
 - 1. Protect surfaces surrounding the work area against spillage.
 - 2. Epoxy oozed out from the holes and spillages shall be cleaned before they become difficult to remove.
 - 3. Cleanup whatever portions of the existing structure are soiled or stained in the process of grouting the bolts, dowels or reinforcing bars.

END OF SECTION 03 63 00

SECTION 04 20 00 - UNIT MASONRY

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

RELATED DOCUMENTS

A. Requirements of this section apply to masonry work specified in Division-04 section Reinforced Unit Masonry", Section 04 20 00.13.

CODES & SPECIFICATIONS

A. All concrete masonry construction shall conform to the requirements of the local building code and IBC 2009.

DESCRIPTION OF WORK

- A. Extent of each type of masonry work is indicated on the architectural and structural drawings and in schedules. Provide all labor, materials, equipment, and services necessary for and incidental to the installation of all masonry construction as indicated on the drawings and specified herein.
- B. Masonry construction includes non-reinforced brick, and reinforced and non-reinforced concrete masonry including concrete filled masonry beams. Accessories include, but are not necessarily limited to ties, horizontal and vertical reinforcement, anchors to the structure, and control joints.
- C. The masonry contractor shall install all accessory items that are required in the work and supplied by others, including: bolts, nailing blocks, inserts, anchors, flashing, lintels, expansion joints, conduits, etc.
- D. Types of masonry work required include:
 - 1. Concrete unit masonry (CMU).
 - 2. Brick masonry.

QUALITY ASSURANCE

- A. Single Source Responsibility for Masonry Units:
 - 1. Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.
- B. Single Source Responsibility for Mortar Materials:
 - 1. Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

SUBMITTALS

- A. Product Data:
 - Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements. Provide certification of pull-out strength of all masonry ties and anchors. Submit certification of compliance with required standards for all masonry units. Submit one sample each of all masonry accessories items.
 - 2. For each type of brick masonry work, furnish not less than five individual brick as samples, showing extreme variations in color and texture.
- B. Samples for Initial Selection Purposes:
 - 1. Submit samples of the following materials:
 - a. Unit masonry samples in small scale form showing full extent of colors and textures available for each type of exposed masonry unit required.
 - b. Colored masonry mortar samples showing full extent of colors available.
- C. Samples for Verification Purposes:
 - 1. Submit the following samples:
 - a. Unit masonry samples for each type of exposed masonry unit required; include in each set the full range of exposed color and texture to be expected in completed work.
 - b. Include size variation data verifying that actual range of sizes for brick falls within ASTM C 216 dimension tolerances for brick where modular dimensioning is indicated.
 - 2. Provide minimum 3'-0" x 5'-0" sample of each brick type laid with selected mortar for final approval. Sample(s) shall remain on job site until completion of brick work.
- D. Mix Designs:
 - 1. Mix designs for mortar and grout specifying type, source, and brand of all materials shall be submitted for Engineer and Owner testing laboratory approval prior to start of the work. Mix designs shall be submitted only for structural load bearing walls and exterior walls subjected to wind load.
- E. Results of Preconstruction Testing:
 - 1. Test reports for each type of building and facing brick are to be submitted to the Architect/Engineer for approval.
 - 2. Testing and reports are to be completed by an independent laboratory.
 - 3. Test reports shall show:
 - a. Compressive strength
 - b. 24-hr. cold water absorption
 - c. 5-hr. boil absorption
 - d. Saturation coefficient
 - e. Initial rate of absorption (suction).
- F. Certificates:
 - 1. Prior to delivery, submit to Architect/Engineer certificates attesting compliance with the applicable specifications for grades, types or classes included in these specifications.

DELIVERY, STORAGE & HANDLING

- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.

- C. Limit moisture absorption of concrete masonry units during delivery and until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.
- D. Store cementitious materials and masonry units off the ground, under cover and in dry location. All materials must be protected from wetting by capillary action, rain, or snow, and protected from mud, dust, or other materials and contaminants likely to cause staining or defects.
- E. Store aggregates where grading and other required characteristics can be maintained.
- F. Store masonry accessories including metal items to prevent deterioration by corrosion or accumulation of dirt.
- G. Store mortar materials on dunnage, in a dry place. During freezing weather, protect masonry units with tarpaulins or other suitable material.
- H. Protect reinforcement and accessories from elements.

PROJECT CONDITIONS

- I. Protection of Work:
 - 1. The Contractor shall construct and maintain temporary protection as required to permit continuous progress of the work. During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
 - a. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 - b. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.
 - a. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.

PART 2 - PRODUCTS

BRICK MADE FROM CLAY OR SHALE

- A. General:
 - 1. Comply with referenced standards and other requirements indicated below applicable to each form of brick required.
- B. Size:
 - 1. Provide bricks manufactured to the following actual dimensions:
 - a. King Size Brick: 3" x 2-5/8" x 9-5/8".
- C. Special Shapes:
 - 2. Provide special molded shapes where indicated and for application requiring brick of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing. The Contractor shall furnish all required sizes and shapes as required to complete the work.
 - 1. For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored or unfrogged units with all exposed surfaces finished.

- D. Facing Brick:
 - 1. ASTM C 216, and as follows:
 - a. Grade SW.
 - b. Type FBS (normal size and color variations).
 - c. Compressive Strength:
 - i. Average of five tests per ASTM C 67.
 - d. Application:
 - i. Use where brick is exposed, unless otherwise indicated.
 - e. Texture and Color:
 - i. Provide brick similar in color, texture, and physical properties to those available for inspection at the Architect's office. Do not exceed variations in color and texture of samples accepted by the Architect.
- E. Building (Common) Brick:
 - 1. ASTM C 62 Grade SW, and as follows:
 - f. Application:
 - i. Use where brick is indicated for concealed locations.

CONCRETE MASONRY UNITS

- A. Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
- B. Provide square-edged units for outside corners, except where indicated as bullnose.
- C. Provide units complying with characteristics indicated below for Grade, Type, face size, exposed face and, under each form of block included, for weight classification.
 - 1. Grade N.
 - 2. Size:
 - Manufacturer's standard units with nominal face dimensions of 16" long x 8" high (15-5/8" x 7-5/8" actual) x thicknesses indicated unless shown otherwise on the drawings. The Contractor shall furnish all required sizes and shapes as required to complete the work.
 - 3. Type I, moisture-controlled units. Cure units by autoclave treatment at a minimum temperature of 350°F (176°C) and a minimum pressure of 125 psi.
 - 4. Exposed Faces:
 - a. Manufacturer's standard color and texture, unless otherwise indicated.
 - i. Where special finishes are indicated, provide units with exposed faces of the following general description matching color and texture of Architect's sample.
 1. Standard aggregate, ground finish.
 - ii. Where special patterns are indicated, provide units with exposed faces matching color, texture and pattern of Architect's sample.
 - 5. Hollow Loadbearing Block:
 - a. ASTM C 90 lightweight.
 - 6. Solid Loadbearing Block:
 - a. ASTM C 145 lightweight.
 - 7. Limestone Tapered Base:
 - a. Units shall be manufactured using limestone aggregate for smoother texture than CMU wall units.
 - b. Units shall be 4 inches high x 16 inches long x thickness and with taper as shown on the drawings. Custom cut taper as shown on drawings from straight faces units.

MORTAR & GROUT MATERIALS

- A. Portland Cement:
 - 1. ASTM C 150, Type I, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.
- B. Hydrated Lime:
 - 1. ASTM C 207, Type S.
- C. Quicklime:
 - 1. ASTM C5.
- D. Aggregate for Mortar:
 - 1. ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.
 - a. White Mortar Aggregates: Natural white sand or ground white stone.
- E. Coarse Aggregate for Grout:
 - 1. ASTM C 404, maximum size 3/8".
- F. Water:
 - 1. Clean and potable. Mixing water must be free of harmful amounts of acids, alkalis, organic materials, or other substances that would adversely affect the quality or appearance of the mortar or the masonry units.
- G. Proprietary Mortar Mixes:
 - 1. Proprietary mortar mixes may not be used.

JOINT REINFORCEMENT, TIES & ANCHORING DEVICES

- A. General:
 - 1. Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics:
 - 2. Manufacturers:
 - a. Subject to compliance with requirements, provide products of one of the following:
 - i. AA Wire Products Co.
 - ii. Dur-O-Wall, Inc.
 - iii. Hohmann & Barnard, Inc.
 - iv. National Wire Products Corp.
 - b. Other manufacturers shall be used only with Engineer approval. The Contractor shall submit technical literature for all reinforcing units.
- B. Hot-Dip Galvanized Steel Wire:
 - 1. ASTM A 82 for uncoated wire and ASTM A 153, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication into units.
 - a. Application: Use for masonry exposed to exterior and in contact with earth.
- C. Zinc-Coated (Galvanized) Steel Sheet:
 - 1. Carbon steel with zinc coating complying with ASTM A 525, Coating Designation G90. a. Application: Use for dovetail slots and where indicated.
- D. Hot-Dip Galvanized Carbon Steel Sheet:
 - 1. ASTM A 366, Class 2 or ASTM A 635; hot-dip galvanized after fabrication to comply with ASTM A 153, Class B.
 - a. Application: Use for anchors.

- E. Joint Reinforcement:
 - 1. Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods in straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:
 - a. Width: Fabricate joint reinforcement in units with widths a minimum of 2" less than nominal width of walls. Provide mortar coverage over joint reinforcement of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.
 - 2. Wire Size for Side and Cross Rods:
 - a. 0.1483" diameter (9 ga.) for all masonry construction except as noted below.
 - b. 0.1875" diameter (6 ga.) for loadbearing or reinforced concrete masonry construction.
 - 3. For single-wythe masonry provide type as follows with single pair of side rods:
 - a. Ladder design with perpendicular cross rods spaced not more than 16" o.c.
- F. Bent-Wire Ties:
 - 1. Provide individual prefabricated bent-wire units complying with requirements indicated below:
 - a. Wire Size: 0.1875" diameter.
 - Length: Provide units of length indicated but not less than that required for embedment into each wythe of 2" for solid units and for a minimum of 2" embedment of tie end into face shells of hollow units, with not less than 5/8" mortar cover on exterior face joints, 1/2" elsewhere.
 - c. Tie Shape for Hollow Masonry Units Laid with Cells Vertical: Rectangular with ends welded closed and not less than 2" wide.
 - d. Tie Shape for Solid Masonry Unit Construction: Z-shaped ties with ends bent 90° to provide hooks not less than 2" long.
 - e. Type for Masonry where Coursing Between Wythes Align: Unit ties bent from one piece of wire.
 - f. Type for Masonry where Coursing Between Wythes Does Not Align:
 - i. Adjustable ties composed of two parts, one with a pintle, the other with an eye.
- G. Flexible Anchors:
 - 1. Where flexible anchors are indicated for connecting masonry to structural framework, provide 2-piece anchors as described below which permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall:
 - a. For anchorage to concrete framework, provide manufacturer's standard anchors with dovetail anchor section formed from 0.1046" (12 gage) thick sheet metal and triangular-shaped wire tie section sized to extend within 1" of masonry face.
 - b. For anchorage to steel framework provide manufacturer's standard anchors with crimped 1/4" diameter wire anchor section for welding to steel and triangular-shaped wire tie section sized to extend within 1" of masonry face.
 - c. Wire Size: 0.1875" diameter.
- H. Masonry Veneer Anchors:
 - 1. Provide individual prefabricated bent-wire units complying with requirements indicated below:
 - a. Wire Size: 0.1875" diameter.
 - b. Length: Provide units of length indicated but not less than that required for embedment into each wythe of 2" for solid units and for a minimum of 2" embedment of tie end into face shells of hollow units, with not less than 5/8" mortar cover on exterior face joints, 1/2" elsewhere.
 - c. Tie Shape for Brick Veneer to CMU backup: Z-shaped ties with ends bent 90° to provide hooks not less than 2" long.
- I. Rigid Anchors:

- Provide straps of form and length indicated, fabricated from sheet metal strips of following width and thickness, unless otherwise indicated. Typical length to be 24" plus 2" long, 90° bends at ends.
 - a. Width: 1-1/4"
 - b. Thickness: 1/4"
- J. Unit Type Masonry Inserts in Concrete:
 - 1. Furnish cast iron or malleable iron inserts of type and size indicated.
- K. Dovetail Slots:
 - 1. Furnish dovetail slots, with filler strips, of slot size indicated, fabricated from 0.0336" (22 gage) sheet metal.
- L. Anchor Bolts:
 - 1. Provide steel bolts with hex nuts and flat washers complying with ASTM A 307, Grade A, hotdip galvanized to comply with ASTM C 153, Class C, in sizes and configurations indicated.

CONCEALED FLASHING MATERIALS

- A. Sheet Metal Flashing
 - 1. Fabricate from the following metal complying with requirements specified in Section 07 62 00 Sheetmetal Flashing and Trim and below:
 - a. Stainless Steel: 0.015" thick.
 - 2. Fabricate through-wall metal flashings with deformation in both directions for integral mechanical mortar bond.
- B. Membrane Flashing:
 - 1. Refer to Section 07 10 00 Dampproofing & Waterproofing.

MISCELLANEOUS MASONRY ACCESSORIES

- A. Weepholes:
 - 1. Cut out at least one half the height of head joints, approx. 1 1/2", at weeps and assure cut out area is completely clean with no build up of grout pushed back into cavity to block water from draining out of weephole.
- B. Bond Breaker Strips:
 - 1. Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No.15 asphalt felt).

MASONRY CLEANERS & SEALERS

- A. Job-Mixed Detergent Cleaning Solution:
 - 1. Solution of trisodium phosphate (1/2 cup dry measure) and laundry detergent (1/2 cup dry measure) dissolved in one gallon of water.
- B. Brick Sealer:
 - 1. Sonneborn White Roc 10 Plus water-repellent.
 - 2. Furnish a five (5) year written performance guarantee from Sonneborn for the White Roc 10 Plus water-repellent.

MORTAR & GROUT MIXES

A. General:

- 1. Do not add admixtures including coloring pigments, air-entraining agent, accelerators, retarders, water repellant agent, anti-freeze compounds or other admixtures.
- 2. Do not use calcium chloride in mortar or grout.
- B. Mortar for Unit Masonry:
 - Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated. Minimum twenty-eight day compressive strength shall be 1800 psi.
 a. Limit cementitious materials in mortar to portland cement-lime.
 - b. Use Type S mortar for reinforced masonry unless noted otherwise.
- C. Colored Pigmented Mortar:
 - 1. Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment-to-cement ration of 1-to-10, by weight.
- D. Grout for Unit Masonry:
 - Comply with ASTM C 476 for grout for use in construction of reinforced and non-reinforced unit masonry. Use grout of consistency indicated or if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout. Minimum twenty-eight day compressive strength shall be 3000 psi.
 - 2. Use fine grout in grout spaces less than 2" in horizontal direction, unless otherwise indicated. Fine grout shall be composed of one part portland cement, to which may be added not more than one-tenth part hydrated lime or lime putty, and two and one-fourth to three parts sand.
 - 3. Use coarse grout in grout spaces 2" or more in least horizontal dimension, unless otherwise indicated. Coarse grout shall be composed of one part portland cement to which may be added not more than one-tenth part hydrated lime or lime putty, and two to three parts sand, and not more than two parts gravel.
 - 4. Satisfy all local codes for maximum aggregate size with respect to minimum clear opening to be grouted.

PART 3 - EXECUTION

INSTALLATION - GENERAL

- A. Inspect surfaces that are to support masonry work to assure completion to proper lines and grades free of dirt and other deleterious material. Do not begin work until surfaces not properly prepared have been satisfactorily corrected.
- B. Wetting Clay Brick:
 - 1. Wet brick made from clay or shale which have ASTM C 76 initial rates of absorption (suction) of more than 20 grams for 30 sq. in. per minute. Use wetting methods which ensure each clay masonry unit being nearly saturated with clean water 24 hours prior to placement but surface dry when laid.
 - a. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements:
 - i. For units with surface temperatures above 32°F (0°C), wet with water heated to above 70°F (21°C).
 - ii. For units with surface temperatures below 32°F (0°C), wet with water heated to above 130°F (54°C).
 - iii. During freezing weather, units that require wetting shall be sprinkled with warm or hot water just before laying.
 - 2. Do not wet concrete masonry units.

- C. Cleaning Reinforcing:
 - 1. Before placing, remove loose rust, ice and other coatings from reinforcing.
- D. Thickness:
 - 1. Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.
 - 2. Build chases and recesses as shown or required for the work of other trades. Provide not less than 8" of masonry between chase of recess and jamb of openings, and between adjacent chases and recesses.
 - 3. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
- E. Cutting masonry units:
 - 1. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous patterns and to fit adjoining work. Use full-size units without cutting where possible.
 - 2. Use dry cutting saws to cut concrete masonry units.
- F. Do not install cracked, broken, or chipped masonry units exceeding ASTM allowances.
- G. Protect sills, ledges, and offsets from mortar droppings or other damage during construction. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface. Remove misplaced mortar or grout immediately. Protect face materials against staining. Protect door jambs and corners from damage during construction.
- H. Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Immediately remove grout or mortar in contact with such masonry.
- I. Mixing Mortar and Grout:
 - Combine and thoroughly mix cementitious material and aggregate for a minimum of five (5) minutes in a mechanical batch mixer. Add water in amounts required for workability. If mortar begins to stiffen from evaporation or absorption of a part of mixing water, retemper by adding water and remix. Grout shall have a slump of ten and one-half (10 1/2) to eleven (11) inches at time of placement. Mortar and grout shall be used within two and one-half (2 1/2) hours of initial mixing and no mortar or grout shall be used after it has begun to set.

COLD WEATHER CONSTRUCTION

- A. Surface Conditions:
 - 1. Ice or snow that has formed on the masonry bed shall be thawed by application of heat. Apply heat carefully until top surface is dry to the touch. Any section of completed masonry work that is deemed frozen and damaged shall be removed before continuing construction of that section.
- B. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10°F (6°C).
 - 1. 40°F (4°C) to 32°F (0°C):
 - a. Mortar: Heat mixing water to produce mortar temperature between 40°F (4°C) and 120°F (49°C).
 - b. Grout: Follow normal masonry procedures.

- 2. 32°F (0°C) to 25°F (-4°C):
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C); maintain temperature of mortar on boards above freezing.
 - b. Grout: Heat grout materials to 90°F (32°C) to produce in place grout temperature of 70°F (21°C) at end of work day.
- 3. 25°F (-4°C) to 20°F (-7°C):
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C); maintain temperature of mortar on boards above freezing.
 - b. Grout: Heat grout materials to 90°F (32°C) to produce in place grout temperature of 70°F (21°C) at end of work day.
 - c. Heat both sides of walls under construction using salamanders or other heat conventionally used and effective sources.
 - d. Use windbreaks or enclosures when wind is in excess of 15 mph.
- 4. 20°F (-7°C) and below:
 - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C).
 - b. Grout: Heat grout materials to 90°F (32°C) to produce in place grout temperature of 70°F (21°C) at end of work day.
 - c. Masonry Units: Heat masonry units so that they are above 32°F (0°C) at time of laying.
 - d. Provide enclosure and auxiliary heat to maintain an air temperature of at least 40°F (4°C) for 24 hours after laying units.
- 5. Do not heat water for mortar and grout to above 160°F (71°C).
- C. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.
 - 1. 40°F (4°C) to 32°F (0°C): Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.
 - 2. 32°F (0°C) to 25°F (-4°C): Completely cover masonry with weather-resistive membrane for at least 24 hours.
 - 3. 25°F (-4°C) to 20°F (-7°C): Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.
 - 4. 20°F (-7°C) and below: Except as otherwise indicated, maintain masonry temperature above 32°F (0°C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40°F (4°C) for 48 hours.

CONSTRUCTION TOLERANCES

- A. Variation from Plumb:
 - For vertical lines and surfaces of columns, walls and arises do not exceed 1/4" in 10 feet, or 3/8" in a story height not to exceed 20 feet, nor 1/2" in 40 feet or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story or 20 feet maximum, nor 1/2" in 40 feet or more. For vertical alignment of head joints do not exceed plus or minus 1/4" in 10 feet, 1/2" maximum.
- B. Variation from Level:
 - For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20 feet maximum, nor 1/2" in 40 feet or more. For top surface of bearing walls do not exceed 1/8" between adjacent floor elements in 10 feet or 1/16" within width of a single unit.

- C. Variation of Linear Building Line
 - 1. For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20 feet maximum, nor 3/4" in 40 feet or more.
- D. Variation in Cross-Sectional Dimensions:
 - 1. For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".
- E. Variation in Mortar Joint Thickness:
 - Do not exceed bed joint thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to 1/2". Do not exceed head joint thickness indicated by more than plus or minus 1/8".

LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.
- B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.
- C. Pattern Bond:
 - Lay exposed masonry in the bond pattern shown or, if not shown, lay in 1/2 running bond with vertical joint in each course centered on units in courses above and below (King size brick to be laid in 1/3 running bond). Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2". Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4" horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work:
 - Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces at set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.
- E. Built-in Work
 - Install bolts, anchors, nailing blocks, inserts, frames, vent flashings, conduit, and other built-in items specified under this and other sections of these specifications as masonry work progresses. Avoid cutting and patching. Solidly grout spaces around built-in items. Provide joints around exterior framed openings 1/4" to 3/8" wide, raked and tooled smooth to a uniform depth of 3/4", ready for caulking by others. Build chases, do not cut. Consult other trades in advance and makeprovisions for installation of their work to avoid cutting and patching. Install chases minimum of one full masonry unit length from jambs.
 - a. Fill in space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
 - b. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core, unless detailed otherwise.
 - c. Fill cores in hollow concrete masonry units with grout to supporting beam or slab below under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.
- F. Bondbreaker Strips at Corners:
 - 1. Unless shown otherwise, provide bondbreaker strips between concrete foundation and first masonry course for a length of 3 feet each direction from all corners.

MORTAR BEDDING & JOINTING

- A. Provide uniform nominal joint thickness as shown below, unless noted otherwise on the drawings:
 1. Concrete Masonry Units & Brick, 3/8".
- B. Lay solid brick size masonry units and hollow CMU with cells grouted with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not furrow bed joints. Do not slush head joints.
- C. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells of cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
- D. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints.
- E. Provide weather-proof, concave, tooled joints in exposed surfaces when mortar is thumbprint hard, using round jointing tool. Strike joints flush in surfaces to be plastered, stuccoed, or covered with other material or surface-applied finish other than paint. Concave tool exterior joints below grade. Remove mortar protruding into cells or cavities to be grouted. Do not permit mortar droppings to fall into cavities of multi-wythe walls or to block weep holes. Do not fill horizontal joints between top of masonry partitions and underside of concrete or steel construction with mortar unless specifically shown on the drawings. If not shown otherwise, provide 1" clear joint to be filled with caulk. Keep movement joints clean of all mortar and debris. For tuckpointing, rake mortar joints to a depth of 1/2 to 3/4 in., saturate with clean water, fill solidly with pointing mortar, and tool to match existing joints.
- F. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners of jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.
- G. Collar Joints:
 - 1. After each course is laid, fill the vertical longitudinal joint between wythes solidly with mortar (grout if walls are grouted) for the following masonry work:
 - a. Exterior walls, except cavity walls.

STRUCTURAL BONDING OF MULTI-WYTHE MASONRY

A. Where horizontal joints in adjacent wythes do not align use individual metal ties installed in horizontal joints to bond wythes together. Provide ties as shown, but not less than one metal tie for 2.0 square feet of wall and spaced not to exceed 16" o.c. horizontally or vertically. Stagger ties in alternate courses. Provide additional ties within 1'-0" of all openings and space not more than 3'-0" apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 16" o.c. vertically.

> MAX. TIE SPACING VERT. HORIZ. 16" 16"

B. Bed joints of opposing wythes shall not be farther apart vertically than 1 1/2" either direction. Ties shall be sized to extend a minimum of 2" into the joints.

- C. Where horizontal joints of adjacent wythes align, use continuous horizontal joint reinforcement installed in horizontal mortar joints for bond tie between wythes. Install at not more than 16" o.c. vertically.
- D. Corners:

Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.

- 1. For horizontally reinforced masonry, provide continuity at corners with prefabricated "L" units, in addition to masonry bonding.
- E. Intersecting and Abutting Walls:

Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:

- 1. Provide individual metal ties at not more than 16" o.c. vertically.
- 2. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.
- F. Non-bearing Interior Partitions:
- G. Build full height of story to underside of solid floor or roof structure above, unless otherwise shown.

CAVITY WALLS

- A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity flush.
- B. Where horizontal joints of adjacent wythes align, tie exterior wythe to back-up with continuous horizontal joint reinforcing, installed in mortar joints at not more than 16" o.c. vertically.
- C. Where horizontal joints of adjacent wythes do not align, tie exterior wythe to back-up with individual metal ties spaced not more than 16" o.c. vertically and 16" o.c. horizontally. Stagger courses with joint reinforcing.
- D. Provide weep holes in head joints in first course immediately above all flashing. Leave head joint free and clean of mortar. Space weep holes 24" on center maximum for brick masonry, and 32" on center maximum for concrete unit masonry. Keep weep holes and area above flashing free of mortar droppings.

HORIZONTAL JOINT REINFORCEMENT

- A. General:
 - 1. Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6" at splices.
 - 2. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
 - Reinforce walls with continuous horizontal joint reinforcing unless specifically noted to be omitted.
 - 4. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
 - 5. Space continuous horizontal reinforcement as follows:
 - a. For multi-wythe walls (solid or cavity) space horizontal reinforcement 8" o.c. vertically for first two courses then 16" o.c. vertically.

- b. For single-wythe walls space horizontal reinforcement 8" o.c. vertically for first two courses then 16" o.c. vertically.
- c. For parapets, space reinforcement at 8" o.c. vertically, unless otherwise indicated.
- d. For perforated masonry screen walls, space reinforcement at 12" o.c. vertically, unless otherwise indicated.
- e. For concrete masonry cantilever walls and fences, space reinforcement at 8" o.c. vertically, unless otherwise indicated.
- 6. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in two horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints. Horizontal joint reinforcement interrupted by the jamb of an opening shall have the cross rod or side rod bent and hooked at the jamb. Provide an additional rectangular adjustable tie at the jamb for each joint not containing the normal horizontal reinforcing unit.
- 7. Provide reinforcement at openings in addition to other specified wall reinforcement.

ANCHORING MASONRY VENEER

- A. General:
 - 1. Provide anchor devices of type indicated.
- B. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following, unless noted otherwise on the drawings:
 - 1. Provide an open space not less than 1" in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.
 - 2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 16" o.c. vertically and 16" o.c. horizontally.
- C. Where wire ties are welded to structural members, paint welded area with Z.R.C. Cold Galvanizing Compound after welding.
- D. Brick Soffits:
 - 1. Place brick, face down, in strip grid system of form face. After bricks are positioned, fill joints with high bond mortar. Install Z-ties as detailed.
- E. Anchor single wythe masonry veneer to CMU back up walls with adjustable masonry veneer anchors to comply with the following requirements:
 - 1. Install ladder or truss type horizontal joint reinforcing in the CMU wall. Locate joint reinforcement in the first bed joint and at 16" centers vertically above that.
 - 2. Tie masonry veneer to CMU wall with rigid Z wire ties as specified. Provide one wall tie for each 2.00 square feet of wall area.
 - 3. Maximum spacing shall be 16" vertically and 16" horizontally.
 - 4. Place wall ties in alternate courses from CMU wall horizontal reinforcing.
 - 5. Bed joints of opposing wythes with ties shall not be farther apart vertically than 1 1/2" either direction.
 - 6. Ties shall extend a minimum of 2" into brick and CMU joints.

GROUTING

A. Where detailed, grout in reinforced masonry walls, columns, and pilasters as specified below. Fully grout vertical cells of concrete masonry containing steel reinforcement. Wherever possible, grouting shall be done from inside face of masonry. Exercise extreme care to prevent grout from staining face of masonry. Immediately remove any spilled grout from face and top of masonry.

CONTROL & EXPANSION JOINTS

- A. General
 - 1. Provide vertical and horizontal expansion, control and isolation joints in masonry where shown. Build-in related items as the masonry work progresses.
- B. Where control joints are not indicated on the drawings the Contractor shall submit a proposed control joint layout for Architect and Engineer approval. General guidelines for control joint locations are as follows
 - 1. At major changes in wall height
 - 2. At changes in wall thickness
 - 3. At corresponding control joints in foundations, floor, or roof construction
 - 4. At one or both sides of wall openings (masonry veneer only)
 - 5. Near wall intersections
 - 6. At column centerlines.
- C. Maximum Spacing:

Maximum control joint spacing shall be as follows:

- 1. Non-Reinforced Masonry. Ratio of wall length to height shall not exceed 3 with maximum spacing of 20 feet.
- 2. Reinforced Masonry. Ratio of wall length to height shall not exceed 4 with a maximum spacing of 30 feet.
- D. Build-in non-metallic joint fillers where indicated.
- E. Provide continuous bond break at steel columns and members.
- F. Provide pressure-relieving joints by adhering a continuous 3/8" thick neoprene pad below shelf angles supporting masonry veneer.
- G. Leave joints around outside perimeters of exterior doors, window frames and other wall openings:
 1. Depth: Uniform 3/4 in. (19mm).
 - 2. Width: 1/4 in. (6.4 mm) to 3/8 in. (9.5mm).

LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and wherever openings of more than 1'-0" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide formed-in-place masonry lintels. Temporarily support formed-in-place lintels until grout is properly cured.
 - 1. For hollow concrete masonry unit walls, use specially formed U-shaped lintel units with reinforcement bars placed as shown filled with coarse grout.
- C. Provide minimum bearing of 8" at each jamb, unless otherwise indicated. Provide vertical reinforcing at jambs.

FORMS & SHORES

- A. Provide forms and shores sufficiently strong and rigid as required to support brick soffits, beams, and lintels during construction.
- B. Build forms to conform to shape, line, and dimension of masonry members as detailed, substantial and sufficiently tight to prevent leakage of mortar, grout or concrete. Properly brace or tie together so as to maintain position and shape.
- C. Provide joint strips on form face of soffit forms at each brick joint.

FLASHING OF MASONRY WORK

A. Refer to Section 07 52 16 - SBS Modified Bituminous Membrane Roofing, Hot Applied and Section 07 10 00 – Waterproofing & Dampproofing.

INSTALLATION OF REINFORCED UNIT MASONRY

A. Refer to Section 04 20 00.13 "Reinforced Unit Masonry" for installation requirements applicable to reinforced unit masonry.

FIELD QUALITY CONTROL

- A. Owner will employ separate testing laboratory to perform field quality control testing.
- B. Prism Test Method:
 - 1. Compression Test: For each type of wall construction indicated for testing, test representative masonry prisms by methods of sampling and testing of ASTM E 447, Method B, and as follows:
 - a. Prepare one set of three prisms for testing at 7 days and one set of three prisms for testing at 28 days.
 - b. For brick and concrete masonry prisms adhere to requirements as specified under preconstruction testing. Build prisms on job using same materials and methods as for wall construction. Store prisms in air at temperature not less than 65°F in a place where they will be undisturbed for seven (7) days. After seven (7) days, transport to laboratory in a manner which will not disturb mortar bond.
 - c. Cap each prism with suitable material to provide bearing surfaces on each end.
 - i. Plane within 0.003 inch
 - ii. Approximately perpendicular to the axis of the prism.
 - d. Conduct tests no less frequently than that required to provide sets of prisms from each 5000 square feet of wall area installed but not less than three such tests for any building.
 - 2. Report test results in writing and in form specified under each test method, to Architect and Contractor, on same day tests are made.
 - 3. Evaluation of Quality Control Tests: Masonry work, in absence of other indications of noncompliance with requirements, will be considered satisfactory if results from construction quality control tests comply with minimum requirements indicated.
 - 4. Retests: Where prism tests indicate non-compliance with specified requirements, additional testing shall be performed at the frequency of two additional tests for each unsatisfactory test. The cost of all such additional testing shall be the responsibility of the Contractor. Where retesting fails to indicate conformance with specified requirements, any masonry construction represented by unsatisfactory tests shall be removed and replaced with acceptable masonry construction.

PARGING

A. Parge walls where indicated with Type S or N mortar, in thickness indicated.

Thickness: Not less than 1/2".

- B. Trowel finish to a smooth, dense surface. Form a wash at top of parging and a cove at bottom. Where parging is applied in 2 coats, roughen first coat when partially set, let harden for 24 hours and moisten prior to application of second coat.
- C. Damp cure parging for at least 24 hours and protect until cured.

REPAIR, POINTING, CLEANING & SEALING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing:
 - During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Pointup all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants. If the repairs must be made after the mortar has hardened, the joint must be raked or chiseled out to a depth of about 1/2" thoroughly wetted, and repointed with fresh mortar.
 - 2. To pre-hydrate mortars, thoroughly mix all ingredients except water in proportions used for original mortar mix; then mix again, adding only enough water to produce a damp unworkable mix which will retain its form when pressed into a ball. After 1 to 2 hours, add sufficient water to bring it to the proper consistence; that is conventional masonry mortars.
- C. Final Cleaning:
 - 1. After mortar is thoroughly set and cured, clean masonry as follows:
 - a. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
 - Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - c. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.
 - d. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clean water.
 - e. Use bucket and brush hand cleaning method described in BIA "Technical Note No. 20 Revised" to clean brick masonry made from clay or shale, except use masonry detergent cleaner.
 - f. Remove efflorescence in accordance with brick manufacturer's recommendations and as approved by Architect.
 - g. Clean concrete unit masonry to comply with masonry manufacturer's directions and applicable NCMA "Tek" bulletins.
- D. Sealing Brick:
 - 1. After brick wall is thoroughly cleaned and dry seal as follows:

- a. Apply Sonneborn White Roc 10 Plus water-repellent in strict accordance with manufacturer's written instructions and recommendations for the particular substrate involved
- b. Avoid overspray on to adjacent building components and wall surfaces.
- E. Protection and Cleanup:
 - 1. Provide final protection and maintain conditions in a manner acceptable to Installer, which ensure unit masonry work being without damage and deterioration at time of substantial completion.
 - 2. Leave work area and surrounding surfaces clean and free of mortar spots, droppings, and broken masonry.

END OF SECTION 04 20 00

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

DESCRIPTION OF WORK

- A. Extent of structural steel work is shown on drawings including schedules, notes and details which show size and location of members, typical connections, and type of steel required. Furnish all labor, materials, services, equipment and appliances required in conjunction with or related to the furnishing, fabrication, delivery, and erection of all structural steel defined below. Include all supplementary parts, members and connections necessary to complete the structural steel work, regardless of whether all such items are specifically shown or specified on the drawings.
- B. Structural steel shall be defined as that work prescribed in Section 2.1 of the AISC Code of Standard Practice and the following items: angle frames for openings in floors and roofs, miscellaneous metal deck support and edge angles, all connection material, temporary construction bracing, and all other structural steel shown or specified on the drawings to be part of the work. Labor shall include shop painting as specified, and field touch-up painting.
- C. Miscellaneous metal fabrications and architecturally exposed structural steel are specified elsewhere in these Specifications.

QUALIFICATIONS

- A. Fabricator: The structural steel fabricator shall have not less than 10 years experience in the successful fabrication of structural steel similar to this project. Evidence of compliance with this section shall be submitted to the Architect/Engineer.
- B. Erector: The structural steel erector shall have not less than 5 years successful experience in the erection of structural steel of a similar nature to this project. Evidence of compliance with this section shall be submitted to the Architect/Engineer.

QUALITY ASSURANCE

- A. The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.
- B. Codes and Standards:

Comply with provisions of the following, except as otherwise indicated:

- 1. All federal (OSHA), state and local laws which govern safety requirements for steel erection and other requirements if more stringent than the codes and standards enumerated below.
- 2. AISC "Code of Standard Practice for Steel Buildings and Bridges", 13th edition.
- 3. AISC "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings", latest edition.

- 4. AISC "Specification for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation (Research Council on Structural Connections), November 13, 1985.
- 5. AWS D1.1 "Structural Welding Code Steel".
- 6. "Steel Structures Painting Manual", Volumes 1 and 2, Steel Structures Painting Council.
- C. Qualifications for Welding Work:

Qualify welding processes and welding operators in accordance with AWS "Structural Welding Code - Steel".

- 1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
- 2. If recertification of welders is required, retesting will be Contractor's responsibility.
- D. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in the mill, shop, and field by the Owner's testing laboratory. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements. The Contractor shall promptly remove and replace materials or fabricated components which do not comply.
- E. Question about Contract Documents: The Contractor shall promptly notify the Architect/Engineer whenever design of members and connections for any portion of the structure are not clearly indicated or when other questions exist about the Contract Documents. Such questions shall be resolved prior to the submission of shop drawings.
- F. Testing Laboratory Services: See Structural Drawings required testing. Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

SUBMITTALS

- A. Shop Drawings:
 - General Requirements: Submit shop drawings including complete details and schedules for fabrication and assembly of structural steel members, and details, schedules, procedures and diagrams showing sequence of erection. Shop drawings not complying with the above requirements will not be reviewed. Structural steel shop drawings shall include the following minimum information:
 - a. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld. Holes, flange cuts, slots and openings shall be made as required by the structural drawings, all of which shall be properly located by means of templates.
 - 2. The fabricator alone shall be responsible for all errors of detailing, fabrication, and for the correct fitting of the structural members.

- 3. All fabricated material and connections shall fit within architectural constraints.
- 4. Structural steel members for which shop drawings have not been reviewed and approved shall not be fabricated.
- 5. The omission from the shop drawings of any materials required by the Contract Documents shall not relieve the Contractor of the responsibility of furnishing and installing such materials, even though the shop drawings may have been reviewed and approved.
- B. Test Reports: Submit copies of reports of tests conducted on all field-welded connections that are inspected. Include data on type(s) of tests conducted and test results.

DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast- in-place concrete or masonry, in ample time so as not to delay work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration. Do not store materials on structure in a manner that might exceed allowable loads on or cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed by Architect/Engineer.
- D. Furnish all fuel, maintenance, and equipment required for hoisting and placement of materials under this contract.
- E. Process, pay for and maintain all permits and certificates of on-site inspection required for derricks, cranes and hoisting equipment. No derrick, crane or hoisting equipment shall be operated without a certificate of operation and a certificate of on-site inspection, as required by governing authorities.
 - 1. Wherever the erection equipment is supported by the structure, the Contractor shall be responsible for the retention of a licensed professional engineer to determine the adequacy of the member supporting the erection equipment in relation to the loads imposed thereon. The Contractor shall submit to the Architect/Engineer, for review, the loads which will be imposed by the erection equipment on the building structure. Where the imposed load exceeds the allowable stresses, the Contractor shall be responsible for any additional materials, supports, bracing, connections and similar measures required to support the imposed load of the equipment while in use, subject to review by the Architect/Engineer.
 - 2. In addition to the above, all hoisting equipment shall be installed, operated and maintained in accordance with all applicable regulations of authorities having jurisdiction.
 - 3. Street storage and sidewalk crossing permits shall be furnished by the Contractor.

JOB CONDITIONS

A. The Contractor shall coordinate the fabrication and erection of all structural steel work with the work of other trades. The contractor shall verify existing conditions prior to beginning work. The contractor shall verify all dimensions shown on the drawings with existing job conditions prior to beginning work.

PART 2 - PRODUCTS

MATERIALS

A. Structural Steel: All hot rolled steel plates, shapes, sheet piling, and bars shall be new steel conforming to ASTM Specification A6 "Standard Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use".

Structural steel shall comply with the provisions of the following ASTM Specifications as appropriate for the grades and types, and at the locations as specified on the drawings:

- 1. Structural Steel Shapes, Plates and Bars Carbon Steel, ASTM A992 GR50 "Standard Specification for Structural Steel."
- 2. Pipe Columns ASTM A53 (Type E or S) Grade B, or ASTM A501.
- 3. Tube Sections ASTM A500 Grade B. FY = 46 KSI
- 4. Connection Material: All connection material except as noted otherwise on the drawings including bearing plates, gusset plates, stiffener plates, filler plates, angles, etc. shall be A36 steel unless a higher or matching grade of steel with the members connected is required by strength or stiffness calculations and provided the resulting sizes are compatible with the members connected.
- B. Structural Bolts and Threaded Fasteners: Structural bolts and threaded fasteners shall comply with the following ASTM Specifications as appropriate for the types and at the locations as specified on the drawings:
 - 1. ASTM A307 Grade A, "Carbon Steel Externally Threaded Standard Fasteners".
 - 2. ASTM A325 Type 1, "High-Strength Bolts for Structural Steel Joints".
 - 3. Bolts and Nuts, High Strength Bolts: Bolts and nuts for all high strength bolts shall be heavy hex head conforming to ANSI Standards B18.2.1 and B18.2.2 respectively. Nuts shall conform to ASTM A563, "Standard Specification for Carbon and Alloy Steel Nuts".
 - 4. Washers: All washers shall be circular, flat and smooth and shall conform to the requirements of Type A washers in ANSI Standard B23.1. Washers for high strength bolts shall be hardened and conform to ASTM F436, Specification for Hardened Steel Washers. Beveled washers for American Standard Beams and channels shall be square or rectangular, shall taper in thickness (16 2/3% slope) with an average thickness of 5/16". When an outer face of a bolted part has a slope greater than 1:20 with respect to a plane normal to the bolt axis, a beveled washer shall be used.
 - Bolt Lubrication: All bolts shall be well lubricated at time of installation. Dry, rusty bolts will not be allowed. Bolts or nuts shall be wax dipped by the bolt supplier or "Johnson's Stick Wax 140" shall be used with all bolts in the shop or field.

- 6. New Bolts: All bolts shall be new and shall not be reused.
- C. Electrodes for Welding: Comply with AWS D1.1, "Structural Welding Code Steel". Electrodes for various welding processes shall be as specified below:
 - 1. SMAW: E70XX low hydrogen
 - 2. SAW: F7X-EXXX
 - 3. GMAW: ER70S-X
 - 4. FCAW: E7XT-X
 - 5. Weathering Steel Electrodes shall conform to Table 4.1.4 of the AWS D1.1 Manual.

Electrodes shall be compatible with parent metal joined.

D. Structural Steel Primer Paint: Primer paint shall be one of the following types with the indicated surface preparation:

Red Oxide Shopcoat Primer AKP563 Manufacturer: INSULATE – (845) 786-5000

Product Information:

Colors: Gray Oxide Finish: Low sheen Coating Type: Modified Alkyd Resin Mixing Ratio: Single Component VOC 2.78 lbs/gallon (334 grams per liter) Solids by Volume: 53% Recommended Dry Film: 1.5 – 2.5 mils Coverage (Theoretical): 340-566 SF/gallon Drying Time: 2-4 hours to touch; 12 hours to recoat Dry heat resistance: 225 degrees F (107 degrees C) Viscosity: 65-75 KU Weight per Gallon: 12.31 lbs/gallon (1.3 kg/liter) Pot Life: Not applicable Shelf Life: More than one year

- 1. Physical Properties:
 - a. Flash point 72 degrees F (22 degrees C) Setaflash
- 2. Limitations:
 - a. Do not use on galvanized metal or under epoxy topcoats.
- 3. Surface Preparation:

All surfaces must be sound, dry, clean and free of oil, grease, dirt, mildew, form release agents, curing compounds, loose and flaking paint and other foreign substances. New Surfaces: Steel – For best results, abrasive blast to a commercial blast (SSPC-SP-6). For mild conditions, a hand or power tool cleaning (SSPC-SP-2) may be satisfactory, but performance is dependent on the degree of cleaning. Previously Painted Surfaces: Wash
and rinse any areas that may have oil or grease residue. Dull glossy areas by light sanding. Remove sanding dust. Remove loose paint. All areas that are rusting, blistering, cracking or peeling must be cleaned to bare metal. If more than 25% of the surface is involved, sandblast the entire surface to a commercial blast and prime. If less than 25% of the surface is involved, clean soiled areas and spot prime.

4. Application:

Paint should be stirred to a uniform consistence prior to application. Thinning is usually not required or desired; however, small amount (5% or less) of mineral spirits may be added depending on local VOC and air quality regulations. Do not apply if air or surface temperature is below 45 degrees F. Relative humidity should be below 90%. Apply by brush, roller or spray.

5. Clean Up:

Clean all equipment with TH-0201 Reducer promptly after use.

6. Safety Information

See the Material Safety Data Sheet and the product label for complete safety and precaution requirements.

Refer to Architect's drawings and specifications for final paint finish requirements of structural steel. Primer paint shall be compatible with final paint requirements.

FABRICATION

- A. Shop Fabrication and Assembly:
 - Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specification and as indicated on approved final shop drawings. Fabricator shall coordinate joint fit-up procedures with erector. Provide camber in structural members where indicated. The General Contractor shall coordinate provision of all erection bolts, lifting lugs or other devices required for erection with the fabricator and the erector.
 - 2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
 - 3. Clearly mark the grade of steel on each piece, distinguishable in the field from floor surfaces, for purpose of field inspection and confirmation of grade of steel.
- B. Dimensional Tolerances: Dimensional tolerances of fabricated structural steel shall conform to Section 6.4 of the AISC Code of Standard Practice.
- C. Splices in Structural Steel: Splicing of structural steel members in the shop or the field is prohibited without prior approval of the Engineer. Any member having a splice not shown and detailed on approved shop drawings will be rejected.

D. Cutting: Manual oxygen cutting shall be done only with a mechanically guided torch. An unguided torch may be used provided the cut is not within 1/8 inch of the finished dimension and final removal is completed by means such as chipping or grinding to produce a smooth surface quality free of notches or jagged edges. All corners shall be smooth and rounded to a minimum 1/2" radius.

WELDING

- A. Code: All shop and field welding shall conform to all requirements in the "Structural Welding Code Steel", ANSI/AWS D1.1, as published by the American Welding Society (AWS).
- B. Welder Certification: All shop and field welders shall be certified according to AWS procedures for the welding process and welding position used. Submit certification certificates to the Architect for record purposes.
- C. Minimum Size and Strength:
 - 1. Fillet Welds: Minimum size of fillet welds shall be as specified in Table 1.17.2A in the AISC Manual of Steel Construction.
 - 2. Minimum Strength of Welded Connections: Unless noted otherwise on the drawings, all shop and field welds shall develop the full tensile strength of the member or element joined. All members with moment connections, noted on the drawings with "MC", shall be welded to develop the full flexural capacity of the member, unless noted otherwise on the drawings.
- D. Filler Metal Requirements: Weld metal shall be as specified in AISC Manual of Steel Construction Table 1.5.3.
- E. Welding Procedures:
 - 1. Welds not specified shall, if possible, be continuous fillet welds developing the minimum strength, as specified above, using not less than the minimum fillet welds as specified by AISC.

BOLTING

- A. Minimum Bolt Diameter: Minimum bolt diameter shall be 3/4 inch.
- B. Connection Type: Unless noted otherwise on the drawings or in the General Notes, all bolted connections shall be bearing type connections using standard holes (hole diameter nominally 1/16 inch in excess of nominal bolt diameter) with threads included in the shear planes.
- C. Simple Beams: Simple shear connections shall be capable of end rotations of unrestrained beams as specified in Section 1.15.4 of the AISC Specification.
- D. Allowable Working Stresses: The allowable working stresses of bolts shall be as specified in the AISC Specification Table 1.5.2.1 and Tables 2 and 3 of the high strength bolting specification previously cited.
- E. Washers: Washers under the bolt head and/or nut shall be used as required by the bolt specification previously cited.

- F. New Bolts: All bolts shall be new and shall not be reused.
- G. Minimum Strength of Bolted Connections: Unless noted otherwise on the drawings, all shop and field bolted connections shall develop, as applicable, the full tensile or compressive strength of the member. All members with bolted moment connections, noted on the drawings with "MC", shall be bolted to develop the full flexural capacity of the member, unless noted otherwise on the drawings.

CONNECTIONS

- A. Typical connection details are indicated on the drawings.
- B. Design Procedure: Exception is taken to the second sentence of Section 4.2.1 of the AISC Code of Standard Practice for Bridges and Buildings, and the following provisions shall be substituted and made a binding part of the project specifications:
 - 1. Connection types to be used are Type 2 "Simple".
- C. Type 2 Simple Beam Connections:
 - 1. All typical beam simple connections shall be standard double angle or single angle framed beam connections using bolts as specified.
 - Single plate "shear tab" connections may be used provided there is no axial force in the beam and they are designed strictly according to the procedure outlined in "Engineering for Steel Construction" as published by AISC and the paper appearing in the 3rd Quarter, 1984 Engineering Journal "Single Plate Framing Connections with Grade 50 Steel and Composite Construction" as published by AISC.
 - 3. Simple Beam Design Capacity: Unless a larger reaction is shown otherwise on the plans, minimum design forces shall be as follows:
 - a. Non Composite Beams: Support a reaction R equal to one half the total uniform load capacity from the table of Uniform Load Constants in the AISC Manual Part 2 for given shape, span, and grade of steel.
- D. Struts and Braces:
 - 1. Connections for all struts, hangers, and braces shall have connections designed to develop the full allowable tensile strength of the member.

SURFACE PREPARATION AND PAINTING

- A. Specification: Surface preparation, paint, and painting practices shall conform to the "Steel Structures Painting Manual", Volumes 1 and 2, as published by the Steel Structures Painting Council (SSPC).
- B. Scope: Shop paint all steel.

C. Surface Preparation and Primer Paint - Shop Painted Steel: All structural steel specified to be shop primed shall have paint applied in strict accordance with manufacturers instructions using prescribed surface preparation but not less than specified. Paint shall be applied immediately after surface preparation at a rate to provide a uniform dry film thickness of not less than 1.5 mils. Painting methods shall be used which result in full coverage of joints, corners, edges, and all exposed surfaces. Two coats shall be applied to surfaces which are inaccessible after assembly or erection. The color of the second coat shall be changed to distinguish it from the first coat.

Coordinate shop primer paint requirements with architectural drawings and specifications.

PART 3 - ERECTION

ERECTION

- A. Inspection: Erector shall examine areas and conditions under which structural steel work is to be installed and notify the Contractor and the Architect/Engineer in writing of conditions detrimental to proper and timely completion of the work.
- B. Erection Tolerances: Erection tolerances of anchor bolts, embedded items, and all structural steel shall conform to the AISC Code of Standard Practice.
- C. Field Assembly of Structural Steel:
 - 1. As erection of the steel progresses, the work shall be fastened securely to take care of all dead load, wind and erection stresses. Particular care shall be exercised to ensure straightness and tautness of bracing immediately upon raising a steel column.
 - 2. Provide temporary planking and working platforms as necessary to effectively complete work.
 - 3. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure within specified AISC tolerances. The Contractor shall coordinate with Erector and Fabricator regarding possible discrepancies in member lengths between temperature at time of fabrication and temperatures during erection, and shall make necessary adjustments to ensure plumbness within AISC tolerances at 60°F. Compensate for cumulative welding draw, construction loadings, sequential applications of dead loads, or any other predictable conditions that could cause distortions to exceed tolerance limitations.
 - 4. On exposed welded construction, remove erection bolts, fill holes with plug welds or filler and grind smooth at exposed surfaces.
 - 5. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces receiving field welds.
 - 6. Comply with all bolting and welding requirements of Part 2 of this specification section.
 - 7. Remove and replace existing finish materials as required to accomplish all work. The contractor shall comply with all fire codes when performing welding of steel or metal studs.

- D. Field Modifications to Structural Steel: Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and structural fitting of parts shall be reported immediately to the Architect/Engineer, and approval of the method of correction shall be obtained. Approved corrections shall be made at no additional cost to the Owner. Do not use cutting torches, reamers, or other devices in the field for unauthorized correction of fabrication errors.
- E. Miscellaneous Framing: Provide supplemental structural steel support framing for metal deck where normal deck bearing is interrupted by column flange plates or other framing members and other floor openings whether shown or not on either the architectural, mechanical, or structural drawings.
- F. Removal of Erection Aids and Devices: The erector shall remove all erection aids and devices that interfere with architectural finish or MEP requirements.
- G. Touch-Up Painting:
 - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas that have been shop painted. Apply paint to exposed areas using same material and surface preparation as used for shop painting. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.
 - 2. All field welded galvanized connections shall have welds protected with "Z.R.C. Cold Galvanizing Compound" as manufactured by Z.R.C.Products Company.
 - 3. Steel Plates Embedded in Concrete:
 - a. Studs shall be welded using automatically timed stud welding equipment to develop the full capacity of the stud.
 - b. Plates must be unpainted and free of heavy rust, mill scale, dirt, sand or other foreign material which will interfere with the welding operation. Shop prime all plates and studs after welding unless plates are exposed to the outside in which case the assembly shall be hot dip galvanized after welding.
- H. Clean Up: Clean up all debris caused by the Work of this Section, keeping the premises neat and clean at all times. Replace and repair to like new condition, all damaged areas of the interior and exterior of the building.

END OF SECTION 05 12 00

SECTION 05 31 23 - STEEL ROOF DECKING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

SCOPE OF WORK

- A. Supplier: The metal deck supplier shall furnish all metal deck materials and accessories indicated on the Architectural, Structural, and Mechanical Drawings required to produce a complete job including but not necessarily limited to deck units, cover plates, pour stops, metal deck edge closures, cell closures, cant strips, sump pans, and all related accessories.
- B. Erector: The Subcontractor responsible for erecting the metal deck shall provide all labor and equipment as required to place all metal deck components and accessories as described above.

QUALIFICATIONS

A. The metal deck supplier shall be a manufacturer with a minimum of two years successful experience and with a minimum of two successful jobs of a comparable size and scope to this project.

QUALITY ASSURANCE

- A. The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.
- B. Codes and Standards: Comply with provisions of the following codes and standards except as otherwise indicated or specified:
 - 1. "Design Manual for Composite Decks, Form Decks, and Roof Decks", as published by the Steel Deck Institute (SDI).
 - 2. "Specification for the Design of Cold Formed Steel Structural Members", as published by the American Iron and Steel Institute (AISI).
 - 3. "Structural Welding Code Steel", as published by the American Welding Society (AWS).
- C. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with AWS procedures.

SUBMITTALS

- A. Product Certification: Submit manufacturer's specifications and installation instructions for each type of deck specified. Also submit a certificate of product compliance with SDI Standards as specified.
- B. Shop Drawings: Submit detailed shop drawings showing type of deck, complete layout, attachment details, closures, edge strips, supplementary framing, and all

other accessories.

C. Insurance Certification: Assist Architect and Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire, windstorm, and extended coverage insurance.

PART 2 - PRODUCTS

GENERAL REQUIREMENTS

- A. See General Notes on the drawings for the location, depth, design thickness, section properties, and suggested manufacturer for all required roof decks.
- B. Acceptable manufacturers include:
 - 1. Vulcraft
 - 2. Wheeling
 - 3. S.M.I.

Other manufacturers may be used only with Architect/Engineer approval. Steel Deck from Mexico is not allowed.

GRADES OF STEEL

A. Steel deck shall be manufactured from steel conforming to ASTM Designation A611 Grades C, D, or E for painted deck or A446 Grades A, B, C, D, E or F for galvanized deck or Engineer approved equal, having a minimum yield strength of 33,000 PSI.

<u>FINISH</u>

A. Galvanizing: Steel deck shall be galvanized with a protective zinc coating conforming to ASTM A525 G60 class.

ROOF DECK ACCESSORIES

A. Provide minimum 20 gauge ridge and valley plates, minimum 20 gauge cant strips, minimum 14 gauge sump pans, minimum 20 gauge inside or outside closure channels, minimum 20 gauge butt strips at change of deck directions, minimum 20 gauge filler sheets, and rubber closures as required to provide a finished surface for the application of insulation and roofing.

FABRICATION

- A. Metal Deck Spans: Metal deck spans shall not exceed the maximum center-tocenter spans as required by SDI criteria. Where possible, all metal deck shall extend over three or more supports.
- B. Metal Closure Strips: Fabricate metal closure strips of not less than 0.071" minimum (14 gage) cold-formed sheet steel. Form to provide tight fitting closures at open ends of cells or flutes and sides of decking. Provide sheet metal closures at all slab edges, columns, walls, and openings unless steel angles or bent plates are specified in details on the drawings. Also, provide wherever deck stops or changes direction. Weld closures at edge supports with 1" long weld at 12"

maximum centers unless shown otherwise on the drawings. Provide minimum 2" bearing over steel support. Closures and support welds shall be designed to support a 200 pound concentrated load at the roof edge without exceeding a stress of 0.8 Fy.

ROOF OPENINGS

A. Roof openings less than 6" square or diameter require no reinforcement. Openings 6" to 10" inclusive shall be reinforced with a 20 gauge galvanized plate welded to the deck at each corner and 6" maximum centers with a 5/8" diameter puddle weld or sheet metal screws. Unless indicated otherwise on the drawings, openings over 10" wide or diameter shall be reinforced with an angle 2 1/2 x 2 1/2 x 1/4 framing each side of the opening and spanning between supports for spans 4'-0" or less and L 3 x 3 x 1/4 for spans greater than 4'-0" but less than 6'- 0". Larger openings shall be referred to the Engineer for framing.

PART 3 - EXECUTION

INSTALLATION

- A. General: Install deck units as accessories in accordance with manufacturers recommendations and approved shop drawings, and as specified herein:
 - 1. Place deck units on supporting framework and adjust to final position with ends accurately aligned and bearing 2" minimum on supporting membersbefore being permanently fastened. Do not stretch or contract side lap interlocks.
 - 2. Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.
 - 3. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
 - 4. Do not place deck units on concrete supporting structure until concrete has cured and is dry.
 - 5. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
 - 6. Do not use roof deck units for storage or working platforms until permanently secured.
- B. Attachment of Roof Deck:
 - 1. Welding:
 - a. Typical Requirements: Roof deck units shall be welded to each structural support member using 5/8" diameter puddle welds at spacing shown on Typical Detail on plans. Weld metal shall penetrate all layers of deck material at end laps and side joints and shall have good fusion to the supporting members.
 - b. Side Laps: Side laps of adjacent units shall be fastened by sheet metal screws at spacing shown on Typical Detail on plans.

- c. Welding Washers: Welding washers shall be used only when welding steel deck less than 0.028" thickness.
- 2. Minimum Bearing: Provide a minimum end bearing of 2" over supports.
- 3. End Laps: End laps of sheets shall be a minimum of two inches and shall occur over supports. Roofs having a slope of 1/4 inch or more in 12 inches shall be erected beginning at the low side to insure that end laps are shingle fashion.
- C. Welding Requirements: Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking.
- E. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength continuity of decking and support of other work shown on the drawings.
- F. Hanger Slots or Clips: Provide UL approved punched hanger slots between cells or flutes of lower element where roof deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures.
 - 1. Hanger clips designed to clip over male side lap joints of roof deck units may be used instead of hanger slots.
 - 2. Locate slots or clips at not more than 14" o.c. in both directions, not over 9" from walls at ends, and not more than 12" from walls at sides, unless otherwise shown.
 - 3. Provide manufacturer's standard hanger attachment devices.
 - 4. Loads hanging from metal deck slabs shall not exceed 100 pounds unless specifically detailed otherwise on the drawings.
- G. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of deck units, except where taped joints are specified.

TOUCH-UP PAINTING

- A. After deck installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.
- B. Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.
- C. Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.
- D. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

INSPECTION

A. Welded decking in place is subject to inspection and testing by the Owner's Testing Laboratory. Expense of removing and replacing portions of decking for testing purposes will be borne by Owner if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work. Cost of such removal and replacement shall be borne by the Contractor.

END OF SECTION 05 31 23

SECTION 05 50 00 - METAL FABRICATIONS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

<u>SCOPE</u>

A. Furnish all materials, labor and equipment shown on the drawings, specified herein or required for completion of the work.

MATERIALS

A. Unless noted otherwise on the plans, all structural steel shall comply with ASTM A36, latest edition and amendments.

SHOP DRAWINGS

- A. Provide completely detailed shop drawings showing anchorage placement, member placement and erection plans indicating all member sizes, locations, bridging, bracing, connections, methods of assembly, etc. The Contractor shall carefully check these drawings, then submit them to the Architect. The Architect may conduct limited spot checks aimed solely at determining general comprehension of the work detailed, then return them to the Contractor. The Contractor shall then carefully re-check the drawings and approve them prior to fabrication.
- B. The Architect's spot check does not relieve the Contractor from correcting, at his own expense, any work or re-fabricating items which may be found not to comply with the requirements and intent of the plans and specifications.

FABRICATION & ERECTION

- A. Comply with requirements of the Manual of Steel Construction, Specifications for Buildings as amended to date, and the Code of Standard Practice, latest edition as adopted by the American Institute of Steel Construction. Welding shall comply with Standard Code of Arc and Gas Welding in Building Construction as published by the American Welding Society, except that all welding is by the electric arc process.
- B. Welds shall be made only by welders and welding operators who have been qualified within the preceding 12 months by tests as prescribed in the Standard Code for Welding in Building Construction of the American Welding Society, to perform the type of welding required. All welders working on the project shall be assigned an identifying symbol to be place on or near each weld for identification. The Contractor shall maintain a record of all welders employed, date of qualification and identification symbol assigned to each.
- C. Field correcting or altering by "torching", or otherwise, shall not be permitted unless prior approval is obtained from the Architect or Engineer. This applies to fabrication errors as well as work to accommodate other trades. Any errors which prevent the proper assembly of parts or components as detailed shall be reported to the fabricator for correction.

WELDS

A. All welds shall be full penetration fillet welds.

B. Grind all welds smooth prior to priming or galvanizing.

PAINTING

A. Steel to be primed shall receive a shop primer coat of Sherwin-Williams "KROMIK", Pittsburgh "IRONHIDE", Negley "ZINC CHROMATE RUST INHIBITIVE PAINT", or equal. After erection, all field welds, bolts, and abraded areas of surfaces shall receive a touch-up of the same paint as the shop primer coat.

ROOF ACCESS LADDERS

A. Ladders to be fabricated using standard steel pipe rails with bent plate brackets and manufactured rung and rung covers as detailed on the drawings.

B. Shop prime and touch-up after erection as specified above.

STEEL LINTELS

- A. Fabricate from steel angles as detailed on the drawings. Unless shown otherwise, length shall be 1'-4" wider than the brick opening being spanned. For openings greater than 5'-0", verify length of lintel with structural engineer.
- B. Hot-dip galvanize after fabrication.

BOLLARDS

- A. Fabricate bollards from steel pipe, plates and other components as detailed on the drawings.
- B. Shop prime and touch-up after erection as specified above or hot-dip galvanize after fabrication. Refer to notes on drawings.

OVERHEAD ROLLING & SECTIONAL DOOR FRAMES

- A. Fabricate overhead rolling door frames from steel channels and other components as detailed on the drawings.
- B. Hot-dip galvanize after fabrication.

NON - SHRINKING GROUT

A. Use non-shrinking grout as indicated on the plans. Use Master Builders Company "EMBECO", Sonneborn Chemical & Refining Corporation's "SONOGROUT 14K", or equal, mixed according to the manufacturer's written instructions.

EXPANSION JOINT COVERS

A. Provide various floor expansion joint assemblies & covers as noted and detailed on the drawings.

EXPOSED EXTERIOR STEEL

A. Shop prime and touch-up after erection as specified above or hot-dip galvanize after fabrication.

MISCELLANEOUS

A. Furnishing bolts, anchors, inserts, drive pins, expansion shields, lag screws, ramset fasteners, toggle bolts, dovetail anchors and other fastening devices as required and/or indicated on the drawings necessary for the fastening of wood nailing and stripping and furring members to each other and to masonry, concrete or other adjoining materials needed to complete the work is an obligation of the General Contractor, and he shall be responsible for their furnishing and erection whether they are mentioned in other divisions of these specifications or not.

END OF SECTION 05 50 00

SECTION 06 10 00 - ROUGH CARPENTRY

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

LUMBER GRADING

- A. Stamp each piece with the grade and species.
- B. Grade to the standards of one of the following associations:
 - 1. Southern Pine Association
 - 2. Western Wood Products Association

LUMBER

- A. Surfaced on all sides (S4S).
- B. Lumber shall fall within the following moisture content ranges:
 - 1. Southern Pine, 12% average, 15% maximum.
 - 2. West Coast Soft Woods, 15% average, 19% maximum.
- C. Unless stated otherwise in the specifications or on the drawings, lumber shall have the following minimum grading for use on the project:
 - 1. Southern Pine, #2 common.
 - 2. West Coast Soft Woods, standard for structural use and utility for on-structural use.
 - 3. Pressure Treated Wood, "Smart Sense" by Osmose.

WOOD TREATMENT

- A. Stamp each piece of lumber with the type of treatment and amount of retention.
- B. Pressure Treated Wood, "MicroPro/Smart Sense" by Osmose.
- C. After treatment, lumber shall be dried to maximum moisture content of 19% prior to installation.

MATERIAL

- A. Roof fascia, nailers, bottom plates, rough bucks in exterior walls, etc., shall be #2 or better yellow pine treated lumber.
- B. Roof parapet cap blocking, nailers, plates, rough bucks in exterior walls, etc., shall be #2 yellow pine treated lumber.
- C. Interior and exterior partition framing, headers, ceiling framing, ceiling stripping, partition blocking, rough bucks, blocking in drywall for cabinet and shelving supports, grab bars and other specialties, etc., shall be #2 or better yellow pine. "white wood" studs can be used for non-load bearing partitions only.
- D. Refer to Structural Drawings for notes relative to wood framing as well. Any wood types or structural properties referred to specifically on the structural drawings supersede these specifications.

INSTALLATION

- A. Treated fascia, curbs, cant strips, nailers, etc., shall be nailed or bolted as shown on the drawings and set straight and even.
- B. Parapet cap blocking, window and door bucks and blocking, nailers, etc., shall be screwed, nailed, bolted or attached with drive-pin fasteners as shown on the drawings and set straight and even.
- C. Bolts or other fasteners shall be placed a maximum of 18" from the end of all pieces.
- D. All wall studs shall be typically spaced at 16" o.c. (certain areas are noted to be 12" o.c.) and shall be toe-nailed to bottom plates.

ROUGH HARDWARE

- A. Use common nails, typically, but countersunk wood screws for all tension joints.
- B. All fasteners and other hardware exposed to weather shall have a galvanized finish. Refer to literature provided by manufacturer of pressure treated lumber and provide finishes on all fasteners used for treated lumber that are approved by the manufacturer to resist corrosion due to contact with chemicals used in the wood treatment process.
- C. Bolts and other anchors shall have a minimum 3/8" diameter unless shown otherwise. Provide washers when securing wood. Bolts and anchors shall have galvanized finish when used in exterior exposure, exterior wall construction or placed in slabs on grade. Provide the proper type of bolt or anchor, i.e., bolt and _______ nut, toggle bolt, expansion bolt, bolt and lead shield, lag screws, etc., as required by condition of use.
- D. Refer to Structural Drawings for notes relative to fasteners, joist hangers or other special hardware needed when adding additional lumber members to strengthen existing structural components of the building.
- E. Unless shown otherwise on the drawings all nailing and fastening of framing members shall at a minimum be in accordance with Table 2304.9.1, Fastening Schedule, in the 2009 International Building Code.

PLYWOOD

- A. Roof decking at new drive up canopy or patching of existing roof decks shall be 3/4" thick CDX, APA Exterior or Exposure 1, tongue and groove, yellow pine plywood. (OSB board is not an acceptable equal)
- B. Interior floor decking shall be 3/4" thick B-C grade tongue and groove yellow pine plywood.
- C. Install plywood using 8d nails at maximum 6" o.c. at edges and 12" o.c. intermediate.
- D. Roof parapet caps and plywood wall sheathing where detailed shall be 1/2", 5/8" or 3/4" thick CDX yellow pine plywood as shown on the drawings.
- E. Mezzanine decking, where detailed shall be 1 1/8" thick CDX yellow pine plywood.
- F. Install plywood using galvanized drywall screws (or other corrosion resistant fasteners as approved by Architect) at maximum 6" o.c. at edges and 12" o.c. intermediate (6" o.c. intermediate at curved roof sheathing).

WORKMANSHIP

A. Carefully plan and lay out all work as required to carry out the intent of the contract documents. Coordinate with other trades requiring stripping, blocking, nailers, etc., and locate these items as required to properly accommodate their work.

END OF SECTION 06 10 00

SECTION 06 20 00 – FINISH CARPENTRY

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

REFERENCE SPECIFICATIONS

- A. Work under this section shall be governed by "Quality Standards of the Architectural Woodwork Industry", AWI (Latest Edition), Premium Grade except when another grade is specifically referenced.
- B. Fabricator must demonstrate a minimum of 5 years experience in manufacture of architectural woodwork that complies with AWI Standards.

SUBMITTALS

- A. Submit six (3) copies of shop drawings indicating veneer, AWI Grade, construction details and location of each millwork item at the project.
- B. Submit actual samples of all materials, solid stock and plywood.
- C. Submit actual samples of plastic laminates.

SOLID STOCK WOOD

- A. Stain grade, base, wall trim, door trim, window trim, cabinet style, rail, trim, banding, drawer faces, corner blocks, handrails, chair railing, etc. and other pieces as detailed on the drawings shall be S4S, select red oak, grade 1.
- B. Stained decorative ornaments, railings, wood caps, etc. as detailed on the drawings shall be cut from S4S, select grade 1, red oak.
- C. Mill all solid stock wood to sizes and shapes as detailed on the drawings, use longest lengths possible and miter corners and joints.
- D. Paint grade projection screen mounting boards, wall trim, etc. shall be S4S, C & better grade, fir, poplar or parana pine.
- E. Moisture content at time of installation shall be between 8% and 13% in relation to oven-dry weight.

PLYWOOD

- A. Plywood shall be AWI premium grade with lumber or veneer core. Particleboard cores are not acceptable.
- B. Plywood for painted telephone/data equipment boards shall have A-B grade birch paint-grade veneer. Wood edge where exposed to view and wood edge all sides of adjustable shelving.
- C. Plywood for wall paneling, stained cabinets and shelving shall have premium solid piece red oak veneer, grade 1. Wood edge where exposed to view and wood edge all sides of adjustable shelving.

LAMINATE CLAD COUNTERTOP - AWI CUSTOM GRADE

- A. Countertop frames shall be fabricated in accordance with Section 400 B except as modified herein.
- B. Construction shall be as detailed.
- C. Edge treatment shall be in accordance with Section 400 B except bottom edges of doors and edges of shelves shall be banded; laminate edges before faces.
- D. Cabinet tops shall be fabricated in accordance with Section 400 C except as modified herein.
- E. Cores, countertops, back & side splashes and window sills shall be 3/4" thick, grade B, plywood. No particle board. Double layer tops required in certain locations as shown on the drawings.
- F. Laminate cladding shall be NEMA LD3 general purpose plastic laminate; solid colors, wood grains or patterns; GP-50 (0.050 inch) nominal thickness for all surfaces; PF-42 (0.042 inch) nominal thickness for post-formed fabrications. Laminates are noted specifically on the plans.
- G. Apply edge laminate before top laminate.
- H. Provide topset backsplashes with full returns.
- I. Balancing sheets shall be Mill option of CL-20 laminate or low pressure laminate.

CABINETS & SHELVING

- A. The following definitions shall apply to cabinetwork:
 - 1. <u>Exposed</u>; surfaces visible when doors and drawers are closed. Bottoms of cases and shelves more than 2'-0" above the floor and the back of hinged doors.
 - 2. <u>Semi-exposed</u>; surfaces that become visible when drawers and doors are opened. Tops of cases and shelves more than 6'-0" above the floor and bottoms of cases and shelves less than 2'-0" above the floor.
 - 3. <u>Concealed</u>; surfaces permanently hidden after installation such as backs or sides of cabinets against walls.
- B. The following thicknesses of materials shall be used for cabinet construction and shelving unless noted differently on the plans:
 - 1. Cabinet bottoms, ends and divisions shall be 3/4" thick.
 - 2. Face plates shall be equal to door thickness with 3/4" minimum.
 - 3. Cabinet backs and drawer bottoms shall be 1/4" thick plywood (1/2" plywood for file drawer bottoms). Drawers over 24" wide require center bottom support. Reinforce backs with strips or braces to limit area to 12 square feet.
 - 4. Drawer fronts shall be 3/4" thick.
 - 5. Drawer backs and sides shall be 1/2" thick.
 - 6. Shelves shall be 3/4" thick up to 41" wide.
 - 7. Install 3/4"x1-1/2" thick edge on front of 3/4" shelves 42" wide and over.
 - 8. Doors shall be 3/4" thick.
 - 9. Doors shll be 3/4" thick with perimeter moulding when detailed on drawings.
- C. Cabinet construction shall be a modified half or partial overlay style with 1-1/2" of cabinet face stiles and rails typically showing between doors and drawers faces.

HARDWARE

A. The following cabinet hardware shall be provided.

- Hinges shall be Salice, 120 degree, casework hinge, or equal, and required baseplates for half or partial overlay construction. Provide blocking behind face stiles at hinge locations. Provide number of hinges as recommended by manufacturer for particular door size and weight.
- 2. Door and drawer pulls shall be Stanley 4477AL-4", "Ribbon Pulls" or equal.
- 3. Standard drawer slides shall be KV 8400 series, 100 lb. rated, full extension, or equal.
- 4. File drawer slides shall be KV 8500 series, 150 lb. rated, full extension, or equal.
- 5. File drawers shall have KV 476F ZC letter-size file followers with KV 476TZC track, or equal. Provide 1/2" thick plywood drawer bottoms at file drawers and recess follower track in 2-1/4" wide x 1/4" deep slot.
- 6. Adjustable cabinet shelving standards shall be KV 255BRN with KV 256WAL supports, or equal.
- 7. Adjustable wall mounted shelving standards shall be KV 87ANO with KV 187ANO heavy duty brackets, or equal. Provide wood blocking in walls at standard locations.
- 8. Cabinet door and drawer locks, when shown on plans, shall be National C8053-14 cam locks, or equal, keyed alike in groups as directed by Owner.

FABRICATION

- A. Fabricate architectural woodwork in strict accordance with AWI Standard Details for Grade specified, shop assemble in the largest possible sections and deliver to site.
- B. Provide that work that cannot be shop assembled be given trial fit at the shop to ensure proper and expeditious field assembly. Join shop assemblies with mortise and tenon and dowels and glued blocks where practical. Mortises and tenons shall be of such size as will provide maximum strength in assembled joint. Provide blind tenons where exposed in finished work.
- C. When necessary to cut and fit on site, provide material with ample allowance for cutting; provide trim for scribing and site cutting.
- D. Apply plastic laminate finish in full, uninterrupted sheets consistent with manufactured sizes; corners and joints hairline; slightly eased edges.
- E. Mechanically fasten backsplash to countertops with concealed steel brackets at 16" on center.
- F. Apply laminate balancing sheet to reverse side of surface finished with plastic laminate in accordance with AWI Standard.
- G. Shop assemble architectural woodwork items for delivery to site in sizes easily handled and to ensure passage through building openings.

SITE CONDITIONS

- A. Deliver architectural woodwork products only when site environmental conditions are adequate to receive such products.
- B. Store products in ventilated areas with constant temperatures between 60 degrees F and 80 degrees F and relative humidity between 25 and 55 percent.

C. Maintain temperature and humidity in installation area as required to maintain content of installed woodwork within a 1.0 percent tolerance of the optimum moisture content from the date of installation through the remainder of the construction period.

INSTALLATION – GENERAL

- A. Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims.
- B. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces. Repair damaged finish at cut ends.
- C. Install to a tolerance of 1/8" in 8'-0" of plumb and level (including tops). Variations in flushness of adjoining surfaces are unacceptable.
- D. Anchor woodwork to built-in blocking or attach directly to substrates.
- E. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing.
- F. Leave surfaces clean and true with exposed wood sanded parallel with grain, free of discernable marks, dusted and ready for final finish.
- G. Countersink semi-concealed anchorage devices used to wall-mount components and conceal with solid plugs of species to match surrounding wood. Place flush with surrounding surfaces.

INSTALLATION – CABINETS

- A. Install countertops no more than 1/8" in 8'-0" of sag, bow or other variation from a straight line.
- B. Carefully scribe cabinetwork which is against other building materials leaving gaps of 1/32" maximum. Do not use overlay trim for this purpose.
- C. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Make cutouts for field penetration only after Architect's approval. Prime paint or seal contact surfaces of cutouts.
- D. Anchor tops secure to base units and other support systems.

ADJUSTMENT & CLEANING

- A. Repair damaged and defective woodwork to eliminate functional and visual defects.
- B. Where repairs are not acceptable to Architect, replace woodwork. Adjust joinery for uniform appearance.
- C. Clean woodwork on exposed and semi-exposed surfaces.
- D. Touch up damaged and soiled finishes and adjacent areas.

MATERIAL LOCATIONS

A. Stained, painted or laminated finished components are clearly noted on the drawings.

END OF SECTION 06 20 00

SECTION 07 10 00 – DAMPPROOFING AND WATERPROOFING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

- A. Install joint tape and damproofing mastic on gypsum sheathing behind both brick veneer and plaster.
- B. Install membrane flashing at base of all walls and at door and window heads, jambs and sills in brick walls and other similar openings and locations as shown on the drawings.

MATERIALS

- A. Joint tape at gypsum sheathing shall be PROTECTO WRAP building tape as manufactured by Protecto Wrap Company, Denver, CO.
- B. Joint coating and dampproofing mastic on cavity wall insulation joints at concrete block back-up shall be trowel grade asphaltic coating (solvent type), Gulf Seal 304 by Gulf States Asphalt, Bestile by Manville, or approved equal.
- C. Dampproofing mastic on gypsum sheathing shall be spray grade asphaltic coating (solvent type), Gulf Seal 211 by Gulf States Asphalt, Hydrocide Semi-Mastic by Sonneborn and Semi-Mastic by W.R. Meadows, or approved equal.
- D. Membrane flashing shall be BFG Water Barrier, 30 mil, as manufactured by B.F. Goodrich Company or Nevastral 300, 30 mil, as manufactured by Rubber & Plastic Compound Co., Inc. Product shall be provided in a minimum width of 18" and shall have the brand name permanently imprinted on the material.
- E. Adhesives used to secure and mop-in membrane flashings shall be as recommended by the membrane manufacturer for each particular application.

APPLICATION

- A. At gypsum sheathing, apply joint covering tape 4" wide on joints and 6" wide at corners. Embed firmly onto surfaces without leaving air pockets, wrinkles or other voids. Apply full bed joint coating to fill joints. Feather a 1/8" thickness on sheathing for 2" on either side of joint. Once joint work is complete, apply spray grade dampproofing coating over entire area of sheathing and joints in 50% overlap pattern leaving a uniform continuous layer of coating 1/16" (62 mils) thick minimum.
- B. At cavity wall insulation apply trowelled coat of dampproofing minimum 4" wide over all joints. Cover all screw heads and apply material around all brick ties. Provide mesh reinforcing tape at all outside corners and at all open joints.
- C. At dowels, anchors, etc., which protrude through the dampproofing apply additional material completely around devices to completely seal.
- D. At shelf angles, lintels, etc., apply dampproofing to completely cover top surfaces and extending a minimum of 4" above the top of each member.

- E. At wall openings, extend dampproofing around and through the opening the full thickness of the wall.
- F. At window and door heads, jambs and sills; bases of brick walls, steel lintels, shelf angles, over steel structural members exposed to exterior wall cavties and other locations as shown on the drawings, coat surfaces with adhesive and embed one ply of membrane flashing shaped as required. All joints and ends shall be completely sealed and made watertight. <u>It is extremely important that membrane flashing at the base of brick veneer be embedded to concrete foundation in adhesive to prevent water from migrating beneath membrane, with special care taken where bottom of brick is flush with finish floor near handicap entrances.</u>

END OF SECTION 07 10 00

SECTION 07 21 00 – THERMAL AND ACOUSTICAL INSULATION

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

- A. Install batt insulation used for thermal and sound insulation in stud walls, and where shown on drawings or required.
- B. Install semi-rigid fiberglass acoustical insulation where scheduled on drawings.

SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's literature on each insulation type specified.
 - 2. Manufacturer's installation instructions for each insulation type specified.
- B. Samples: Six (6) inch x six (6) inch piece of rigid insulation for Architect's approval.
- C. Certifications:
 - 1. Manufacturer's certification of compatibility of rigid insulation with dampproofing mastic.
 - 2. Manufacturer's affidavit that materials used in Project contain no asbestos.

MATERIALS

- A. Interior wall thermal/acoustical insulation shall be 3 1/2" thick, R-11 unfaced fiberglass as manufactured by Owens Corning Fiberglass Corporation or equal.
- B. Acousitc insulation in sound partitions as scheduled on drawings shall be 2" thick, rigid fiberglass, Owens Corning 703 or equal.

INSTALLATION

- A. Consult with tradesmen whose work precedes and follows insulation installation to insure that their preparatory and finish work coordinates in an orderly fashion with work under this section.
- B. Do not install any insulation until the building has been made substantially water and weathertight.
- C. Protect all insulation work during installation and until work is covered. Insulation which becomes compressed, displaced or otherwise damaged shall be removed and replaced with new undamaged material.
- D. Notify Architect upon completion of work or portions of the work to allow inspection prior to enclosing or covering.

END OF SECTION 07 21 00

SECTION 07 26 16 - BELOW-GRADE VAPOR RETARDERS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

SECTION INCLUDES

- A. Surface preparation.
- B. Application of an underslab vapor retarder.

REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM E1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
 - 2. ASTM E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.
 - 3. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
 - 4. ASTM E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
 - 5. ASTM F1249-01 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
- B. American Concrete Institute (ACI)
 - 1. ACI 302.1R-96 Vapor Barrier Component (plastic membrane) is not less than 10 mils thick.

SUBMITTALS

- A. Comply with Division 013300 Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

DELIVERY, STORAGE & HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean dry area in accordance with manufacturer's instructions.
- C. Stack membrane on smooth ground or wood platform to eliminate warping.
- D. Protect materials during handling and application to prevent damage or contamination.

ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Do not apply on frozen ground.

PART 2 – PRODUCTS

MANUFACTURERS

- A. W.R. Meadows, Inc.
 P. O. Box 338
 Hampshire, Illinois 60140-0338
 (800) 342-5976. (847) 683-4500
 Fax (847) 683-4544
 Web Site www.wrmeadows.com
- B. Stego Industries, LLC 27442 Calle Arroyo, Suite A San Yuan Capistrano, CA 92675 (877-464-7834 Texas, Louisiana, Oklahoma Regional Office Contact: (281) 367-0040

MATERIALS

- A. Plastic Vapor Retarder
 - 1. Performance Based Specification: Vapor Retarder membrane must meet or exceed all requirements of ASTM E1745 Classes A, B, and C.
 - a. Minimum Permeance ASTM E96: 0.018 Perms
 - b. Water Vapor Transmission Rate ASTM F1249 calibrated to ASTM E96 (water method): 0.007 grains/ft²/hr
 - c. Resistance to Organisms and Substrates in Contact with Soil ASTM E154, Section 13: 0.027 Perms
 - d. Tensile Strength ASTM E154, Section 9: 84 LBS. Force/Inch
 - e. Puncture Resistance ASTM D1709, Method B: 4,335 Grams
 - f. Water Vapor Retarder ASTM E1745: Meets or exceeds Classes A, B, and C
 - g. Thickness of Retarder (plastic) ACI 302.1R-96: Not less than 10 mils
 - 2. Proprietary Based Specification
 - Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., (877) 464-7834 <u>www.stegoindustries.com</u>.
 - b. Perminator[™] 15 mil by W.R. Meadows.

ACCESORIES

- A. Seam Tape
 - 1. Stego Crete Claw by Stego Industries LLC, (887) 464-7834 www.stegoindustries.com.
- B. Pipe Boots
 - 1. Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.
- C. Perimeter/edge seal
 - 1. Stego Crete Claw by Stego Industries LLC, (887) 464-7834 www.stegoindustries.com.
- D. Penetrations of Vapor Barrier
 - 1. Stego Mastic by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
 - 2. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

PART 3 – EXECUTION

EXAMINATION

A. Examine surfaces to receive membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

SURFACE PREPARATION

A. Prepare surfaces in accordance with manufacturer's instructions.

INSTALLATION

- A. Install vapor barrier in accordance ASTM E1643.
 - 1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
 - 2. Extend vapor barrier over footings and grade beams 6" below grade or stop at impediments such as dowels and waterstops.
 - 3. Seal vapor barrier to slab perimeter/edge using Stego Crete Claw and remove dirt, debris, and mud from Crete Claw prior to concrete placement.
 - 4. Overlap joints 6 inches and seal with manufacturer's tape.
 - 5. Apply tape/Crete Claw between seams @ 42" O.C. max. parrallel to seams.
 - 6. Apply tape/Crete Claw to a clean and dry vapor barrier.
 - 7. Seal all penetrations (including pipes) per manufacturer's instructions.
 - 8. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
 - 9. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.

END OF SECTION 07 26 16

SECTION 07 42 93 - SOFFIT PANELS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

GENERAL

SECTION INCLUDES

A. Flush-profile, concealed fastener, lap-seam metal soffit panels, with related metal trim and accessories.

RELATED REQUIREMENTS

- A. Division 07 Section "Thermal Insulation" for thermal insulation installed under metal panels.
- B. Division 07 Section "Air Barriers" for air barriers within metal panel assembly and adjacent to metal panel assembly.
- C. Division 07 Section "Metal Roof Panels" for metal roof panels installed with metal soffit and liner panels.
- D. Division 07 Section "Metal Wall Panels" for metal wall panels installed with metal soffit and liner panels.
- E. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing items in addition to items specified in this Section.

REFERENCES

- A. ASTM International (ASTM): www.astm.org:
 - 1. ASTM A755 Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
 - 2. ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 3. ASTM C920 Specification for Elastomeric Joint Sealants.
 - 4. ASTM D2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
 - 5. ASTM D4214 Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
 - 6. ASTM E1592 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

QUALITY ASSURANCE

- A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer accredited under IAS AC472, Part B.
- B. Installer Qualifications: Experienced Installer certified by metal panel manufacturer with minimum of five years experience with successfully completed projects of a similar nature and scope.
 - 1. Installer's Field Supervisor: Experienced mechanic certified by metal panel manufacturer supervising work on site whenever work is underway.
- C. Steel Construction Publications: Comply with published recommendations in the following, unless more stringent requirements are indicated.
 - 1. American Institute of Steel Construction (AISC): "Steel Construction Manual."
 - 2. American Iron and Steel Institute (AISI): "Cold Formed Steel Design Manual."

ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, metal panel installer, metal panel manufacturer's technical representative, inspection agency and related trade contractors.
 - 1. Coordinate building framing in relation to metal panel system.
 - 2. Coordinate openings and penetrations of metal panel system.
 - Coordinate work of Division 07 Sections "Roof Specialties" and "Roof Accessories" and openings and penetrations and manufacturer's accessories with installation of metal panels.

ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets for specified products. Include data indicating compliance with performance requirements.
- B. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.
 - 1. Indicate points of supporting structure that must coordinate with metal panel system installation.
 - 2. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.
- C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.
- D. Samples for Verification: Provide 12-inch- (305 mm-) long section of each metal panel profile. Provide color chip verifying color selection.

INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Indicating compliance of products with requirements.
- B. Qualification Information: For Installer firm and Installer's field supervisor.
- C. IAS Accreditation Certificate: Indicating that manufacturer is accredited under provisions of IAS AC472 Part B.
- D. Manufacturer's warranty: Unexecuted sample copy of manufacturer's warranty.

CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

DELIVERY, STORAGE, AND HANDLING

- A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.
 - 1. Deliver, unload, store, and erect metal panels and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
 - 2. Store in accordance with Manufacturer's written instruction. Provide wood collars for stacking and handling in the field.

3. Shield foam insulated metal panels from direct sunlight until installation.

WARRANTY

- A. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail in materials and workmanship within one year from date of Substantial Completion.
- B. Special Panel Finish Warranty: On Manufacturer's standard form, in which Manufacturer agrees to repair or replace metal panels that evidence deterioration of factory-applied finish within the warranty period, as follows:
 - 1. Modified Silicone-Polyester Two-Coat System:
 - a. Basis of Design System: MBCI, Signature 200.
 - b. Color fading in excess of 7 Hunter units per ASTM D2244.
 - c. Chalking in excess of No. 6 rating per ASTM D4214.
 - d. Failure of adhesion, peeling, checking, or cracking.
 - e. Warranty Period: 30 years from date of Substantial Completion.

PRODUCTS

MANUFACTURER

- A. Basis of Design Manufacturer: MBCI Metal Roof and Wall Systems, Division of NCI Group, Inc.; Houston TX. Tel: (877)713-6224; Email: <u>info@ecoficientseries.com</u>; Web: <u>www.mbci.com</u>.
- B. Substitutions: Permitted

PERFORMANCE REQUIREMENTS

- A. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.
- B. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E1592:
 - 1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
 - a. Wind Negative Pressure: Certify capacity of metal panels by actual testing of proposed assembly.
 - 2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/120 of the span with no evidence of failure.
 - 3. Seismic Performance: Comply with ASCE 7 Sections 9, "Earthquake Loads."
- C. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

FORMED METAL SOFFIT PANELS

- A. Flush-Profile, Concealed Fastener Metal Soffit Panels: Metal panels consisting of formed metal sheet with vertical panel edges, with flush joints between panels, field assembled with nested lapped edges, and attached to supports using concealed fasteners.
 - 1. Basis of Design: MBCI, Artisan Series Panels.
 - Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, structural quality, Grade 50, Coating Class AZ50 (Grade 340, Coating Class AZM150), prepainted by the coil-coating process per ASTM A755/A755M.
 - a. Nominal Thickness 24 gage coated thickness, with smooth surface.
 - 3. Exterior Finish: Modified silicone-polyester two-coat system
 - 4. Color: As selected by Architect from manufacturer's standard colors
 - 5. Panel Width: 8 inches (203 mm).
 - 6. Panel Thickness: 1 inch (25 mm).

MISCELLANEOUS MATERIALS

- A. General: Provide complete metal panel assemblies incorporating trim, fasciae, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.
- B. Flashing and Trim: Match material, thickness, and finish of metal panels.
- C. Fasteners: Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.

FABRICATION

- A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.
- B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

FINISHES

- A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- B. Modified Silicone-Polyester Two-Coat System: 0.20 0.25 mil primer with 0.7 0.8 mil color coat.
 - 1. Basis of Design: MBCI, Signature 200.

EXECUTION

EXAMINATION

- A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
 - Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.

B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

METAL PANEL INSTALLATION

- A. Concealed-Fastener Formed Metal Soffit Panels: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, project drawings, and referenced publications. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.
- B. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer. Fasten panel to support structure through leading panel flange. Fit back flange of subsequent panel into secured flange of previous panel.
 - 1. Cut panels in field where required using manufacturer's recommended methods.
 - 2. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer.
- C. Attach panel flashing trim pieces to supports using recommended fasteners.

ACCESSORY INSTALLATION

- A. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal panel assembly, including trim, flashings, sealants, closure strips, and similar items.
 - 2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
 - 3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

CLEANING AND PROTECTION

- A. Clean finished surfaces as recommended by metal panel manufacturer.
- B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION 07 42 93
SECTION 075554 – THERMOPLASTIC MEMBRANE ROOFING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

RELATED DOCUMENTS

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

SUMMARY

- A. This Section includes the following new roofing installation over structural metal roof decking
 1. Hot applied thermoplastic roof membrane.
 - a. One (1) ply of modified bitumen coated polyester/glass/polyester trilaminate reinforced base ply sheet adhered with hot applied adhesive.
 - b. One (1) ply of White 60 mill Polyester Fleece Backed Tri-Polymer Alloy (TPA) adhered with hot applied adhesive.
 - 2. Hot applied thermoplastic flashing membrane.
 - a. One (1) ply of modified bitumen coated polyester/glass/polyester trilaminate reinforced backing sheet adhered with hot applied adhesive.
 - b. One (1) ply of White 60 mill Polyester Fleece Backed Tri-Polymer Alloy (TPA) adhered with hot applied adhesive.
 - 3. <u>Updraft Afterburner Kettles</u> will be used for bitumen heating on all hot applied roofing projects.
 - 4. Ten (10) year manufacturer's warranty.

DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Hot Roofing Asphalt: Roofing asphalt heated to its equiviscous temperature within a range of plus or minus 25 deg. F, measured at the mop cart or mechanical spreader immediately before application.

PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7 or other acceptable methods.
 - 1. Corner, Perimeter, and Field-of Roof Uplift Pressures: **As indicated**.

- D. Flashings: Comply with requirements of Division 7 Section "Sheet Metal Flashing and Trim." Provide base flashings, perimeter flashings, detail flashings and component materials that comply with requirements and recommendations of the following:
 - 1. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.
 - 2. ANSI/SPRI ES-1, "Wind Design Standard for Edge Metal Systems Used with Low Slope Roof Systems".
 - 3. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.

SUBMITTALS

- A. Product List: Meeting requirements of Division 1 Section "Product Requirements."
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
 - 1. Base, perimeter, and detail flashings, cants, and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Crickets, saddles, and tapered edge strips, including slopes.
 - 4. Insulation fastening patterns.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system and eligible to receive the standard roofing manufacturer's warranty.
- E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of meeting performance requirements, including FMG listing.
- F. Qualification Data: For Installer, manufacturer, and manufacturer's technical representative if not pre-approved or listed in the Quality Assurance section of these specifications.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for roofing system and system components.
 - 1. Include report indicating compliance with load-strain properties requirements.
- H. Manufacturer Certificates: Indicating compliance of proposed products with requirements, including:
 - 1. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing base and ply sheets, membrane backer and flashing sheets, reinforcement fabric felts and mats, adhesives, mastics, coatings, and sealants.
- I. Maintenance Data and Training Materials: For roofing system to include in maintenance manuals and Owner's training library.
- J. Warranties: Special warranties and service agreements specified in this Section.
- K. Inspection Reports: Copy of daily and final technical inspection reports of roofing installation.

SUBSTITUTIONS

- A. General:
 - 1. Refer to Division 1, Section 01400 Quality Requirements.
 - 2. ONLY Substitutions approved in writing by the architect/owner prior to the scheduled bid date will be considered.
 - 3. Notification of approvals will be issued at least five (5) days before the scheduled bid date.
 - 4. Architect/Owner reserves the right to be final authority on acceptance or rejection of any substitution request.
- B. When a particular make or trade name is specified, it shall be indicative of standard required. Bidders proposing substitutes shall submit the following ten (10) days prior to bid date to the Architect; requests received after that time will not be considered.
 - 1. Written application with explanation of why it should be considered.
 - 2. Independent laboratory certification providing written confirmation that the physical and performance characteristics of the substitute material/system will meet the physical and performance characteristics of the specified materials and or system.
- C. Submit five copies of request for substitution. Items to be included in the request:
 - 1. Complete data substantiating compliance of proposed substitution.
 - 2. Product identification, including manufacturer's literature and manufacturer's name.
 - 3. Current certificate from an accredited testing laboratory comparing the physical and performance attributes of the proposed material with those of the specified materials. Test results must be dated, notarized, and on testing laboratory stationary.
 - 4. Material Safety Data Sheets providing all pertinent data as to flammability, combustibility.
 - 5. List of at least (5) five jobs as described under the requirements where the proposed alternate material was used under similar conditions. These jobs must be available for inspection by the Architect. Names and phone numbers are required for verification. Submit a minimum of 200,000 square feet for review. Submitted projects must be a minimum of (5) years old.
 - 6. Notarized statement from the Roof System Manufacturer, signed by a corporate officer of the corporation stating that:
 - a. All Documents have been reviewed and are approved.
 - b. The Project site has been inspected.
 - c. The Roofing System Manufacturer will provide two (2) field inspections weekly; during, and until all construction work is complete and accepted by the owner. A full time employee of the manufacturer must perform inspections.
 - d. Provide documentation of the proposed alternate system passing the specified regulatory requirements. Documentation must be on the specified regulatory requirements letterhead or approval guide. No third party testing will be accepted.
- D. In making substitution request, Bidder/Contractor represents:
 - 1. He has personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified. Additionally, he will have a technical service representative of the proposed manufacturer attend the pre-bid meeting.
 - 2. He will provide the same guarantee for substitution as for those specified.
 - 3. He will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.

- 4. Advise the owner of any credit savings or additional costs as opposed to the system type specified.
- E. Substitutions will <u>not</u> be considered if:
 - 1. Product or method to be considered does not have a minimum of (5) five years of successful performance in roofing and re-roofing of similar applications.
 - 2. Any discrepancies in the test data, or if the tests or submittals are incomplete.
 - 3. They are indicated or implied on Shop Drawings or Project Data Submittals without formal request submitted in accordance with the specification document.
 - 4. Acceptance requires significant revision of documents.
 - 5. Only substitutes approved in writing by prior to scheduled cut off date will be considered.
 - 6. Notification of approvals will be mailed at least 3 days before bid opening.
 - 7. The owner will not incur any additional costs for design or construction costs.

QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
 - 1. Upon request, the installer must be able to provide a list of at least five (5) reference projects with addresses, telephone numbers and representative names. Project references must be successful prior applications employing the same system type within the past five years.
 - 2. Roofing Contractors included in the following list are to the owner's knowledge, the only pre-approved installers that can install and provide the system and warranty for this specified system.
 - a. Rain King, Victoria, Texas (361) 576-0606.
 - b. Easley Roofing & Sheet Metal Co., Inc., Victoria, Texas (361) 575-0294.
 - c. Rain Seal Master Roofing & Sheet Metal, Inc., Victoria, Texas (361) 576-0926.
 - d. Sechrist-Hall Company, Inc., corpus Christi, Texas (361) 224-5264.
 - e. Haeber Roofing Company, Corpus Christi, Texas (361) 851-8142.
 - f. Port Enterprises, Inc. Corpus Christi, Texas (361) 289-2944.
 - 3. Roofing Contractors not on the list, that would like to bid on the proposed project, must complete the required qualification statement and must meet all requirements in the contract documents. Contractors, who are not approved by the Architect, will not be allowed to bid the project. Qualification statements may be requested from the technical roofing consultant and the local chapter of the American Institute of Architects.
 - 4. Installer must provide (2) manufacturer inspections each week.
 - a. Noncompliance may result in an \$850 per day fee for missing inspections.
- B. Manufacturer Qualifications: A qualified manufacturer that has UL listing and FMG approval for roofing system identical to that used for this Project.
- C. Manufacturer's Technical Representative Qualifications: An authorized full-time employee representative of manufacturer experienced in the installation and maintenance of the specified roofing system and qualified to determine Installer's compliance with the requirements of this Project.

- 1. Manufacturer Technical Representative must provide two (2) project inspections each week and provide a written and photographic report to the Roofing Contractor, the Architect and the General Contractor.
- 2. An independent testing agency will be used, if the manufacturer does not have a technical support staff to provide job site inspections.
- D. Source Limitations: Obtain components for roofing system from or approved in writing by roofing system manufacturer.
- E. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
- F. Project Meetings: Comply with requirements for preinstallation conferences in Division 1 Section "Project Management and Coordination."
 - 1. Pre-Construction Conference
 - a. General: Before starting roof deck construction, conduct conference at Project site. Comply with requirements for preinstallation conferences in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roof deck construction and roofing system as follows:
 - 1) Will be scheduled by the Architect after notice of award.
 - 2) Attendance: Architect, General Contractor, Manufacturer/warranty issuer, and Third Party Inspectors (if required).
 - 3) Minimum agenda: Submittal list of subcontractors, materials and progress schedule. Designation of responsible personnel. Walkover inspection. Review of the building and grounds; review the scope of work; review manufacturers installation standards and review of the environmental and atmospheric plan.
 - 2. Progress Meetings
 - a. General: Review methods and procedures related to roofing system as follows:
 - 1) Will be scheduled by the General Contractor.
 - 2) Attendance: Architect/Owner's representative, Consultants, General Contractor, Roof Sub-contractor, Manufacturer, Third Party Inspector (if required).
 - 3) Minimum agenda: Review of work progress. Maintenance of progress schedule. Maintenance of quality and work standards. Review of the building and grounds. Review of the scope of work.
 - 3. Final Inspection
 - a. General: Review methods and procedures related to roofing system as follows:
 - 1) Will be scheduled by General Contractor upon completion.
 - 2) Attendance: Architect/Owner's representative, Consultants, General Contractor, Roof Sub-contractor, Manufacturer, Third Party Inspector (if required).
 - 3) Minimum agenda: Walkover inspection. Identification of problems, which may impede issuance of warranty.
- G. Random Sampling

- 1. During course of work, the Architect may secure samples according to ASTM D140-93 of materials being used from containers at job site and submit them to an independent laboratory for comparison to specified material.
- Should test results prove that material is not equal to specified material: Contractor shall pay for all testing. Roofing installed and found not to comply with the specifications shall be removed and replaced with no change in the contract price.
- 3. Review roof observation and repair procedures after roofing installation.

DELIVERY, STORAGE AND HANDLING

- A. Refer to manufacturer recommendations.
- B. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.
- C. Storage of Materials
 - Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
 - Store materials marked "keep from freezing" in areas where temperatures will remain above 40 deg. F.
 - 3. For insulation, remove plastic packaging shrouds. For felt rolls, slit the top of the plastic shrink-wrap only. Cover top and sides of all stored materials with tarpaulin. Secure tarpaulin. Store in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
 - 4. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces.
 - 5. Do not double-stack rolls.
 - 6. Rooftop storage: Disperse material to avoid concentrated loading.
 - 7. Materials may not be stored without a canvass tarpaulin, or on direct contact with the ground or roof surface. Do not leave unused felts and other sheet materials on the roof overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg. F.
 - 8. Should Contractor be required to quickly cover material temporarily, such as during an unanticipated rain shower, all materials shall be stored on a raised platform covered with secured canvas tarpaulin, top to bottom.
 - 9. Contractor is responsible for the safekeeping of materials stored onsite.
- D. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- E. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

PROJECT CONDITIONS

A. Weather Limitations:

- 1. Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.
 - a. Do not work in rain, snow, or in presence of water.
 - b. Do not work in temperatures below 40 deg. F.
 - c. Do not install materials marked "keep from freezing" when daily temperatures are scheduled to fall below 40 deg. F.
 - d. Remove any work exposed to freezing.
 - e. Advise the owner when volatile materials are to be used near air ventilation intakes so that they can be shut down or blocked, as the owner requires.

<u>WARRANTY</u>

- A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Upon project completion, Manufacturer acceptance, and once complete payment has been received; the contractor shall deliver to the Owner a ten (10) year renewable Quality Assurance Warranty and Owner's Manual. The Manufacturer must, during the second, fifth, and tenth year of the warranty, inspect and provide a written Executive Summary. Upon warranty expiration, the owner may renew the warranty for five (5) years, after paying a nominal inspection fee and the prudent recommended maintenance is completed.
- C. The Manufacturer's Warranty must include labor & material coverage against leakage on all components; including those manufactured by others. Included are the following:
 - 1. Base sheet and fasteners.
 - 2. Insulation materials and adhesives.
 - 3. All roof membrane components and adhesives.
 - 4. All perimeter flashing metal components.
 - 5. All tapered edge and cant strips.
 - 6. All existing or new counter flashing.
 - 7. All surface mastics, coatings, stripping ply, etc.
 - 8. All drain assemblies, scuppers, expansion joints, pitch pans and other components, excluding interior plumbing.
 - 9. Any leaks or other problems caused by substrate movement, excluding decks.
 - 10. Cover against damages from wind speeds up to hurricane force winds as outlined within the Beaufort Scale.
- D. Special Project Warranty:
 - 1. Submit Roofing Installer's Warranty, on the warranty form at the end of this Section, signed by the Installer, covering the work of this Section, including membrane roofing, base flashing, roofing insulation, fasteners, sheet metal components, and vapor retarders, if any, for the following warranty period. Roofing contractor shall provide a letter to the architect stating that the roofing contractor will agree to participate in allowances and adjustments for 2 years of the warranty period. It must be determined by the architect and the roof system manufacturer that the defects in the roofing assembly are a result of application and workmanship errors. All defects noted during this time period will be corrected by the roof contractor at their expense.
 - 2. Roof Installers Warranty Period: 2 years from the date of substantial completion.

PRODUCTS

MANUFACTURERS

- A. In Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified. Basis of Design:

Tremco Inc., Cleveland, OH (216) 292-5000.

- 2. Available Manufacturers: <u>Any</u> manufacturer properly submitting **all** required information in accordance with Section 1.6 <u>and</u> complying with **all** requirements of these specifications. <u>Inclusion in the list below does not constitute prior approval</u>. <u>All</u> manufacturers must submit verification of compliance with all of the performance and physical characteristics of the specified materials. <u>All</u> manufacturers must submit verification that all services and technical support indicated in the specifications and under the terms of the specified warranty will be provided.
 - a. Available Manufacturers
 - 1) Tremco Inc., Cleveland, OH (216) 292-5000.
- B. The products listed within each paragraph are used to establish a basis of design. <u>Inclusion</u> in the list below does not constitute prior approval.
 - 1. Refer to Section 01600 Product Requirements within the General Conditions.

ROOFING MEMBRANE PLIES

- A. Base Sheet: Provide one (1) ply of modified bitumen coated polyester/glass/polyester trilaminate reinforced ply sheet. Exceeding ASTM D 4601-86, Type II.
 - 1. Performance requirements:
 - a. Weight, 31.0 lb/100ft², ASTM D 228-90a
 - b. Tensile Strength, 161 lbf/in (MD), 137 lbf/in (XMD), ASTM D 5147
 - c. Elongation, 5.4% MD, 6.56% XMD, ASTM D 5147
 - d. Tear Strength, 265 lbf MD, 212 lbf XMD, ASTM D 5147
 - e. Asphalt, 10.0 lb/100ft², ASTM D 228-90a
 - 2. Basis of Design: Tremco BURmastic Composite Ply HT.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- B. Finish Ply: Provide one (1) ply of Reinforced Thermoplastic Tri-Polymer Alloy Sheet: Uniform, flexible elastomeric sheet formed from a thermoplastic tri-polymer alloy fleecebacked membrane, of the following thickness, exposed face color, and physical properties:
 - 1. Thickness: 60 mils, nominal, minimum membrane thickness.
 - 2. Exposed Face Color: White. Energy Star Rated.
 - 3. Physical Properties:
 - a. Tensile Strength: 350 lbs; ASTM D 751-98.
 - b. Elongation at Break: 40 percent MD x 30 percent XMD; ASTM D 751-98.
 - c. Tear Strength: 100 lbs; ASTM D 751-98.
 - d. Low Temperature Bend: -40 degrees F; ASTM D 2136-94.
 - 4. Basis of Design: Tremco TPA FB Single Ply Roof System.

5. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.

FLASHING MATERIAL

- A. Backing Sheet: Provide one (1) ply of modified bitumen coated polyester/glass/polyester trilaminate reinforced ply sheet. Exceeding ASTM D 4601-86, Type II.
 - 1. Performance requirements:
 - a. Weight, 31.0 lb/100ft², ASTM D 228-90a
 - b. Tensile Strength, 161 lbf/in (MD), 137 lbf/in (XMD), ASTM D 5147
 - c. Elongation, 5.4% MD, 6.56% XMD, ASTM D 5147
 - d. Tear Strength, 265 lbf MD, 212 lbf XMD, ASTM D 5147
 - e. Asphalt, 10.0 lb/100ft², ASTM D 228-90a
 - 2. Basis of Design: Tremco BURmastic Composite Ply HT.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- B. Flashing Sheet: Provide one (1) ply of Reinforced Thermoplastic Tri-Polymer Alloy Sheet: Uniform, flexible elastomeric sheet formed from a thermoplastic tri-polymer alloy fleecebacked membrane, of the following thickness, exposed face color, and physical properties:
 - 1. Thickness: 60 mils, nominal, minimum membrane thickness.
 - 2. Exposed Face Color: White. Energy Star Rated.
 - 3. Physical Properties:
 - a. Tensile Strength: 350 lbs; ASTM D 751-98.
 - b. Elongation at Break: 40 percent MD x 30 percent XMD; ASTM D 751-98.
 - c. Tear Strength: 100 lbs; ASTM D 751-98.
 - d. Low Temperature Bend: -40 degrees F; ASTM D 2136-94.
 - 4. Basis of Design: Tremco TPA FB Single Ply Roof System.
 - 5. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- C. Elastomeric Flashing Adhesive: One-part, asbestos-free, cold-applied, butyl rubber-based, elastomeric trowel-grade adhesive specially formulated for compatibility and use with specified roofing membranes and flashings, with the following properties:
 - 1. Performance requirements:
 - a. Adhesion in Peel, minimum, ASTM D 1876: 3 lbf/in.
 - b. Lap Shear Adhesion, minimum, ASTM D 816: 18 psi.
 - c. Asbestos Content: ASTM D 276: None.
 - d. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 250 g/L.
 - 2. Basis of Design: Tremco, Sheeting Bond (White)
- D. Elastomeric Flashing Adhesive (Option): Elastomeric single ply bonding adhesive, with the following properties:
 - 1. Performance requirements:
 - a. Viscosity @ 77 deg F, 2,500 cps, ASTM D 183
 - b. Density, 7.3 lbs/gal, ASTM D 147
 - c. Percent Solids, 26.5%, ASTM D 316
 - d. Volatile Organic Compounds (VOC), 612 g/L, ASTM D 164
 - e. Color, amber/yellow
 - 2. Basis of Design: Tremco TPA Single Ply Bonding Adhesive.

- E. Metal Flashing:
 - 1. Metal flashings, counter flashings, pitch pans, scuppers, and like applications shall be in accordance with:
 - a. NRCA Roofing and Waterproofing Manual (Fifth Edition) for construction details and recommendations.
 - b. ANSI/SPRI ES-1, "Wind Design Standard for Edge Metal Systems Used with Low Slope Roof Systems".
 - c. SMACNA Architectural Sheet Metal Manual (Fifth Edition) for construction details.
 - 2. Provide Metal Flashings as specified in Division 7 Section "Sheet Metal Flashing and Trim," except that all sheet metal flashing and trim adhered to or in contact with the TPA sheet membrane flashing membrane must be TPA coated metal as provided by the manufacturer.
 - a. 24 gauge (0.023"minimum) G90 hot dipped galvanized steel with a back wash coat of 0.0001" clear acrylic, laminated on one side with a 20 mil unreinforced TPA Membrane.
 - 3. b. Basis of Design: TPA Coated Metal by Tremco or pre-approved substitution.
 - 3. Coping, collector head, downspout and other visible sheet metal flashing:
 - a. Galvanized, pre-painted: Twenty-four (24) gage minimum, galvanized steel; commercial quality, Fed. Spec. QQ-S-775, Type I, Class D or ASTM A 526 or lock forming quality ASTM A 527, G90 coating in accordance with ASTM A 525. All sheet metal to be pre-painted.
 - 1) Paint finish at exposed side: Factory applied baked-on two (2) coat system comprised of one (1) coat of full 70% resin fluorocarbon by Kynar 500 or accepted substitute over a smooth coat of corrosion-resistant epoxy-based primer. Color as selected by owner.
 - 2) Finish at underside shall be a wash coat over a coat of corrosion-resistant epoxy-based primer.
 - 4. Counter flashing, slip flashing, pitch pans with hood and other sheet metal flashings not visible to the general public:
 - a. Galvanized Steel: ASTM A 526-85, sheet steel with 1.25 oz./sq. (3.82 g/m²) galvanized coating.
 - 1) Gage: Twenty-four (24).
 - 2) Solder: ASTM B32-89, alloy grade 50A. Neutralize flux after soldering.
 - 5. Scupper inserts:
 - a. Stainless Steel, Type 304: Twenty-four (24) gauge minimum, stainless steel; commercial quality, Fed. Spec. QQ-S-775, Type I, Class D or ASTM A 526 or lock forming quality ASTM A 527, G90 coating in an accordance with ASTM A 525.
 - 6. Lead Flashings:
 - a. ASTM B 29-79 (1984), 4 lb. (1.82 kg) sheet lead.
 - Use prefabricated plumbing vent flashings with factory welded and sealed joints at all plumbing vents.
 Flange: 4 inch minimum.
 - c. Use a single piece of sheet lead flashing at roof drains. Minimum 30 inch x 30 inch.

ASPHALT MATERIALS

A. Primer:

- 1. An asbestos free, modified water-based asphalt primer
- 2. Basis of Design: Tremco Tremprime WB.
- 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- B. Insulation, interply, cap sheet and flashing sheet adhesive: ASTM D 312, Type IV low odor, low fuming asphalt as recommended by built-up roofing system manufacturer for application.
 - 1. Basis of Design: Trumbull TruLo[®] Lo Odor, Low-Odor Asphalt by Owens-Corning.

AUXILARY MATERIALS

- A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.
 - 1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.
- B. Asphalt Mastic:
 - 1. ASTM D 4586-86 heavily fibrated asphalt mastic.
 - 2. Basis of Design: Tremco ELS.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- C. Pitch pan cement:
 - 1. ASTM C 928-89, rapid hardening non-shrink grout.
- D. Pitch pan mastic:
 - 1. High performance single component roof elastomer.
 - 2. Basis of Design: Tremco POLYroof LV.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- E. Metal Joint Sealant:
 - 1. An asbestos free, one-part, polyurethane sealant.
 - 2. Basis of Design: Tremco TremSEAL D.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- F. Reglet Joint Sealant.
 - 1. One-part, bituminous polyurethane sealant.
 - 2. Basis of Design: Tremco Reglet Joint Sealant.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- G. Vents:
 - 1. Galvanized Steel: ASTM A 526-85, sheet steel with 3.82 g/m² (1.25 oz./sq.) galvanized coating.
 - a. Gage: Twenty-two (22).
 - b. Solder: ASTM B32-89, alloy grade 50A. Neutralize flux after soldering.
- H. Termination Bar:
 - 1. Extruded aluminum, pre-punched 8 inch o.c.

- I. Walkway Pads:
 - Mineral-surfaced asphaltic composition panels, factory formed, nonporous, with a slipresisting surface texture, manufactured specifically for adhering to built-up roofing as a protection course for foot traffic: Thickness: 1/2 inch
 - 2. Basis of Design: Tremco TremTred.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- J. Primer:
 - 1. An asbestos free, modified water-based asphalt primer
 - 2. Basis of Design: Tremco Tremprime WB.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- K. Elastomeric mastic:
 - 1. A single component, weather resistant, asbestos free durable roof elastomer, suitable for use over both asphalt and tar roof membranes.
 - 2. Basis of Design: Tremco POLYroof LV.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- L. Reinforcement membrane:
 - 1. A non-shrinking, non-rotting, vinyl coated, woven glass mesh.
 - 2. Basis of Design: Tremco Burmesh.
 - 3. Pre-approved substitution, subject to compliance with all requirements indicated in Section 2.1 above.
- M. Miscellaneous Accessories:
 - 1. Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces. Minimum board size: 4' x 4' or 4' x 8'.
 - 1. Applied in two layers for a total minimum thickness of 3.5 inches
 - 2. Available Manufacturers:
 - a. Atlas Roofing Corporation.
 - b. Celotex Corporation.
 - c. Firestone Building Products Company.
 - d. Koppers Industries.
 - e. RMAX.
 - f. Tremco, Inc.

- C. Cover Board: **A**STM C 208, Type II, Grade 2, Cellulosic-fiber and water-resistant binders, asphalt coated on ALL six (6) sides and chemically treated for deterioration. Minimum board thickness to be 1/2 inch.
- D. Tapered Perlite Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/2 inch per 12 inches, unless otherwise indicated. Back slope to roof drains: 1/2 inch per foot; Crickets and Saddles: 1/2 inch per foot; and Drain or Scupper Sumps: 1/2 inch per foot. Minimum board thickness to be 1/2 inch.
- E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Wood Cant and Nailer Strips:
 - 1. Refer to Division 6, Section 06100 "Wood Blocking and Curbing".
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain or scupper. Fabricate to slopes indicated.
 - 1. ASTM C 728, perlite insulation board.
- D. Tapered Edge Strips: ASTM C 728, perlite insulation board.

MECHANICAL FASTENERS

- A. Insulation to Steel Deck (as required): Length: Use the shortest fastener which will penetrate the top flange of the steel deck 3/4 inch.
 - a. ITW Buildex: Accutrac or Hextra with Recessed or Accutrace Plates OR #12, 1/4 inch, #14-10 or #15 Roofgrip with Recessed or Flat Bottom Plates.
 - b. Olympic Fasteners: Olympic #10, Olympic Standard, Olympic Heavy Duty, Stainless #12, Hex Head #12, #14, Iron-Lok or Strap Toggle with Standard or G-2 Plates OR Olympic Standard or Olympic Heavy Duty with LGP.
 - c. SFS Stadler Inc: #12 or #14 Insul-Fixx with IF-3-S.
- B. Wood to Steel Deck (if required):
 - 1. Length: Use the shortest fastener which will penetrate the top flange of the steel deck 3/4 inch.
 - a. Tremco/Olympic No. 12-11 Standard Roofing Fastener, with CR-10 fluorocarbon coating by Tremco.
 - b. Deckfast #12 screw by Construction Fasteners Inc., Wyomissing PA
 - c. Olympic Fastener #12-10 by Olympic Manufacturing Group, Agawam MA
 - d. Rawl Deck #12 Deck screw by The Rawlplug Company Inc., New Rochelle NY
- C. Wood to wood (if required):
 - 1. Galvanized, common, annular ring nail.
 - 2. Length: Sufficient to penetrate underlay blocking 1-1/4 inch.

- D. Sheet steel to wood blocking (if required):
 - 1. FS FF-N-105B Type II, Style 20, roofing nails galvanized and stainless steel, flat head, diamond point, round, barbed shank.
 - 2. Length: Sufficient to penetrate wood blocking 1-1/4 inch.
- E. Termination bar to masonry or concrete:
 - 1. Lead masonry anchors.
 - 2. Length: Sufficient to provide 1-1/4 inch embedment minimum.
- F. Drawband:
 - 1. Gold Seal stainless worm gear clamp by Murray Corporation, Cockeysville MD.
 - 2. Power-Seal stainless steel worm drive clamps by Breeze Clamp Co, Saltsburg PA.

EXECUTION

EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
 - 2. Verify all structural wood deck is secure and suitable for the new roof system.
 - 3. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

WOOD CANT NAILER INSTALLATION

A. Install wood cants, blocking, curbs, and nailers securely to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

INSULATION INSTALLATION

- A. General: Install insulation boards as follows:
 - 1. One (1) layer min. 1.5 inch polyisocyanurate roofing insulation board mechanically attached as required to achieve the specified wind resistance requirements.
 - 2. One (1) layer min. 2.0 inch polyisocyanurate roofing insulation board adhered with hot applied adhesive over the base layer.

- 3. One (1) layer 1/2 inch wood fiber board cover board roofing insulation adhered with hot applied adhesive over base layer(s).
- B. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- C. Comply with roofing system manufacturer's written instructions for installing roof insulation.
- D. Wood Nailer Strips: Mechanically fasten 6-inch nominal-width wood nailer strips of same thickness as insulation perpendicular to sloped roof deck per Factory Mutual requirements.
- E. Wood Cant Strips: Install and secure 45-degree cant strips at junctures of built-up roofing membrane system with vertical surfaces or angle changes greater than 45 degrees per Factory Mutual requirements.
- F. Install tapered insulation under area of roofing to conform to slopes indicated.
- G. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- H. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- I. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- J. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- K. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows: Set each layer of insulation in a solid mopping of hot roofing asphalt.

CRICKET, SADDLE AND SUMP INSTALLATION

- A. Install pre-manufactured tapered insulation crickets in hot adhesive along walls and projections as required to divert water flow as shown on the drawings.
- B. Install pre-manufactured tapered insulation saddles in hot adhesive between roof drains as required to divert water flow as shown on the drawings.
- C. Install pre-manufactured tapered insulation sumps in hot adhesive around roof drain and scuppers as required to direct water-flow into the roof drains or scuppers.
 - 1. Size: 48 inch x 48 inch at roof drains; 24 inch x 48 inch at scuppers
 - 2. Minimum slope: 1/2 inch per 12 inches.

ROOFING MEMBRANE INSTALLATION: GENERAL

- A. Install modified bitumen roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."
- B. Start installation of built-up roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Cooperate with testing and inspecting agencies engaged or required to perform services for installing built-up roofing system.
- D. Coordinate installing roofing system components so insulation and roofing membrane sheets are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt with joints and edges sealed.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
 - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- E. Asphalt Heating: Heat roofing asphalt and apply within plus or minus 25 deg. F of equiviscous temperature unless otherwise required by roofing system manufacturer. Do not raise roofing asphalt temperature above equiviscous temperature range more than one hour before time of application. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Do not heat roofing asphalt within 25 deg. F of flash point. Discard roofing asphalt maintained at a temperature exceeding finished blowing temperature for more than 4 hours.

1. <u>Updraft Afterburner Kettles</u> will be used for asphalt heating on all hot applied roofing projects.

- F. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.
- G. Substrate: Free of foreign particles prior to laying roof membrane.
- H. Phased application: Not permitted. All plies shall be completed each day.
- I. Traffic and equipment: Kept off completed plies until adhesive has set.
- J. Wrapper and packaging materials: Not to be included in roofing system.
- K. Entrapped aggregate: Not permitted within new membrane.
- L. Ply shall never touch ply, even at roof edges, laps, tapered edge strips, and cants.
- M. Fit plies into roof drain rims; install lead flashing and finishing plies; secure clamping collars; install domes.
- N. Extend roofing membrane to top edge of cant at wall and projection bases.

- O. Cut out fish mouths/side laps, which are not completely sealed; patch. Replace all sheets, which are not fully and continuously bonded.
- P. Wood cants: Install and secure preformed 45-degree wood cants at junctures of built-up roofing membrane system with vertical surfaces or angle changes greater than 45 degrees.
- Q. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

ROOFING MEMBRANE INSTALLATION

- A. Base Sheet: Install lapped base membrane starting at low point of the roofing system. Offset laps from laps of proceeding ply sheets and align base sheet without stretching. Lap in direction to shed water. Extend base sheet over and terminate beyond cants.
 - 1. Embed base sheet in a solid mopping of hot roofing asphalt applied at rate required by roofing system manufacturer.
- B. Install Thermoplastic roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing. Install sheet according to ASTM D 5036.
 - 1. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel.
 - 2. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
 - 3. Hot Roofing Asphalt:
 - Apply a solid mopping of hot roofing asphalt to substrate at temperature and rate required by manufacturer and install fabric-backed roofing membrane. Do not apply roofing asphalt to splice area of roofing membrane.
 - 4. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
 - 5. Apply roofing membrane with side laps shingled with slope of roof deck where possible.
 - 6. Seams:
 - a. Clean seam areas, overlap roofing membrane and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
 - 7. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
 - 8. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 - 9. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.

BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

- C. Flash penetrations and field-formed inside and outside corners with sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
- F. Base flashing height:

Not less than 8 inches, not higher than 12 inches above finished roofing surface. Extend flashing up walls or parapets a minimum of 8 inches above roofing membrane and 4 inches onto field of roofing membrane.

- G. Install stripping, according to roofing system manufacturer's written instructions, where metal flanges and edgings are set on built-up roofing.
 - 1. Two-Ply Stripping:
 - a. Prime and set the base of the flange in asphaltic mastic. Prime the top of the flange and seal the flange with two (2) plies embedded in alternate applications of stripping adhesive. Extend first ply 4 inches beyond flange; second ply 2 inches beyond first ply.
- H. Metal Parapet Cap (Coping) and Base Flashing: Refer to NRCA Construction Detail TP-1 and TP-1S.
- I. Raised Perimeter Edge with Metal Flashing (Fascia Cap): Refer to NRCA Construction Detail TP-2 and TP-2S.
- J. Embedded Edge Metal Flashing (Gravel Stop): Refer to NRCA Construction Detail TP-3 and TP-3S.
- K. Surface Mounted counterflashing for Concrete Walls: Refer to NRCA Construction Detail TP-4 and TP-4S.
- L. Base Flashing for Wall-supported Deck: Refer to NRCA Construction Detail TP-5 and TP-5S.
- M. Base Flashing for Vented Base Sheet: Refer to NRCA Construction Detail TP-5A and TP-5AS.
- N. Base Flashing for Non-wall-supported Deck: Refer to NRCA Construction Detail TP-6 and TP-6S.
- O. Expansion Joint with Metal Cover: Refer to NRCA Construction Detail TP-7 and TP-7S.
- P. Expansion Joint with Pre-manufactured Cover: Refer to NRCA Construction Detail TP-7A and TP-7AS.
- Q. Area Divider in Roof System: Refer to NRCA Construction Detail TP-8 and TP-8S.
- R. Equipment Support Curb: Refer to NRCA Construction Detail TP-9 and TP-9S.

- S. Raised Curb Detail for Rooftop Air Handling Units and Ducts (Prefabricated Metal Curb): Refer to NRCA Construction Detail TP-12 and TP-12S.
- T. Raised Curb Detail for Rooftop Air Handling Units and Ducts (Job Site Constructed Wood Curb): Refer to NRCA Construction Detail TP-13 and TP-13S.
- U. Sheet Metal Enclosure for Piping Through Roof Deck: Refer to NRCA Construction Detail TP-16 and TP-16S.
- V. Isolated Stack Flashing (Hot or Cold): Refer to NRCA Construction Detail TP-17 and TP-17S.
- W. Isolated Stack Flashing Sheet Metal (Hot or Cold): Refer to NRCA Construction Detail TP-17A and TP-17AS.
- X. Plumbing Vent: Refer to NRCA Construction Detail TP-18A and TP-18AS.
- Y. Penetration Pocket: Refer to NRCA Construction Detail TP-19 and TP-19S.
- Z. Roof Drains: Set 30-by-30-inch metal flashing in bed of asphalt roofing cement on completed roofing membrane. Cover metal flashing with stripping and extend a minimum of 4 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
 - 1. Install stripping of not less than two roofing membrane ply sheets, each set in a continuous coating of asphalt roofing cement or in a solid mopping of hot roofing asphalt.
 - 2. Refer to NRCA Construction Detail TP-20 and TP 20S.
- AA. Scupper Through Raised Perimeter Edge: Refer to NRCA Construction Detail TP-21 and TP-21S.
- BB. Gutter: Refer to NRCA Construction Detail TP-22 and TP-22S

FIELD QUALITY CONTROL

- A. Inspection Services: Contractor to provide roof system manufacture/warrantor's inspection service 2 times per week during roof installation.
- B. Test Cuts: Before flood coating and surfacing built-up roofing membrane, test specimens will be removed to evaluate problems observed during quality-assurance inspections of roofing membrane as follows:
 - 1. Approximate quantities of components within roofing membrane will be determined according to ASTM D 3617.
 - 2. Test specimens will be examined for interply voids according to ASTM D 3617 and to comply with criteria established in Appendix 3 of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

- D. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 55 54

SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

- A. Provide fabricated sheet metal items including:
 - 1. Flashings and counterflashings not a part of Unit Masonry systems.
 - 2. Roof fascias.
 - 3. Copings.
 - 4. Gutters and Downspouts.
 - 5. Metal trim not part of manufactured roof or wall systems.

SUBMITTALS

- A. Shop Drawings: Indicated material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- B. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.

PRODUCTS

SHEET METAL FLASHING AND TRIM

- A. Pre-finished Galvanized Steel Sheet: ASTM A755/A755M coil coated.
 - 1. Base Metal: ASTM A653/A653M; Strucural Quality; G90 zinc coating, minimum 24 gauge thick.
 - 2. Exposed Finish: Three coat fluoropolymer metallic coating with minimum 70 percent polyvinyldene flouride resin.
 - 3. Unexposed Finish: Manufacturer's standard coating.
- B. Lead: ASTM B749, 2.5 lb/sq ft 0.039 inch thick.
- C. Stainless Steel: ASTM A240/240M; Type 304, dead soft fully anealed; smooth surface, Number 2D finish; minimum 26 gauge thick.

GUTTERS AND DOWNSPOUTS

- A. Pre-finished Galvanized Steel; 24 gauge galvalume steel with Signature 300 Kynar 500 finish, color to be selected by Architect, as manufactured by MBCI, or equal.
- B. Provide 18 gauge galvalume steel downspout boot to match downspout color as detailed on drawings.
- C. Miscellaneous metal trim pieces, flashings, etc. shall be 24 gauge Galvalume steel. Provide with color coating when exposed to view. All cleats shall be 22 gauge Galvalume steel. Special aluminum flashings and trims are specifically noted to be aluminum.
- D. Rake trim shall match gutter material and profile.

- E. Downspouts shall be 4" x 4". Provide in length longer than base of building if required to reach splash blocks. Color to be as indicated on drawings.
- F. Parapet wall caps shall be fabricated from 24 gauge, Galvalume steel with color coating.

ROOF JACKS

- A. Pre-manufactured neoprene boots as manufactured by the roof panel manufacturer, Dektite or equal.
- B. See roof plan and visit site to identify new or existing vents or other penetrations needing roof jacks.

ACCESSORIES

- A. Fasteners: Stainless steel, with soft neoprene washers. Match finish of exposed heads with material being fastened.
- B. Underlayment: ASTM D226; Type II, No. 30 unperforated asphalt felt.
- C. Protective Backing Paint: FS TT-C-494 Bituminuous.
- D. Sealant: As specified in Section 079000.
- E. Plastic Cement: ASTM D4586, Type I.
- F. Solder: ASTM B32; type suitable for application and material being soldered.

APPLICATION

- A. Install sheet metal flashing and trim in accordance with SMACNA requirements.
- B. Secure flashings in place using concealed fasteners wherever possible. Use exposed fasteners only where not exposed to view.
- C. Install flashings embedded in roofing system in accordance with roofing specification and as detailed on drawings.
- D. Fabricate and install external gutters, downspouts, flashings, base flashings and other incidentals as detailed on the drawings.
- E. Fabricate internal gutter as detailed on the drawings. Solder all laps and joints. Install with high and low points at roof drains (coordinate roof drain installation with plumbing contractor). Refer to 071000 for membrane gutter liner and wall flashing.
- F. Place all roof jacks and plumbing vents, review MEP drawings and provide all pre-finished metal curb flashing and counterflashing at all roof penetrations and roof mounted equipment.

FINISHES & WARRANTIES

A. Color coatings shall be a PDVF, Fluorocarbon meeting both Kynar 500 and Hylar 5000 specifications and shall be warranted for 20 years.

END OF SECTION 07 62 00

SECTION 07 84 00 - FIRESTOPPING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SECTION INCLUDES

- A. Non-combustible firestopping and fire safing materials, and accessories as shown on drawings, or if not shown, as required, including but not limited to the following:.
 - 1. Intumescent Caulks, Elastomerics, Sealants, Compounds, Putties, Joint Sprays, Wrap Strips, and Coatings
 - 2. Silicone Sealants
 - 3. Mortar Materials (Cementitious)
 - 4. Firestopping Foam Materials
 - 5. Fire Block Materials
 - 6. Pillow Materials
 - 7. Mat Materials
 - 8. Cast-in-place Devices, Collars, and other materials, including fire/smoke stop systems, which meet the specified requirements.

B. General description of the work in this section:

- 1. Only tested firestop systems shall be used in specific locations as follows:
 - a. Penetrationsfor the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies) and vertical service shaft walls and partitions.
 - b. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - c. Openings and penetrations in fire-rated partitions or walls containing fire doors.
 - d. Openings around structural members which penetrate floors or walls.

RELATED WORK

- A. Section 03 30 00 Cast-in-Place Concrete
- B. Section 04 20 00 Masonry
- C. Section 07 21 00 Thermal and Acoustical Insulation
- D. Section 07 90 00 Joint Sealants
- E. Section 09 21 13 Plaster Assemblies
- F. Section 09 21 16 Gypsum Board Assenblies: Wallboard used for fire rated construction.
- G. Division 23 Mechanical: Requirements for penetrations through fire rated construction.
- H. Division 26 Electircal: Requirements for penetrations though fire rate construction.

REFERENCES

- A. ASTM International (ASTM)
 - 1. C665, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 2. E84, standard Test Method for Surface Burning Characteristics of Building Materials
 - 3. E119, Standard Test Methods for Fire Tests of Building Construction and Materials
 - 4. E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops
 - 5. E2174, Standard Practice for On-Site Inspection of Installed Fire Stops
- B. National Fire Protection Association (NFPA)
 - 1. 70, National Electric Code

2. 101, Life Safety Code

- C. Underwriters Laboratories (UL)
 - 1. 163, Fire Tests of Building Construction and Materials
 - 2. 1479, Fire Test of Through-Penetration Firestops
 - 3. 2079, Tests for Fire Resistance of Building Joint Systems
 - 4. UL Fire Resistance Directory:
 - a. Firestop Devices (XHJI)
 - b. Fire Resistance Ratings (BXRH)
 - c. Through-Penetration Firestop Systems (XHEZ)
 - d. Fill, Voids, or Cavity Material (XHHW)
 - e. Forming Materials (XHKU)
 - f. Joint Systems (XHBN)
- D. International Firestop Council Guidelines for Evaluation Firestop Systems Engineering Judgments

PERFORMANCE AND QUALITY ASSURANCE REQUIREMENTS

- A. Firestopping Materials:
 - 1. Shall be rated as non-combustible when tested in accordance with ASTM E119 to achieve fire rating noted on the drawings and provide a fire rating equal to that of construction being penetrated. If no such fire rating is noted on the drawings, the fire rating shall be required by the authorities having jurisdiction.
 - 2. If such materials are used in a through-penetration seal condition, they shall be approved for such use, with all required devices and accessories forming an assembly or included in the test, when tested in accordance with ASTM E814 or UL 1479.
 - 3. Tests shall be performed by an approved testing agency to indicate compliance with specified requirements and the resulting approval number shall b ethe latest or current test approved by authorities having jurisdiction. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council.
- B. Fire safing Materials:
 - 1. Shall be tested and rated non-combustible to achieve fire rating noted on the drawings, or if not noted, as required by authorities having jurisdiction.
 - 2. If such materials are used in an assembly, they shall be approved for such use, with all required devices and accessories forming an assembly or included in the test.
 - 3. Tests shall be perfrmed by an approved testing agency to indicate compliance with specified requirements and the resulting approval number shall be the latest or current test approved by authorities having jurisdiction.
 - 4. Proposed fire safing materials and methods shall conform to applicable governing codes having local jurisdiction.
- C. Definitions: As they appear in this Section:
 - 1. Combustible: Penetrations composed of any material which will burn or melt in a fire, including, but not limited to the following:
 - a. Nonmetallic pipes made of glass or plastic.
 - b. Metallic pipes made of lead or aluminum.
 - c. Electrical, data, communication, security, and telephone cables.

- 2. Non-combustible: Penetrations composed of material which will not burn or melt in a fire, including, but not limited to the following:
 - a. Metallic pipes made of steel, iron or copper.
- 3. Approved Testing Agencies: UL or other testing agency licensed and equipped to conduct the required fire tests and approved by authorities having jurisdiction.
- 4. Authorities Having Jurisdiction: Shall be the person or entity responsible for applicable governing code enforcement.
- D. Manufacturer Qualifications: Those listed in Paragraph 2.1, A, or company specializing in manufacuturing the products specified in this Section with minimum of five (5) years experience. Refer to Division 1 for substitutions.
- E. Installer Qualifications: Company specializing in performing the Work of this Section with minimum three (3) years experience installing tested and classified firestop and fire safing systems or manufacturer certification and approval.
- F. Standards: All firestop and fire safing systems shall have a flame (F) rating and temperature (T) rating conforming to applicable building codes and in accordance with Drawings and Specifications.
- G. Sincle Source Responsibility: Obtain firestopping and fire safing materials from a single manufacturer for each different product required.
- H. No firestopping or fire safing materials shall be concealed or covered until they have been observed and approved for use by the Architect and/or authorities having jurisdiction.

SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's technical data on product characteristics, performance, and limitation criteria for each material including UL firestop systems to be used.
 - 2. Manufacturer's installation instructions.
 - 3. Manufacturer's Materal Data Sheets (MSDS)
- B. Shop Drawings: Manufacturer's shop drawings or detail sheets indicating each condition that requires a penetration or joint seal. Details must be in accordance with proposed approved system. Include materials to be used, anchorage, methods of installation and relationship to all adjacent construction.
- C. Manufacturer's engineering judgement identification number and drawing details when no UL system is available for application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in drawing.
- D. Certifications:
 - 1. Manufacturer's certification of compliance indicating approval of authorities having jurisdiction for combustibility and use of materials, and that their installation conforms to shown or required fire rating.
 - 2. Manufacturers affidavit that materials used in Project contain no asbestos.

DELIVERY, STORAGE AND HANDLING

- A. Deliver and store materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

INSTALLER QUALIFICATIONS

A. Engage an experienced installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an installer engaged by the Contractor does not in itself confer qualification on the buyer.

REGULATORY REQUIREMENTS

- A. Conform fire resistance ratings and surface burning characteristics of authorities having jurisdiction.
- B. Provide certificate of compliance from manufacturer indicating approval or authorities having jurisdiction for combustibility and use of materials, and that their installation conforms to shown or required fire rating.

ENVIRONMENTAL REQUIREMENTS

- A. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- B. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- C. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.
- D. Provide ventilation in areas to receive solvent cured materials.
- E. Sequence Work to permit firestopping and fire safing materials to be installed after adjacent and surrounding work is complete.

WARRANTY

- A. Warrant the work specified herein for two (2) years against becoming unserviceable or causing an objectionable apperance resulting from either defective or non-conforming materials and workmanship.
- B. Defects shall include, but not be limited to:
 - 1. use of incorrect material within the installation
 - 2. No mineral wool insulation within a system that requires it.
 - 3. Use of mineral wool insulation when ceramic fiber insulation is required.
 - 4. Incorrect amount of material is installed within system.
 - 5. No use of an accessory seal within a system that requires one.
 - 6. Use of an incorrect system with a firestop or fire safing installation.
 - 7. Failure to meet specified performance or quality assurance requirements.

MANUFACTURERS/PRODUCTS

- A. Subject to compliance with through penetration firestop systems listed in Volume II of the UL Fire Resistance Directory (XHEZ), manufacturers specified are approved for use in the Project. Other manufacturers must have a minimum of five (5) years experience manfacturing products meeting or exceeding the specifications and comply with Division 01.
 - 1. Hilti, Inc.
 - 2. Nelson Firestop Products
 - 3. Specified Technologies, Inc.
 - 4. Tremco Inc.
 - 5. 3M Fire Protection Products
- B. To maintain clarity of products, specifications are based on specified products manufactured by Hilti, Inc.; Tulsa, OK. Listed manufacturers providing equivalent products are acceptable for use on this project.
- C. It is recognized that the manufacturers listed may not produce all of the specified types of products, therefore, products from several manufacturers may be used throughout the project as long as consistent use of each individual product is maintained thoughout the project, they meet the requirements specified herein for the intended use, and are approved for that use by authorities having jurisdiction. Products which are combined to form a UL listed assembly must be provided as tested and approved as shown in the Fire Resistance Directory.

MATERIALS AND COMPONENTS

- A. General:
 - 1. Any of the following materials, either by itself or in combination with other materials my be used on the Project provided they:
 - a. Satsify the firestopping and fire safing requirements for use in the required application on the Project.]
 - b. Meet the performance and quality assurance requirements specified herein.
 - c. Are approved for use in that application by the authorities having jurisdiction.
 - 2. Materials shall comply with ASTM E814 (UL 1479) or ASTM E1119 (UL 263), and shall be manufactured of non-toxic, non-hazardous, asbestos free materials. Product shall bear proper independent test laboratory label/logo and shall conform to construction assembly type, penetrating item type, annular space requirements, and fire rating involved for each separate instance.

- B. Primers: Conform to firestop manufacturer's recommendations for primers required for various substrates and conditions.
- C. Back-Up (Damming) Materials: Conform to firestop manufacturer's recommendations for back-up (damming) materials. Material may be removable or permanent as recommended by manufacturer to suit application and as required by UL testing or other testing agency approved by authorities having jurisdiction.
- D. Retainers: Steel angles, clips, sheet metal, and impaling fasteners to support damming material and fire safing material and where required by UL testing or other testing agency approved by authorities having jurisdiction.
- E. Adhesives and Fasteners: Conform to firestop manufacturer's recommendations for adhesives and fasteners required for various substrates and conditions and to suit intended use. Materials must conform to those required by UL testing or other testing agency approved by authorities having jurisdiction.
- F. Firestopping Fill, Void, and Cavity Materials: Shall conform to those required by UL testing or other testing agency approved by authorities having jurisdiction, including, but not be limited to the following. Refer to list of approved manufacturers:
 - 1. Cast-in place firestop devices for use with combustible and non-combustible pipes (closed and open piping systems) and cable bundles penetrating concrete floors, the following products are acceptable:
 - a. "CP 680 Cast-In Place Firestop Device" manufactured by Hilti, Inc.
 - 1) Add Aerator adaptor when used in conjunction with aerator ("sovent") system.
 - b. "CP 681 Tub Box Kit" for use with tub installations manufactured by Hilti, Inc.
 - c. "CP 682 Cast-In Place Firestop Device" for use with noncombustible penetrants manufactured by Hilti, Inc.
 - 2. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
 - a. "FS-ONE Intumescent Firestop Sealant" manufactured by Hilti, Inc.
 - b. "CP 604 Self-leveling Firestop Sealant" manufactured by Hilti, Inc.
 - c. "CP 620 Fire Foam" manufactured by Hilti, Inc.
 - d. "CP 606 Flexible Firestop Sealant" manufactured by Hilti, Inc.
 - e. "CP 601s Elastomeric Firestop Sealant" manufactured by Hilti, Inc.
 - 3. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
 - a. "CP 601s Elastomeric Firestop Sealant" manufactured by Hilti, Inc.
 - b. "CP 606 Flexible Firestop Sealsnt" manufactured by Hilti, Inc.
 - c. "FS-ONE Intumenscent Firestop Sealant" manufactured by Hilti, Inc.
 - 4. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
 - a. "FS-ONE Intumescent Firestop Sealant" manufactured by Hilti, Inc.
 - 5. Foams, Intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
 - a. "FS-ONE Intumescent Firestop Sealant" manufactured by Hilti, Inc.
 - b. "CP 620 Fire Foam" manufactured by Hilti, Inc.
 - c. "CP 601S Elastomeric Firestop Sealant" manufactured by Hilti, Inc.
 - d. "CP 606 Flexible Firestop Sealant" manufactured by Hilti, Inc.

- 6. Non curing, re-penetrable, intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
 - a. "CP 618 Firestop Putty Stick" manufactured by Hilit, Inc.
 - b. "CP 658T Firestop Plug" manufactured by Hilti, Inc.
- 7. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
 - a. "CP 617 Firestop Putty Pad" manufactured by Hilti, Inc.
- 8. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
 - a. "CP 643N Firestop Collar" manufactured by Hilti, Inc.
 - b. "CP 644 Firestop Collar" manufactured by Hilti, Inc.
 - c. "CP 645/648 Wrap Strips manufactured by Hilti, Inc.
- 9. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
 - a. "CP 637 Firestop Mortar" manufactured by Hilti, Inc.
 - b. "FS 657 FIRE BLOCK" manufactured by Hilti, Inc.
 - c. "CP 620 Fire Foam" manufactured by Hilti, Inc.
 - d. "CP 675T Firestop Board" manufactured by Hilti, Inc.
- 10. Non curing, re-penetrable materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
 - a. "FS 657 FIRE BLOCK" manufactured by Hilti, Inc.
 - b. "CP 675T Firestop Board" manufactured by Hilti, Inc.
- 11. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:
 - a. "FS 657 FIRE BLOCK" manufactured by Hilit, Inc.
 - b. "CP 658T Firestop Plug" manufactured by Hilti, Inc.
- G. Fire Related Construction Joints and Other Gaps:
 - 1. "CP 601S Elastomeric Firestop Sealant" manufactured by Hilti, Inc.
 - 2. "CP 606 Flexible Firestop Sealant" manufactured by Hilti, Inc.
 - 3. "CP 672 Firestop Joint Spray" manufactured by Hilit, Inc.
- H. Fire Safing Materials: Comply with ASTM C655, Type I, high-melt mineral fiber insulation with minimum nominal density of 4.0lbs per cubic foot, and having a maximum flame spread rating of 15 and smoke developed rating of 0. Size shall be 4 inches thick by 24 inches wide by 48 inches long, unless noted otherwise. Products containing asbestos strictly prohibited.
 - 1. "Thermafiber Safing Insulation" manufactured by Thermafiber, Inc.
 - 2. "Fibrex Safing Insulation" manufactured by Fibrex Insulations, Inc.
 - 3. "Delta Safing Board" manufactured by Rock Wool Manufacturing Company.
- I. Jacketing (For use with fire protection board): 0.016 inch aluminum or 0.010 inch stainless steel roll jacketing as shown, or if not shown, as required where high traffic requires high durability and good appearance, and as directed by Architect.

EXAMINATION

A. Examine joints and openings indicated or required to receive firestop and fire safing materials, for compliance with requirements for proper configuration, installation tolerances and other conditions affecting firestop and fire safing performance.

- B. Do not proceed with installation until unsatisfactory conditions are corrected.
- C. Beginning installation shall indicate acceptance of existing conditions. Work found to be defective or deficient due to uncorrected existing conditions prior to installation should be repaired or replaced at no additional expense to Owner.

PREPARATION

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substance that may affect proper adhesion.
 - 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - 4. Install back-up (damming) materials to arrest liquid material leakage.
 - 5. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.

COORDINATION

- A. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.
- B. Responsible trades to provide adequate spacing fo field run pipes to allow for installation of castin-place firestop devices without interferences.

INSTALLATION

- A. General:
 - 1. Install firestop and fire safing materials in accordance with manufacturer's recommendations to provide F and T ratings as required by authorities having jursdiction.
 - 2. Install firestop materials in accordance with UL Fire Resistance Directory.
 - 3. Install firestop and fire safing materials with sufficient pressure to properly fill and seal openings, then tool or trowel exposed surfaces.
- B. Firestopping Materials:
 - 1. Install primer and firestopping material in sufficient thickness, with required accessories to achieve rating, to uniform density and texture, in accordance with manufacturer's instructuctions and authorities having jurisdiction.
 - 2. Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.
 - 3. Consult with mechanical engineer, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 - 4. Remove dam material after firestopping material has cured or allwo dam material to remain if required to maintain fire rating integrity or required by authorities having jurisdiction.
 - 5. Do not conceal or enclose any firestopping materials until they have been examined and approved use by the Architect and authorities having jurisdiction.

- C. Fire Safing Materials:
 - 1. Install fire safing in sufficient thickness, with retainer materials where shown or required to achieve fire rating in accordance with manufacturer's instructions and authorities having jurisdiction.
 - 2. Do not conceal or enclose any fire safing materials until they have been examined and approved for use by the Archtiect and authorities having jurisdiction.
- D. Fire Protection Board Materials:
 - 1. Install fire protection board in proper type, size, and density, with adhesives, fasteners, and jacketing materials where shown or required to achieve fire rating in accordance with manufacturer's instructions and authorities havning jurisdiction.
 - 2. Do not conceal or enclose any fire protection board materials unitl they have been examined and approved for use by the Architect and authorities having jurisdiction.

PROTECTION

A. Protect adjacent surfaces from damage by material installation.

CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials.

QUALITY CONTROL

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable coade authorities.
- C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspetion of Installed Fire Stops".
- D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems alreadly installed by other trades.

END OF SECTION 07 84 00

SECTION 07 90 00 - JOINT SEALANTS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

A. Examine the drawings and all sections of the specifications to determine the extent of work required under this section.

MATERIALS

- A. Joint sealant in control joints and expansion joints in exterior brick work shall be "Sonolastic NP 2" multiple-component high-performance polyurethane sealant as manufactured by Sonneborn. Color as selected by Architect from standard color selections. Submit samples of actual material.
- B. Joint sealant in control joints in interior concrete block construction shall be "Sonolastic NP 1" single component high-performance polyurethane sealant as manufactured by Sonneborn. Color as selected by Architect from standard color selections. Submit samples of actual material.
- C. Backer rod material shall be "Sonolastic Closed Cell Backer-Rod" as manufactured by Sonneborn. Select rod size as recommended by manufacturer for width of joint.
- D. Primer shall be "Sonolastic Primer 733" as manufactured by Sonneborn.
- E. Provide fire and smoke caulking as manufactured by 3M, or equal, where indicated on plans or needed to seal around all penetrations of fire walls and floors. Packing material shall be ceramic insulation where needed.

APPLICATION

- A. Prepare joint surfaces, install backer rod and prime in strict accordance with the manufacturer's written instructions.
- B. Mix sealant, place in joint and tool finish in strict accordance with manufacturer's written instructions.
- C. Exercise special care in preparing and priming horizontal portions of joints to be sealed which are subject to incidental water immersion.

GUARANTEE

A. Sealant installations shall be guaranteed for a period of two (2) years from the date of substantial completion against defects in materials and workmanship.

END OF SECTION 07 90 00
SECTION 08 11 00 - METAL DOORS AND FRAMES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

REFERENCE SPECIFICATIONS

- A. Work under this section shall be governed by the following specifications, except as modified herein.
 - 1. Specifications for Custom Hollow Metal Doors and Frames, NAAMM, Standard CHM-1-69 of the National Association of Architectural Metal, Manufacturers.
 - 2. Texas Tech University National Wind Institute Tested Shelter Doors, January 2014
 - 3. Design and Construction Guidance for Community Safe Rooms, FEMA P-361, Second Edition, August 2008

SHOP DRAWINGS

A. Provide shop drawings which include schedule of all doors and frames to be provided as well as elevations and details of each different frame and/or door type.

DOOR & FRAME CONSTRUCTION

- A. Doors shall be 16 gauge minimum with no exposed seams, a reinforced core and full insulation. Exterior doors shall have a channel filler at top of door which is fully welded and sealed to prevent water from entering at top of door. Reinforce doors as necessary for hardware. Exterior doors with handicap accessible thresholds must have custom cutoff to insure that there is no gap between bottom of doors and top of threshold seat.
- B. Exterior frames shall be 14 gauge minimum and interior frames 16 gauge minimum. Corner joints shall be fully welded and ground smooth at the factory. Reinforce frames as necessary for hardware.
- C. Provide T-Strap or Stirrup and Strap Adjustable Anchors as per NAAMM specifications. Wire Anchors are not acceptable. At existing openings, provide Pipe and Plate Type Anchors.
- D. Applied stops shall have mitered corners and screw fasteners must be symmetrically spaced along the edges of each glass or solid panel.
- E. Provide frames with U.L. Fire Rated Labels when and as scheduled on the drawings. The Architect has determined that fire rated frame sizes shown on the drawings as well as frame and glass opening sizes shown for window assemblies can be manufactured by certain companies. Companies who can not provide fire rated frames and/or window assemblies are asked not to bid the project, unless they receive written approval prior to bidding of slight size and configuration modifications which would be acceptable to the Owner. Any requests for changes after bidding will not be considered and it will be the Contractor's responsibility to provide fire rated frames and/or window assemblies as drawn at no additional cost to the Owner.

FINISHES

- A. Interior frames shall be factory primed, then field painted as specified in Section 9 of these specifications.
- B. Exterior frames shall be factory galvanized, type G-60, and primed, then field painted as specified in Division 9 of these specifications.

HARDWARE

- A. Mortise and reinforce for all hardware.
- B. Refer to Finish Hardware Section for templating and hardware types.

INSTALLATION

- A. Cut doors and frames as necessary for finish hardware from templates provided by the finish hardware supplier.
- B. Install doors to operate freely and lock and latch properly.

END OF SECTION 08 11 00

SECTION 08 14 00 - WOOD DOORS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

REFERENCE SPECIFICATIONS

- A. Work under this section shall be governed by the current editions of the following standards and specifications to the extent that they are applicable:
 - 1. NWWDA 1.5-1; AWI Sections 1300-5, 1300SLC-5 and 1300FD; ASTM E-152; NFPA 252; UL 10B and NFPA 80.

SHOP DRAWINGS

A. Provide shop drawings which include schedule of all doors to be provided as well as details and/or literature describing door construction, AWI grade and veneer type, cut and grade.

WARRANTY

- A. All wood doors and/or transom panels shall have a 1 year warranty against becoming unserviceable or objectionable in appearance as a result of being defective or non-conforming. Without limiting the scope of the warranty the doors provided shall be guaranteed not to:
 - 1. Warp in excess of 1/4" as defined by NWWDA.
 - 2. Warp or twist to a degree that the door will not operate properly.
 - 3. Photograph any show-through of stiles, rails or cores.

DOOR & TRANSOM CONSTRUCTION

- A. Construction types:
 - 1. Wood blocks or staves. Plain, framed or bonded stile and rail.
 - 2. Chipboard, particle board.
 - 3. Edges to be solid hardwood.
 - 4. Wood veneer faces.
 - 5. Special cores as required for fire rated doors.
 - 6. Provide U.L. Label fire doors and transoms when and as scheduled on the drawings.
 - 7. Add wood blocking reinforcing for closer through bolts.

B. Plies:

- 1. 5 ply , bonded core, construction.
- 2. Hardwood crossbanding.
- 3. Premium, Grade 1, solid piece maple veneer. Veneer shall be bonded to core. Transom panels, if scheduled, must have veneer that matches door.

C. Glue:

1. Water-resistant, type II.

FACTORY FINISHING

- A. Prefinish wood doors at the factory.
- B. Premium grade transparent finish manufacturer's standard finish with performance requirements comparable to AWI system TR-6 catalyzed polyurethane.
- C. Staining: Either none required for clear prefinish or color to be selected from manufacturer's full range.
- D. Effect: Open grain finish.
- E. Sheen: Satin medium rubbed effect.

DOOR LITE FRAMES

A. Cold rolled steel, 18 gauge, fire rated and factory primed, model 84G as manufactured by Advantage Lites & Louvers, Inc., 415 Concord Avenue, Bronx, NY 10455. Tel: 718-585-3230. Fax: 718-292-2243

DELIVERY

A. Doors shall be individually wrapped or cartoned at the factory for protection during transit and storage periods, and shall be marked as per tag designations on shop drawings.

INSTALLATION

- A. Doors shall be sized and beveled for proper fit and security on the lock edge.
- B. Use template machine guides to prepare doors for hanging and installing hardware.

END OF SECTION 08 14 00

SECTION 08 40 00 – ALUMINUM DOORS, WINDOWS & FRAMES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUBMITTALS

A. Submit six (6) copies of shop drawings indicating materials, construction details and location of each item on the project.

MATERIALS

- A. Aluminum doors and sections shall be extruded from 6063-T5 aluminum alloy. Finish to be Class II, Medium Bronze Anodic Coating conforming with Aluminum Association Standard AA-M10C22A44, Kawneer's #17 Clear.
- B. Weather-stripping shall be manufacturer's standard.
- C. Refer to Section 088000 for glazing materials.
- D. Aluminum entrance doors and frames and windows shall be as manufactured by the Kawneer Company and detailed on the drawings.
- E. Hardware at Doors:1. Refer 08 71 00 HARDWARE
- F. Door construction:
 - 1. Doors shall be Kawneer Series 500, wide stile.
 - 2. Top rail and vertical stiles shall be 5" wide with custom bottom rail 12" high. Corner construction shall consist of both sigma deep penetration weld and mechanical fastening.
- G. Door frame construction:
 - 1. Frame construction shall be Kawneer Trifab II 451, 2" x 4 1/2", members as detailed on drawings.
 - 2. Install using surround system members if detailed on the drawings.
 - 3. All screws, miscellaneous fastening devices and internal components shall be of stainless steel, plated or corrosion resistant materials of sufficient strength to perform the functions for which they are used.
 - 4. All frames shall be manufactured with a closed back or with an open back section with "flat aluminum filler" full height. **No open backed frames**.
 - 5. Metal "end dams" as manufactured by Kawneer must be used. Shop or field fabricated "end dams" will not be allowed.
 - 6. Prepare frames for proximity card readers to be provided by Owner under separate contract.
- H. Window & sidelite frame construction:
 - 1. Frame construction shall be Kawneer Trifab VG 451T, 2" x 4 1/2", members as detailed on drawings.
 - 2. Install using surround system members if detailed on the drawings.
 - 3. All screws, miscellaneous fastening devices and internal components shall be of stainless steel, plated or corrosion resistant materials of sufficient strength to perform the functions for which they are used.

- 4. All frames shall be manufactured with a closed back or with an open back section with "flat aluminum filler" full height. **No open backed frames**.
- 5. All sills to receive Kawneer HP Sill Flashing with end dams.
- 6. Metal "end dams" as manufactured by Kawneer must be used. Shop or field fabricated "end dams" will not be allowed.
- I. Break metal:
 - 1. Break metal where show on the drawings shall be .050 inch anodized aluminum.
 - 2. Install in longest lengths possible with hairline butt joints.

ERECTION

- A. Units shall be installed plumb, level, and true to plane and shall be secured and anchored in accordance with the detailed shop drawings and manufacturer's written instructions.
- B. Aluminum "end dams" must be installed at ends of all sills at both windows and sidelites.

PROTECTION & CLEANING

A. After installation the General Contractor shall take all necessary measures to protect exposed aluminum surfaces and shall be responsible for final cleaning.

END OF SECTION 08 40 00

SECTION 08 71 00 - HARDWARE

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

A. PART 1 – GENERAL

RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the Work of this section.

DESCRIPTION OF WORK:

- A. <u>Definition:</u> "Finish Hardware" includes items known commercially as finish hardware which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.
- B. <u>Extent</u> of finish hardware shall be determined by a qualified hardware specialist employed by the Hardware Supplier.
- C. <u>Types</u> of finish hardware required may include, but are not limited to, the following:
 - a.) Hinges
 - b.) Lock cylinders and keys
 - c.) Lock and latch sets
 - d.) Bolts
 - e.) Exit devices
 - f.) Push/pull units
 - g.) Closer
 - h.) Overhead holders
 - i.) Miscellaneous door control devices
 - j.) Door trim units
 - k.) Protection plates
 - I). Weatherstripping for exterior doors
 - m.) Silencers on interior door frame stop
 - n.) Sound stripping for interior doors
 - o.) Automatic drop seals (door bottoms)
 - p.) Astragals or meeting seals on pairs of doors
 - q.) Thresholds

QUALITY ASSURANCE:

- A. <u>Manufacturer:</u> Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements.
- B. <u>Supplier:</u> A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than two (2) years, and who is, or who employs an experienced hardware specialist who is available, at no additional cost to Victoria College, at reasonable times during

the course of the work, for consultation about project's hardware requirements, to Victoria College, Architect and Contractor.

- C. <u>CODES and other Requirements:</u>
- D. <u>State Statute Requirements:</u> The Hardware Supplier, installer shall certify in writing that all hardware furnished on the job meets all requirements of Vernon's Texas Civil Statutes, Article 9102 and other local codes and requirements of the local authority having jurisdiction.
- F. <u>Positive Pressure Ratings:</u> All door hardware products supplied to this project are to meet the requirements of UL 10C and UBC 7-2 (1997) as they relate to positive pressure testing of these products.
- G. <u>Americans with Disabilities Act</u>: All items of the commercial door hardware within the scope of this project shall comply with the Americans with Disabilities Act.

SUBMITTALS:

- B. <u>Product Data:</u> On completion of the installation of each item of hardware, submit to the Owner, the manufacturers technical product data for each item of hardware in accordance with Division-1 section "Submittal'. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.
- C. <u>Final Hardware Schedule:</u> Submit (6) copies of final hardware schedule in manner indicated below prior to ordering any hardware. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.
 - 1) <u>Hardware Schedule Content:</u> Based on finish hardware requirements developed by the supplier's hardware specialist and accepted by the Architect, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - (a) Type, style, function, size, and finish of each hardware item.
 - (b) Name and manufacturer of each item.
 - (c) Fastenings and other pertinent information.
 - (d) Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - (e) Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
 - (f) Mounting locations for hardware.
 - (g) Door and frame sizes and materials.
 - 2) <u>Submittal Sequence:</u> Submit initial draft of schedule along with essential product data in order to facilitate the fabrication of other work (e.g., hollow metal frame),

which is critical in the project construction schedule. Submit final draft of schedule after samples, product data, and coordination with shop drawings of other work, delivery schedules, and similar information has been completed and accepted.

- 3) <u>Keying Schedule:</u> Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- D. <u>Templates:</u> Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

PRODUCT HANDLING:

- A. <u>Tag each item or package</u> separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. <u>Packaging of hardware</u> is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate door number and hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. <u>Inventory hardware</u> jointly with representatives of the Hardware Supplier and the Hardware Installer until each is satisfied that the count is correct.
- D. <u>Deliver</u> individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.
- E. <u>Provide secure, and dry lock up</u> for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items, which are not immediately replaceable, so that completion of the Work will not be delayed by hardware losses, both before and after installation.

B. PART 2 – PRODUCTS

- A. <u>Responsibilities of Finish Hardware Supplier:</u>
- B. <u>Submittals:</u> Provide through the Contractor required Product Data. Final Hardware Schedule, Separate Keying Schedule (if required).
- C. <u>Construction Schedule:</u> Inform the Contractor at earliest possible date of estimated times and dates to process submittals, to furnish templates, to deliver hardware, and to perform other work associates with furnishing finish hardware for purposes of including the construction progress schedule and then comply with this schedule.
- D. <u>Coordination and Templates:</u> Assist the Contractor as required to coordinate hardware with other work in respect to both fabrication and installation. Furnish the Contractor with templates and deliver hardware to proper locations.

- E. <u>Product Handling:</u> Package, identify, deliver, and inventory hardware as specified in Part 1 General of this section.
- F. <u>Discrepancies:</u> Based on requirements indicated in Contract Documents in effect at time of hardware selection: furnish proper types, finishes and quantities of finish hardware, including fasteners, and Owner's maintenance tools; and furnish or replace any items of finish hardware resulting from shortages and incorrect items, at no cost to Victoria College or Contractor. Obtain signed receipts from the Contractor for all delivered material.
- G. <u>Responsibilities of Contractor:</u>
- H. <u>Submittals:</u> Coordinate and process submittals for Builders Hardware in same manner as submittal for other work.
- I. <u>Construction Schedule:</u> Cooperate with the Finish Hardware supplier in establishing scheduled dates for submittals and delivery of templates and finish hardware.
- J. <u>Coordination:</u> Coordinate finish hardware with other work. Furnish the Hardware Supplier or Manufacturer with shop drawings of other work where required or requested. Verify completeness and suitability of hardware with supplier.
- K. <u>Product Handling:</u> Provide secure, dry lock-up for hardware delivered to the site. Inventory hardware jointly with representative of hardware supplier and issue signed receipts for all delivered materials. Any hardware items lost, damaged or stolen after being accepted by the Contractor shall be replaced at the Contractor's expense.
- L. <u>Installation Information</u>: The Contractor shall include all cost for installation of hardware and cores in the base bid.
 - No adjustments in Contract sum will be made for costs other than those covered by the allowances for subsequent increases or decreases in quantity of one or more hardware types which do not exceed five percent (5%).

ACCEPTABLE MANUFACTURERS:

- A. Bid all products as scheduled. Requests for substitution of products shall be submitted to the Architect at least fifteen (15) days prior to bid date and are from the list of acceptable manufacturers below. The Architect has complete and final say on the acceptability of a requested substitute product.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) <u>Butts and Hinges:</u>
 - a) The Hager Companies
 - b) Ives
 - c) Bommer Hinges

- 2) <u>Locksets:</u>
 - a) Sargent
 - b) Corbin/Russwin
 - c) Falcon
- 3) <u>Cylinders:</u>

a) Sargent

- 4) <u>Bolts:</u>
 - a) Triangle Brass Mfg. Co. Inc.
 - b) Glynn-Johnson Corp.
 - c) The Hager Companies
 - d) Ives
- 5) <u>Exit/Panic Devices:</u>
 - a) Sargent
 - b) Monarch
 - c) Von Duprin
- 6) <u>Push/Pull Units:</u>
 - a) Triangle Brass Mfg. Co.
 - b) The Hager Companies
 - c) Ives
- 7) <u>Overhead Closers:</u>
 - a) Dorma Architectural Hardware
 - b) Dor-o-matic
 - c) Sargent
- 9) <u>Door Control Devices:</u>
 - a) Dorma Architectural Hardware
 - b) Ives
 - c) Architectural Builders Hardware
 - d) Triangle Brass Mfg. Co.
- 10) <u>Door Trim Units:</u>
 - a) Ives
 - b) The Hager Companies
 - c) Triangle Brass Mfg. Co.
- 11) Kick, Mop and Armor Plates:
 - a) Ives
 - b) The Hager Companies
 - c) Triangle Brass Mfg. Co.
- 12) Door Stripping and Seals:
 - a) The Hager Companies
 - b) National Guard Products, Inc.
 - c) Zero International, Inc.

- 13) <u>Thresholds:</u>
 - a) The Hager Companies
 - b) National Guard Products, Inc.
 - c) Zero International, Inc.
- 14) <u>Automatic Drop Seals:</u>
 - a) The Hager Companies
 - b) National Guard Products, Inc.
 - c) Zero International, Inc.
- 15) <u>Sound Stripping:</u>
 - a) The Hager Companies
 - b) National Guard Products, Inc.
 - c) Zero International, Inc.
- 16) <u>Astragals:</u>
 - a) The Hager Companies
 - b) National Guard Products, Inc.
 - c) Zero International, Inc.

MATERIALS AND FABRICATION:

- A, <u>General</u>:
- B. <u>Hand of door:</u> Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- C. <u>Manufacturer's Name Plate:</u> Do not use manufacturer's products, which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to the Architect.
 - 1) Manufacturer's identification will be permitted on rim of lock cylinders only.
- D. <u>Base Metals:</u> Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for the applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- E. <u>Fasteners:</u> Provide hardware-manufactured items to conform to published templates, generally prepared for machine screw installation. Do not provide hardware, which has been prepared for self-tapping sheet metal screws, except, as specifically indicated.
- F. <u>Furnish screws</u> for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

- G. <u>Provide concealed fasteners</u> for hardware units, which are exposed when door is closed, except to extent no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on the opposite face is exposed to other work, except where it is not feasible to adequately reinforce the work (or as required by code or fire listing of the door or hardware). In such cases, provide sleeves for each thru-bolt or use sex nuts and machine screw fasteners.
- H. <u>Tools and Maintenance Instructions for Owner's Maintenance Personnel:</u> Furnish a complete set of specialized tools installation instructions, and maintenance instructions as needed for the Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

HINGES, BUTTS AND PIVOTS:

- A. <u>Templates:</u> Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. <u>Screws:</u> Furnish Phillips flat head or machine screws for installation of units, except furnish Phillips flat-head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.
- C. <u>Hinge Pins</u>: Except as otherwise indicated provide hinge pins as follows:
 - 1) <u>Steel Hinges:</u> Steel pins.
 - 2) <u>Non-ferrous Hinges:</u> Stainless steel pins.
 - 3) <u>Exterior Doors:</u> Non-removable pins.
 - 4) <u>Interior Doors:</u> Non-rising pins.
 - 5) <u>Tips:</u> Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.
 - 6) <u>Number of Hinges:</u> Provide number of hinges indicated but not less than three
 (3) hinges per door leaf for doors 90" or less in height and one (1) additional hinge for each 30" of additional height.

LOCK CYLINDERS AND KEYING:

- A. <u>General:</u> Supplier will meet with Owner to finalize keying requirements and obtain final instruction in writing.
- B. <u>Review the keying system</u> with Owner and provide the type required (master, grand master or great-grand master), either new or integrated with Owner's existing systems.
- C. <u>Metals:</u> Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.

- D. <u>Comply with the Owner's instructions</u> for master keying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
 - 1) <u>Permanently inscribe</u> each key with number of lock that identifies cylinder manufacturer key symbol, and notation "DO NOT DUPLICATE".
- E. <u>Key Material:</u> Provide keys of nickel silver only.
- F. <u>Key Quantity:</u> Furnish two (2) change keys for each lock; five (5) master keys for each master system; and five (5) grand master keys for each grand master system.
 - 1) <u>Deliver keys</u> to the Owner's representative..

LOCKS, LATCHES AND BOLTS:

- A. <u>Strikes</u>: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.
 - 1) <u>Provide dust-proof strikes</u> for foot bolts, except where special threshold construction provides non-recessed strike for bolt.
 - 2) <u>Provide roller type strikes</u> where recommended by manufacturer of the latch and lock units.
- B. <u>Lock Throw:</u> Provide 5/8" minimum throw of latch and 1" deadbolt used on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
 - 1) Provide ¹/₂" minimum throw on other latch and deadlock bolts.
- C. <u>Flush Bolt Heads:</u> Minimum of ½" diameter rods of brass, bronze steel or stainless steel, with minimum 12" long rod for doors up to 7'-0" in height. Provide longer rods as necessary for doors exceeding 7'-0" in height.
- D. <u>Exit Device Dogging:</u> Except on fire-rated doors, wherever closers are provided on doors equipped with exit devices, equip the units with keyed dogging device to hold the push bar down and the latch bolt in the open position.
- E. <u>Rabbeted Doors:</u> Where rabbeted door stiles are indicated, provide special rabbeted front on lock and latch units and bolts.

PUSH/PULL UNITS:

A. <u>Concealed Fasteners:</u> Provide manufacturer's special concealed fastener system for installation; through-bolted for matched pairs, but not for single units, unless covered on push side of door with push plate.

EXIT DEVICE PANIC HARDWARE:

A. <u>Panic Exit Hardware:</u> Except at pairs of doors, provide rim-type, center latch bolt type panic exit device activated by a full-width touch bar or push pad; to comply with UL 305,

UL10C, and UBC7-2 (1997). All device touch-bar, rail, and cover assemblies shall be constructed of heavy gauge solid wrought materials for true architectural finishes or color coated finishes as specified. All touch-pads shall be a minimum of one half of the door width and capable of accepting field installed options like cylinder dogging, and exit alarms. Panic exit devices shall have hex key dogging standard and be equipped with deadlocking latch-bolt.

- B. <u>Fire Exit Hardware:</u> Except at pairs of doors, provide rim-type, center latch bolt type panic exit device activated by a full-width touch bar or push pad; to comply with UL 305, UL10C, and UBC7-2 (1997). All device touch-bar, rail, and cover assemblies shall be constructed of heavy gauge solid wrought materials for true architectural finishes or color coated finishes as specified. All touch-pads shall be a minimum of one half of the door width and capable of accepting approved field installed options request to exit switches and exit alarm. Fire exit devices shall not have dogging of any kind, unless approved and installed in accordance with NFPA, and will be equipped with a standard deadlocking latch-bolt. Labeled devices shall be tested and available for all door applications and ratings.
- C. <u>Removable Mullion:</u> Provide steel, prime coat finished, adjustable center mullion, including mullion stabilizers, compatible with rim-type panic hardware for all double doors. Provide fire rated mullions with ratings equal to the fire exit hardware used on any rated openings.

CLOSERS AND DOOR CONTROL DEVICES

- A. <u>Size of Units:</u> Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.
 - 1) <u>Provide parallel arms</u> for all interior overhead closers, except as otherwise indicated. On all exterior doors, provide larger spring size cylinder to supply enough strength to properly control doors.
- B. <u>Access-Free Manual Closers:</u> Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and/or delayed action closing.

DOOR TRIM UNITS:

- A. <u>Fasteners:</u> Provide manufacturer's standard exposed fasteners for door trim units (kickplates, edge trim, viewers, knockers, mail drops and similar units), either machine screws or self-tapping screws.
- B. <u>Fabricate protection plates</u> (armor, kick or mop) not more than 2" less than door width on stop side and not more than ½" less than door width on pull side, by the height indicated. Provide stainless steel plates.

WEATHERSTRIPPING:

A. <u>General:</u> Except as otherwise indicated, provide continuous weatherstripping at each edge of every exterior door leaf. Provide type, sizes and profiles shown or scheduled.

Provide non-corrosive fasteners as recommended by manufacturer for application indicated.

B. <u>Replaceable Seal Strips:</u> Provide only those units where resilient or flexible seal strip is easily replaceable and readily available form stocks maintained by manufacturer.

WEATHERSTRIPPING AT JAMBS AND HEADS:

- A. <u>Provide bumper-type resilient insert</u> and metal retainer strips, surface-applied unless shown as mortised or semi-mortised, of following metal, finish and resilient bumper material:
 - 1) Extruded aluminum with color anodized finish as selected by the Architect form manufacturer's standard color range, 0.062" minimum thickness of main walls and flanges.
 - 2) Flexible, hollow neoprene bulb or loop insert, conforming to MIL R 6055, Class II, Grade 40.

WEATHERSTRIPPING AT DOOR BOTTOMS:

- A. <u>Provide automatic door bottom weatherstripping</u> consisting of contact type resilient insert and metal housing of surface mounted design; of following metal, finish and resilient seal strip:
 - 1) Extruded aluminum with color anodized finish as selected by the Architect from manufacturer's standard color range, 0.062" minimum thickness of main walls and flanges.
 - 2) Solid neoprene wiper or sweep seal complying with MIL R 6065, Class II, Grade 40.

THRESHOLDS:

- A. <u>General:</u> Except as otherwise indicated provide standard metal threshold unit of type, size and profile as shown or scheduled and that meet requirements of Vernon's Civil Statutes, Article 9102.
- B. <u>Exterior Hinged/Pivoted Doors:</u> Provide units not less than 4" wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames, and selected to meet Texas Handicap Code requirements.

HARDWARE FINISHES:

A. <u>Provide matching finishes</u> for hardware units of each door or opening, to the greatest extent possible and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lockset (or push-pull units if no latch-locksets) for color and texture.

- B. <u>Provide finishes which match</u> those established by BHMA in color as selected by Architect..
- C. <u>Provide quality of finish</u>, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.
- D. <u>Provide protective lacquer or ceramic clear coating</u> on all exposed hardware finishes of brass, bronze and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer".
- E. <u>The designations used in schedules</u> and elsewhere to indicate hardware finishes are those listed in ANSI A156.18 "Materials & Finishes Standard" by BHMA, including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
 - 1) <u>Rust-Resistant Finish:</u> For iron and steel base metal, required for exterior work and in areas shown as "High Humidity" areas (and also when designed with the suffix-RR), provide 0.2 mil thick cooper or zinc chromated coating on base metal before applying brass, bronze, nickel or chromium plated finishes.

PART 3 – EXECUTION

INSTALLATION:

- A. <u>Mount hardware units</u> at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, ADA and except as may be otherwise directed by the Architect.
- B. <u>Install each hardware item</u> in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces, which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do no install surface-mounted items until finishes have been completed on the substrate.
- C. <u>Set units level</u>, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. <u>Drill and tap and countersink</u>, units, which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. <u>Set thresholds</u> for exterior doors in full bed of butyl rubber or polyisobutylene mastic sealant.

ADJUST AND CLEAN:

- A. <u>Adjust and check</u> each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units, which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. <u>Clean adjacent surfaces</u> soiled by hardware installation or by painters or other trades while working in the building.
- C. <u>Final Adjustment:</u> Wherever hardware installation is made more than one (1) month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment after these units have been balanced.
- D. <u>Instruct Owner's Personnel</u> in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.
- E. <u>Continued Maintenance Service:</u> Approximately six (6) months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct the Owners' Personnel in recommended additions to the maintenance procedures. Replace hardware items, which have deteriorated or failed due to faulty design, material or installation of hardware units. Prepare a written report of current and predictable problems (of a substantial nature) in the performance of the hardware.

HARDWARE SETS

HARDWARE SET 1: Exterior, Storefront, Pair Doors: 100A 110B 100C 100D 121A 121B

- 3 PR Hinges
- 1 Removable Mullion
- 2 Pulls
- 1 Rim Exit Device w/ Keyed Cylinder
- 1 Rim Exit Device
- 2 Closers
- 2 Overhead Stops
- 2 Sweeps
- 1 Threshold
- 2 Weatherstrips
- 6 Silencers

HARDWARE SET 2: Exterior, Storefront, Single Doors: 130A

- 1.5 PR Hinges
- 1 Pull
- 1 Rim Exit Device w/ Keyed Cylinder
- 1 Closer
- 1 Overhead Stop
- 3 Silencers
- 1 Sweep
- 1 Threshold
- 1 Weatherstrip
- 1 Drip Cap

HARDWARE SET 3: Exterior, Hollow Metal, Pair

Doors: ES1A ES2A

- 3 PR Hinges
- 1 Removable Mullion
- 2 Pulls
- 1 Rim Exit Device w/ Keyed Cylinder
- 1 Rim Exit Device
- 2 Closers
- 2 Overhead Stops
- 2 Sweeps
- 1 Threshold
- 2 Weatherstrips
- 1 Drip Cap
- 6 Silencers

HARDWARE SET 4: Interior, Wood, Pair, 90 min. rated, Hold Open Doors: 110F

- 2 Continous Hinges
- 2 Pulls
- 1 Storeroom Lock
- 2 Overhead Stops
- 1 Seal

HARDWARE SET 5: Interior, Wood, Pair, Hold Open Doors: 110A 110B 110C 110D 113G

- 2 Continous Hinges
- 2 Pulls
- 1 Vertical Rod Exit Device with Fire Latch Less Bottom Rod
- 1 Vertical Rod Exit Device Less Bottom Rod
- 2 Closers
- 2 Overhead Stops
- 2 Magnetic Holder
- 1 Seal

HARDWARE SET 6: Interior, Wood, Pair, Hold Open, 90 min. rated Doors: 120A

- 2 Continous Hinges
- 2 Pulls
- 1 Vertical Rod Exit Device with Fire Latch Less Bottom Rod
- 1 Vertical Rod Exit Device Less Bottom Rod
- 2 Closers
- 2 Overhead Stops
- 2 Magnetic Holder
- 1 Seal

HARDWARE SET 7: Interior, Wood, Single, Sound Rated

Note: Door and Hardware to have an STC Rating of 45 minimum Doors: 130B 134 135 137 138

- 1.5 PR Hinges
- 1 Office Lock
- 1 Closer
- 1 Overhead Stop
- 3 Silencers
- 1 Soundproof Sweep
- 1 Soundproof Seal

HARDWARE SET 8: Interior, Wood, Single Doors: 102A 102B 120B

- 1.5 PR Hinges
- 1 Office Lock
- 1 Closer
- 1 Overhead Stop
- 3 Silencers

HARDWARE SET 9: Interior, Wood, Single Doors: 108 133

- 1.5 PR Hinges
- 1 Push Plate
- 1 Plull Plate
- 1 Privacy Lock
- 1 Closer
- 1 Overhead Stop
- 3 Silencers

HARDWARE SET 10: Interior, Wood, Single Doors: 105 109 116 121C 125 132 136 139

- 1.5 PR Hinges
- 1 Storeroom Lock
- 3 Silencers
- 1 Floor Stop

HARDWARE SET 11: Interior, Hollow Metal, Pair

Doors: 200 201

- 3 PR Hinges
- 1 Removable Mullion
- 2 Pulls
- 2 Closers
- 2 Overhead Stops
- 2 Sweeps
- 1 Threshold
- 6 Silencers

HARDWARE SET 12: Interior, Hollow Metal, Single, 90 min. rated Doors: 112A

- 1.5 PR Hinges
- 1 Pulls
- 1 Rim Exit Device w/ Keyed Cylinder
- 1 Rim Exit Device
- 1 Closers
- 1 Overhead Stop
- 6 Silencers
- 1 Seal

HARDWARE SET 13: Interior, Wood, Single Doors: 106A 106B 107A 107B

- 1.5 PR Hinges
- 1 Push Plate
- 1 Pull Plate
- 1 Passage Lock
- 1 Closer
- 1 Overhead Stop
- 3 Silencers

HARDWARE SET 14: Interior, Wood, Single, 90 min. rated Doors: 110E ES2B

- 1.5 PR Hinges
- 1 Pulls
- 1 Rim Exit Device w/ Keyed Cylinder
- 1 Rim Exit Device
- 1 Closers
- 1 Overhead Stop
- 6 Silencers
- 1 Seal

HARDWARE SET 15: Interior, Wood, Pair, Hold Open

Doors: 115 139

- 2 Continous Hinges
- 1 Removable Mullion
- 2 Pulls
- 1 Storeroom Lock
- 2 Closers
- 2 Overhead Stops
- 6 Silencers
- 1 Seal

HARDWARE SET 16: Interior, Wood, Pair, Hold Open Doors: 120C

- 2 Continous Hinges
- 1 Removable Mullion
- 2 Pulls
- 1 Office Lock
- 2 Closers
- 2 Overhead Stops
- 6 Silencers
- 1 Seal

HARDWARE SET 17: Interior, Wood, Pair, Hold Open Doors: 113E

- 2 Continous Hinges
- 1 Removable Mullion
- 2 Pulls
- 1 Passage Lock
- 2 Closers
- 2 Overhead Stops
- 6 Silencers
- 1 Seal

HARDWARE SET 18: Interior, Hollow Metal, Single Doors: 180 181 182

- 1.5 PR Hinges
- 1 Storeroom Lock
- 3 Silencers
- 1 Floor Stop

HARDWARE SET 19: Interior, Wood, Single, 90 min. rated Doors: 112B 113A 113B 113C

- 1.5 PR Hinges
- 1 Office Lock
- 1 Closer
- 1 Overhead Stop
- 3 Silencers

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

REFERENCE SPECIFICATIONS

- A. Work under this section shall be governed by the current editions of the following standards and specifications to the extent that they are applicable:
 - 1. Glass shall conform to Federal Specifications DD-G-451C. Qualities to be the highest of their categories.
 - 2. Installation shall conform to the requirements of the Flat Glass Jobbers Association.

APPROVED SUPPLIERS

- A. Glass:
 - 1. Guardian Industries.
 - 2. American Saint-Gobain (ASG)
 - 3. Libbey-Owens-Ford Company (LOF)
 - 4. Pittsburgh Plate Glass Company (PPG)
 - 5. American Flat Glass Company (AFG)

GLASS & GLAZING TYPES

- A. Provide all glass and glazing with the manufacturer's label intact. Do not remove labels until glass and glazing has been installed and inspected.
- B. Exterior glass shall be:
 - 1. 1" thick tempered insulated glass
 - 2. PPG Solarban 60 (3) SolarBronze + Clear
 - 3. Solar Heat Gain Coefficient (SHGC) of 0.28
 - 4. U-Value of 0.27
 - 5. Refer to the drawings for material schedule and locations.
- C. Interior glass shall be 1/4" thick laminated safety glass, clear, with .030 plastic interlayer.
- D. Mirrors shall be installed with continuous polished chrome "J" trim top and bottom and mirror mastic.
- E. Non-framed mirrors shall be 1/4" thick commercial quality polished plate glass with silver backing.

GLAZING PROCEDURES

- A. In pressed steel frames, clean glass and rabbet of dirt, moisture and oil. Apply ample glazing compound, as approved by glass or glazing panel manufacturer, to rabbet. Center glass or glazing panel in frame. Press glass or glazing panel into rabbet allowing 1/8" depth of back putty. Butter continuous stop bead against glass or glazing panel, allowing 1/8" bed of compound between glass or glazing panel face and stop bead. Strike surplus compound from both sides of glass or glazing panel.
- B. Screw on continuous glazing bead furnished by hollow metal door and frame manufacturer. Confirm with General Contractor that interior sides of fixed and applied stops have been painted with final color prior to glass installation.

- C. In aluminum window units use extruded aluminum glazing beads and elastomeric gaskets as furnished by the system manufacturer.
- D. Mirrors shall be installed with continuous polished chrome "J" trim top and bottom and mirror mastic.

PROTECTION & CLEANING

- A. After installation the General Contractor shall take all necessary measures to protect glass surfaces and shall be responsible for final cleaning.
- B. At completion of work and immediately prior to final inspection, remove all dirt, stains, etc., from glass and adjacent finishes. Clean both sides of glass.
- C. Do not use acid solutions or water containing caustic soaps. Use commercial cleaning solutions and methods acceptable to the manufacturers of the glass.

END OF SECTION 08 80 00

SECTION 09 21 13 – PLASTER ASSEMBLIES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

- A. Install plaster veneer as scheduled and otherwise detailed on the drawings
- B. Plastering contractors must visit the site in an effort to obtain a fully defined scope of work. Contractors must provide a detailed scope sheet with their proposals which conveys as clearly as possible their understanding of the scope of work they are offering.

MATERIALS

- A. Metal lathe shall be self-furring diamond mesh type copper alloy galvanized steel having a minimum weight of 3.41 lbs. per sq. yd.
- B. Metal Accessories:
 - 1. Casing beads shall be 24 gauge zinc, No. 66 as manufactured by Penmetal, or equal.
 - 2. Corner beads shall be 26 gauge zinc, No. 1X as manufactured by Penmetal, or equal.
 - 3. Expansion joints shall be 26 gauge zinc, No. 40 as manufactured by USG, or equal.
 - 4. Control joints shall be 26 gauge zinc, No. 75 as manufactured by USG, or equal.
- E. Plaster / Stucco:
 - 1. Mix and install as specified below.

INSTALLATION

- A. Channel erection & lathing:
 - 1. Lathing shall be erected so that finished plaster surfaces shall be true to line, level, plumb, square, etc., without excessive plaster thickness.
 - 2. Accessories shall be straight, plumb, level, square and true before plaster is applied.
- B. Proportioning and mixing of plaster coats:
 - 1. First (Scratch) coat shall be 3 parts Portland cement, 1 part hydrated lime and 5 parts masonry sand.
 - 2. Second (Brown) coat shall be 3 parts Portland cement, 1 part hydrated lime and 9 parts masonry sand.
 - 3. Third (Finish) coat shall be 1 part **WHITE** Portland cement, 2 parts lime and 6 parts screened masonry sand.
- C. Plaster application:

- 1. Apply first (Scratch) coat with sufficient material and pressure to form good full keys on metal lathe or good adhesion to masonry or concrete substrates and to cover well, then scratch to roughen surface. Make sure concrete substrates are thoroughly cleaned and all form oils, curing compounds, etc. have been removed.
- 2. Second (Brown) coat shall be applied after the Scratch coat has set firm and hard, brought to a true and even surface by floating or rodding and left rough and ready to receive finish coat. Dampen the surface of the Scratch coat evenly to obtain uniform suction. Apply Brown coat approximately 3/8" thick in two applications or coats, one immediately following the other.
- 3. Third (Finish) coat shall be applied when the Brown coat is in a dry and cured condition. Remove any loose and projecting particles from Brown coat, then apply a thin Finish coat well ground into Brown coat and completely covering it. Double back and fill out to a uniform surface approximately 1/8" thick, covering areas in one operation to eliminate jointing. Trowel three or four times before starting to texture. Texture shall be in accordance with sample applied on the job by Plastering Contractor for Architect's approval. Total thickness of all three coats shall not be less that 7/8".

CLEANING UP

A. Upon completion of the work, remove rubbish, debris, scaffolding and tools and leave spaces beneath and around plaster work broom clean

END OF SECTION 09 21 13

SECTION 09 21 16 – GYPSUM BOARD ASSEMBLIES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

REFERENCE SPECIFICATIONS

- A. The Standard Specifications of the Gypsum Drywall Contractors International (GDCI) and the requirements of ASA No. A97 1 are hereby made part of these specifications. Requirements stated below which may differ from those in the reference specifications shall take precedence.
- B. Component Design: Compute structural properties of studs and joists in accordance with "Specification for Design of Cold-Formed Steel Structural Members" latest edition, as published by the American Iron & Steel Institute (AISI).
- C. Codes and Standards:
 - 1. "Structural Welding Code Sheet Steel", AWS D1.3 as published by the American Welding Society (AWS).
 - 2. "Recommended Practices for Resistance Welding Coated Low Carbon Steels", AWS C1.3, as published by the American Welding Society.

GRADES & FINISH OF STEEL

- A. For 16-gage and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 psi and conform to ASTM A 446 and/or A 570.
- B. For I8-gage and lighter units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 33,000 psi and conform to ASTM A 446 and/or A 570.
- C. Provide galvanized finish to all metal framing components complying with ASTM A 525 for minimum G60 coating.

SUBMITTALS

- A. Product Data: Submit manufacturer's product information and installation instructions for each item of coldformed framing and accessories.
- B. Shop Drawings: Submit shop drawings for all coldform metal framing used to support exterior cladding and used as loadbearing support for any floor or roof areas. Shop drawings shall indicate placing of all framing members showing type, size, gage, number, location and spacing. They shall also indicate supplemental strapping, bracing, splices, bridging, accessories and details required for proper installation. Shop drawings must indicate type of fastening system used along with size and number of fasteners.
 - 1. Weleded connections shall show size ans length of welds for all components.
 - 2. Screwed connections shall show type, size, and number of screws for all connections. Submit manufacturer's data giving strength values for screws used.

Shop drawings submitted must be prepared under the supervision of and selaed by a registered professional engineer in the state where the project is located. The Engineer of record will not be responsible for coldformed metal framing erected without approved shop drawings.

- C. Calculations: Submit calculations for all coldformed metal framing used to support exterior cladding and used as loadbearing support for any floor or roof areas. Calculations shall indicated sizeing of members supporting the loads as indicated on the drawings and design of connections indicating method of connetion and,
 - 1. size and length of all welds for welded connections.

2. type, size, number and capacity of all screwed connections.

Calculations must be prepared and sealed by a registered engineer in the state where the project is located.

TYPES

- A. Cee "C" Shape Loadbearing and Exterior Cladding Studs:
 - 1. See Architectural and Structural Drawings.
 - 2. Subject to compliance with requirements, manufacturers offering Cee "C" shaped, loadbearing steel studs which may be incorporated in the work include, but are not limited to the following:
 - a. Dietrich Industries
 - b. Bostwick Steel Framing Co.
 - c. Chicago Metallic Corp.
 - d. Inryco/Milcor
 - e. Marino Industries Corp.
 - f. Metal Art Studing
 - g. Monex Corp.
 - h. Texas Lightsteel Products, Inc.
 - i. U.S. Gypsum
 - j. Wheeling Corrugating Co.

MATERIALS

- A. Gypsum wallboard and ceiling products:
 - 1. Exterior sheathing shall be 1/2" thick, 4'-0" x 8'-0" DensGlass Gold Fireguard panels as manufactured by G-P Gypsum, or equal.
 - Interior wall and ceiling board shall be 5/8" thick, Type X Fire-Shield, 4'-0"x 8'-0" or 12'-0" panels, with tapered edges as manufactured by Gold Bond, or equal. Use water-resistant Type X "green board" in restroom walls and at mop sinks.
 - 3. Interior Impact Resistant wall shall be 5/8" High Impact XP, 4'-0"x 8'-0" or 12'-0" panels, with tapered edges as manufactured by Gold Bond, or equal.
 - 4. Interior Sound Resistant wall shall be 5/8" Soundbreak Impact XP, 4'-0"x 8'-0" or 12'-0" panels, with tapered edges as manufactured by Gold Bond, or equal.
- B. Metal stud and joist framing components:
 - 1. Metal studs or other cold rolled members in all exterior walls shall be sizes as indicated on the drawings and be galvanized sections as specified or scheduled on the structural drawings as manufactured by Unimast Inc, or equal. If not specifically noted or scheduled on structural drawings to the contrary all exterior studs shall be 16 gauge.
 - 2. Metal studs for all suspended furrings at ceilings shall be sizes as indicated on the drawings and be 16 gauge, galvanized members with 2" flanges as manufactured by Unimast Inc., or equal.
 - 3. Metal studs for full height shaft walls, shall be 4" C-H studs, 20 gauge, galvanizd members as manufactured by Unimast Inc., or equal.
 - 4. Metal studs in interior walls running full height, and framing walls with ceramic tile finish shall be sizes as indicated on the drawings and be 20 gauge members with 1 3/8" flanges as manufactured by Unimast Inc., or equal.
 - 5. All other metal studs in interior walls shall be sizes as indicated on the drawings and be 25 gauge members with 1 1/4" flanges as manufactured by Unimast Inc., or equal.

- 6. Header and beam joists and ceiling framing shall be as noted specifically on the drawings or 6", 16 gauge, galvanized members with widest flanges that will fit in width of wall when set side by side as manufactured by Unimast Inc., or equal.
- 7. Track shall be galvanized deep leg sections in same width and gauge as studs or joists as manufactured by Unimast Inc., or equal.
- 8. Horizontal wall bridging shall be 1-1/2", 16 gauge, galvanized CRC (cold-rolled channel) sections as manufactured by Unimast Inc., or equal.
- 9. Screws shall be type "S" self-drilling drywall screws.
- 10. All other fasteners not specifically noted on the plans shall be weather and corrosion resistant suitable for substrates to which metal members are being attached.
- C. Suspended drywall ceiling components:
 - 1. DGL-26 1 1/2" face main tees, heavy duty classification 1 1/2" high x 144" long, integral reversible splice with knurled face and DGLW-424 cross tee sections 1 1/2" high x 48" long as manufactured by USG or equal.
 - 2. DGWM-24 wall molding 1" x 1 1/2" x 144" long, as manufactured by USG or equal.
 - 3. Hanger wire shall be minimum 12 gauge annealed steel, galvanized.
 - 4. Screws shall be type "S" self-drilling drywall screws.
- D. Metal hat section ceiling stripping:
 - 1. HW-3100, 22 gauge, 1 1/2" high galvanized hat sections (HS-1) as manufactured by MBCI.
- E. Accessories:
 - 1. Corner beads shall be "Dur-a-Bead" no. 103 with 1-1/4" x 1-1/4" flanges as manufactured by United States Gypsum Company, or equal.
 - 2. Casing beads shall be "Sheetrock" series no. 200-A, "J" shaped, channels as manufactured by United States Gypsum Company, or equal.
 - 3. Control joints shall be "Sheetrock", zinc, no. 093 as manufactured byUnited States Gypsum Company, or equal.
 - 4. Drywall revels shall be as detailed on drawings and manfucatured by Fry Reglet Corporation.
- F. Sealants:
 - 1. Concealed acoustical sealants shall be rubber based, permanently flexible, non-skinning and non-hardening as manufactured by Tremco, Pecora, Presstite Division of Interchemical Corp., or equal.
 - 2. Exposed acoustical sealants shall be a synthetic resin, paintable compound as manufactured by Tremco, Pecora, Presstite Division of Interchemical Corp., or equal.

INSTALLATION

- A. Steel wall framing:
 - 1. Install continuous runners (tracks) at partition heads, bases and wherever partition ends terminate against surfaces of other materials. Secure runners (tracks) to other materials with proper fasteners at 24" o.c. maximum.
 - 2. Install all studs at 16" o.c. maximum, with studs located no more than 2" from ends of all partition runs. Provide double studs (min. 20 gauge) at jambs of all door and window openings.
 - 3. Install a minimum of two horizontal runs of CRC (cold rolled channels) through studs as stiffeners in partitions not exceeding 10'-0" in height. Provide a minimum of three rows of stiffeners in partitions greater than 10'-0" in height.
 - 4. All studs and wallboard shall terminate a minimum of 12" above ceilings. Refer to plans to identify walls and framing which is full height from floor to bottom of structure above.

- 5. Brace top of non-full height partitions at approximately 45 degrees using stud material to structure above at 4'-0" o.c. maximum and at jamb studs on each side of door frames. Brace full height walls similarly from a point just above the ceiling to the structure above.
- 6. Fasten suspended ceiling furrings using stud material braced continuous horizontally between structural joists and beams. Do not screw suspended furrings to metal deck above.
- 7. Install lateral and diagonal racking bracing as per manufacture's recommendations and if noted on drawings.
- 8. Fastening of all components shall be with self-drilling screws or welding. Screws shall be of sufficient size to insure the strength of the connection. Wire tying of components shall not be permitted. All welds shall be touched up with a zinc-rich paint.
- B. Gypsum wall and ceiling board:
 - Install wall board vertically with joints centered over studs. Stagger joints on opposite sides of wall. Attach to studs and floor and ceiling runners with 1" long drywall screws at maximum 8" o.c. along edges of boards and maximum 12" o.c. in the field of the boards. For installation of second layer, install same as described above staggering joints from first layer using 1-5/8" long drywall screws at maximum 8" o.c. along edges of boards and maximum 12" o.c. in the field of the boards. Wall board shall be installed as required for 1 Hr. fire rating.
 - 2. Install ceiling board with long dimension perpendicular to the direction of existing structure. Attach to existing structure same as wall board described above. Existing structure along long edges of panels should fall over solid blocking run between structural memebers. Ceiling board shall be installed as required for 1 Hr. fire rating.
- C. Ceiling suspension systems:
 - 1. Install in accordance with manufacturer's written instructions to assure system will support itself plus gypsum board, light fixtures, diffuses and other ceiling supported items with a maximum allowable deflection of 1/360 of span.
 - 2. Main tees shall be spaced a maximum of 48" on center and supported by hanger wires spaced a maximum 48" on center and as specified by UL Fire Resistance Directory attaching hanger wires directly to structure above. Cross tees shall be spaced per manufacture's recommendations and as specified by UL Fire Resistance Directory.
 - 3. Provide additional hanger wires at all four corners of light fixtures, at the midspan of cross tees adjacent to light fixtures and at the cut end of cross tees longer than 23' which abut the walls.
 - 4. Provide secondary supports (such as unistrut) to span beneath large ducts and suspended equipment to allow the maintaining of maximum hanger wire spacing specified above. Secondary supports must be hung from building structure above and not from ductwork or equipment. Submit design of secondary supports to maintain maximum allowable deflection of system (1/360 of span) for Architect's approval.
 - 5. Adjust main runner and cross tee spaces as required to accommodate light fixtures, diffusers and other ceiling mounted items. Refer to reflected ceiling plans.

D. Accessories:

- 1. Install corner beads at all external corners. Corner beads must be screw attached, crimp-on attachment is not acceptable.
- 2. Install casing beads at all exposed wall or ceiling board edges and at all locations where wall or ceiling board abuts a different material.
- 3. Install control joints in drywall at no less than 50'-0" o.c., or as shown on plans. Control joints in fire-rated walls, ceilings or assemblies must be designed to maintain the integrity of the fire rating specified and design must be approved by the architect
- E. Sealants:

- 1. Apply acoustical sealants in accordance with manufacturer's printed instructions at the following locations:
 - a. Serpentine beads under floor track and at ceiling track when abutting other construction.
 - b. Between all gypsum board edges and other materials and building elements.
- F. Wood blocking:
 - 1. Install miscellaneous wood blocking to support items requiring secure fastening with in drywall construction.
 - 2. Refer to Section 06 10 00.

SCHEDULES

- A. Finishes in accordance with GA-214 Level:
 - Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, on portions of walls above ceilings between the ceiligns and the tops of walls and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound rated assemblies.
 - 2. Level 2: Embed tape and apply first coat of joint compound to tape, fasteners, and trim flanges where panels are stubtrate for tile.
 - 3. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges where panels are substrate for medium or heavey textures.
 - 4. Level 4 (Standard Finish): Embed tape and apply separate first, fill and finish coats of joint compound to tape, fasteneres, and trim flanges where panels are substrate for light textures, flat paints or wall coverings.
 - 5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coate of joint compound over entire surface where panels are over 10'-0" high and are substrate for gloss or semi-gloss paints

END OF SECTION 09 21 16

SECTION 09 28 13 - CEMENTITIOUS BACKING BOARDS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

SUMMARY

This Section includes the following: Cementitions Wall Backing Boards.

REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A118.9: Specification for Cementitious Backer Units.
- B. American Society for Testing and Materials:
 - 1. ASTM C 954: Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 inch to 0.110 inch in Thickness.
 - 2. ASTM C 1002: Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - 3. ASTM C 1280: Standard Specification for Application of Gypsum Sheathing.
 - 4. ASTM C 1325: Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Interior Substrate Sheets.
 - 5. ASTM D 226: Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
 - 6. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 7. ASTM E119: Test Method for Fire Tests of Building Construction and Materials.
 - 8. ASTM E 1677: Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls.
- C. Gypsum Association:
 - 1. GA 253: Recommended Specification for the Application of Gypsum Sheathing.

SUBMITTALS

- A. General: Submit in accordance with the General Conditions.
- B. Product Data: Submit manufacturer's current technical literature for product specified.

QUALITY ASSURANCE

- A. Fire Resistance Rated Assembly Characteristics: Provide materials and construction identical to those tested in accordance to ASTM E 119 by an independent testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Fire Resistance Ratings: Indicated by design designations from UL Fire Resistance Directory.

DELIVERY, STORAGE, AND HANDLING
A. All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. WARNING: Store all DUROCK Brand Cement Board flat. Panels are heavy and can fall over, causing serious injury or death. Do not move unless authorized.

PART 2 – PRODUCTS

WALL SHEATHING

- A. Cementitious Fiber-Mat Reinforced Sheathing: ASTM C 1325, ANSI A118.9, cementitious backer.
 - 1. Product: Subject to compliance with requirements, provide DUROCK Brand Cement Board by United States Gypsum Company.
 - 2. Type and Thickness: 5/8 inch thick.
 - 3. Size: 48 by 96 inches.

FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and application.
- B. Nails: 11-gauge hot-dipped galvanized roofing nails 1-3/4 inch, 7/16 inch diameter head.
- C. Wood Screws: DUROCK Brand Wood or USG Sheathing WF screws 1-5/8 inch with corrosionresistant coating.
- D. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: DUROCK Brand Steel or USG Sheathing SF steel drill screws [1-5/8 inch] with corrosion-resistant coating.
 - 1. For steel framing less than 0.0329 inch thick, attach sheathing to comply with ASTM C 1002.
 - 2. For steel framing from 0.033 to 0.112 inch thick, attach sheathing to comply with ASTM C 954.

MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberizedasphalt compound, bonded to a high-density, cross-laminated polyethylene film.
- B. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

PART 3 – EXECUTION

INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

- C. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- D. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturers written instructions.
 - 1. Prime substrates as recommended by flashing manufacturer.
 - 2. Lap seams and junctures with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed flange width.
 - 3. Lap flashing over weather-resistant building paper at bottom and sides of openings.
 - 4. Lap weather-resistant building paper over flashing at heads of openings.
 - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

PROTECTION

A. Cementitious Fiber-Mat Reinforced Sheathing: A continuous water barrier must be installed over the studs and lap over the flashing.

END OF SECTION 09 28 13

SECTION 093000 - TILING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

A. Install ceramic tile floors where scheduled on drawings.Install ceramic tile walls where scheduled on drawings.

SUBMITTALS

A. Submit actual material samples of all tile and grout products to Architect for approval prior to ordering and/or installing any material.

MATERIALS & INSTALLATION

- A. All tile materials shall be quality certified by the Tile Council of America, Inc. to equal or exceed standard grade requirements of AMSI Specification 137.1.1980, packed in sealed containers bearing the certification mark of the TCA. Acceptable Tile Manufacturers:
 - 1. American Olean Tile Company Lansdale, Pennsylvania
 - 2. Dal-tile Corporation Dallas, Texas
 - 3. Monarch Tile Corporation San Angelo, Texas
 - 4. United States Ceramic Tile Company East Sparta, Ohio
 - 5. Wilburn Tile Manufacturing Company Little Rock, Arkansas
 - 6. Summitville Tiles, Inc. Summitville, Ohio
 - 7. ArtWalk Tile Rochester, New York
- C. Tile flooring shall be as scheduled on Interior Drawings. Refer to Interior Drawings for color selection and locations. Install flooring in accordance with the Tile Council of America's 2013 Installation Handbook, Specification F113-15, for thin set tile installation over a waterproofing membrane using latex Portland cement mortar. Basis of Specification: Dal-tile Corp.
 - 1. At floors without dropped concrete sub-floor:
 - a. Install floor tile on top of Waterproofing Membrane using Laticrete 4-XLT Multipurpose thin-set mortar.

Waterproofing membrane shall be Laticrete Hydro Ban liquid applied membrane or approved equal. Membrane must be installed in strict accordance with Manufacturer's written instructions for the particular application.

- D. Tile walls shall be as scheduled on Interior Drawings. Provide with bullnosed edge pieces and trim as required. Refer to Interior Drawings for color selection and locations. Install walls and wainscoting over CMU base at showers only as follows:
 - 1. Install ceramic wall using Laticrete 15 Premium Mastic.
- E. Ceramic tile base, where scheduled, shall be coved with square or bullnose top as required. Install using same specification as for wall tile. Refer to Interior Drawings for color selection and locations. Install Laticrete Pro Premium Grout at restroom walls and floors. Install Laticrete Perma Color Select grout at all other areas to receive tile. Refer to drawings for Color selection and manufacturer.Once grout has fully cured, install commercial silicone sealant over all grout, at interior walls and floors.
- H. Refer to Interior Drawings for aluminum transition strips at doors, floor finish changes and at areas where tile meets concrete.

CLEANING & PROTECTION

A. Upon completion of grouting work thoroughly clean all grout film from tile surfaces. Protect floor tile by covering or controlling traffic until work by other trades is complete.

GUARANTEE

A. Furnish a written guarantee from the installer that all work performed under this section shall be free from defects in material and workmanship for a period of 1 year from the date of substantial completion of the project.

END OF SECTION 09 30 00R

SECTION 09 51 13 – ACOUSTICAL PANEL CEILINGS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

GENERAL

- A. All suspended ceiling systems shall be warranted for one (1) year against becoming unserviceable or objectionable in appearance as a result of being defective or non-conforming. Without limiting the warranty scope, the work shall be warranted against:
 - 1. Noticeable sagging of the tile or board.
 - 2. Discoloration, darkening, mildewing of tile, board or exposed metal parts.
 - 3. Rusting or corrosion of the suspension system.
 - 4. Gaps in the tile or board caused by loose or improperly sized units.

SUBMITTALS

A. Furnish one unit of each type of ceiling tile or board along with samples of each type of suspension system.

MATERIALS

- A. Suspension system shall be non-fire rated, Prelude XL 15/16", heavy duty, Exposed Tee System, 24" x 24", and 48" x 48" in white finish as manufactured by Armstrong or equal.
- B. Ceiling panels (unless listed below) shall be 24" x 24" x 5/8", 465 High Durability School Zone Fine Fissured, square edged, HumiGuard Plus, Anti-Mold/Mildew (BioBlock paint onface and back of HumiGuard panels to inhibit or retard growth of mold/mildew on painted surfaces), Impact-Resistant, white finish as manufactured by Armstrong,or equal.
- D. Ceiling panels in Serving 113, Kitchen 114 and Pantry 115 shall be 24" x 24" x 5/8", 2904 High Durability – Shasta, square edged, HumiGuard Plus, Anti-Mold/Mildew (BioBlock paint onface and back of HumiGuard panels to inhibit or retard growth of mold/mildew on painted surfaces), Impact-Resistant, white finish as manufactured by Armstrong, or equal.
- E. Provide hold-down clips at all ceiling panels with-in 10'-0" of an exterior door and in Parish Hall 110.
- F. Refer to drawings for various drywall / acoustical ceiling reveals and edge treatments as manufactured by Fry Reglet Corporation.

WORKMANSHIP

- A. Coordinate and schedule the work with adjoining work provided under other sections of the specifications. Do not close ceilings until all work above ceilings is complete.
- B. Examine the job conditions affecting acoustical installation and report to the Contractor any deficiencies that will prevent proper installation of acoustical work. Do not start installation until such deficiencies have been corrected.

- C. Installation shall conform to the drawings, the applicable specifications of the Acoustical Materials Association, the manufacturer's written instructions and the requirements herein.
- D. The suspension systems shall support the ceiling assemblies shown on the drawings, including lighting fixtures, diffusers, grilles and similar items in the assemblies, with a maximum allowable deflection of 1/360 of span.
- E. Provide secondary supports (such as unistrut) to span beneath large ducts and suspended equipment to allow the maintaining of maximum hanger wire spacing as recommended by the manufacturer. Secondary supports must be hung from the structure above and not from ductwork or equipment. Submit design of secondary supports to maintain maximum allowable deflection of system (1/360 of span) for Architect's approval.
- F. Layout the work in conformance with the reflected ceiling plan. Center patterns in spaces and conform to building modules as indicated. Layout shall provide greatest possible width of perimeter units, with widths being equal at opposite sides of the spaces. Uniform patterns for ceiling units, lighting fixtures, diffusers and grilles shall be provided through cooperation with other installing trades.
- G. Completed ceilings shall be level, true to plane, pattern and module and square with the walls. Joints in tile, board and exposed suspension members shall be parallel and true. Ceiling work shall fit closely to adjoining items and construction, and be free from damaged tile and trim.
- H. Before final inspection and acceptance of the work, clean soil marks from ceilings, replace damaged units, touch-up abrasions on exposed metal with matching paint, and make any necessary adjustments to the systems. Leave the work clean, true to design and free from defects.

END OF SECTION 09 51 13

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

GENERAL

RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

SUMMARY

- A. Section Includes:
 - 1. Resilient base.

SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Delete "Samples for Initial Selection" Paragraph above if colors and other characteristics are preselected and specified or scheduled. Retain first paragraph below with or without above.
- D. Samples for Verification: For each type of product indicated, in manufacturer's standardsize Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.
- E. Product Schedule: For resilient products

QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Mockups: Provide resilient products with mockups specified in other Sections.

DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C)or more than 95 deg F (35 deg C) in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PRODUCTS

RESILIENT BASE

- A. Resilient Base:
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Allstate Rubber Corp.; Stoler Industries.
 - b. Armstrong World Industries, Inc.
 - c. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - d. Endura Rubber Flooring; Division of Burke Industries, Inc.
 - e. Estrie Products International; American Biltrite (Canada) Ltd.
 - f. Flexco, Inc.
 - g. Johnsonite.
 - h. Mondo Rubber International, Inc.
 - i. Musson, R. C. Rubber Co.
 - j. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
 - k. PRF USA, Inc.
 - I. Roppe Corporation, USA.
 - m. VPI, LLC; Floor Products Division.
- B. Resilient Base Standard: ASTM F 1861.
 - 1. See "Resilient Base" Article in the Evaluations for a discussion of material requirement, manufacturing method, and style.
 - 2. Material Requirement: Type TP (rubber, thermoplastic)
 - 3. Manufacturing Method: Group I (solid, homogeneous)
 - 4. Style: Cove (base with toe)
 - 5. Minimum Thickness: 0.125 inch (3.2 mm)
 - 6. Height: 4 inches (102 mm) and 6 inches (153 mm)
 - 7. Lengths: Cut lengths 48 inches (1219 mm) long or coils in manufacturer's standard length
 - 8. Outside Corners: Preformed
 - 9. Inside Corners: Preformed
 - 10. Finish: As selected by Architect from manufacturer's full range
 - 11. Colors and Patterns: As selected by Architect from full range of industry colors

EXECUTION

EXAMINATION

- A. Coordinate requirements specified in other Sections for substrate construction and tolerances to ensure that they are appropriate for resilient products selected.
- B. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- C. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

PREPARATION

- A. Extensive surface preparation is required over substrates from which existing products have been removed. Requirements vary among manufacturers. Insert requirements to suit Project.
- B. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- C. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 - 4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 5. Follow manufacturer's requirements for moisture testing. Retain one or both subparagraphs below.
 - 6. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - 7. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.
- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- E. Do not install resilient products until they are same temperature as the space where they are to be installed.
 - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Delete first subparagraph below if only resilient base is included in this Section.
 - 3. Sweep and vacuum surfaces thoroughly.
 - 4. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Before retaining first paragraph below, verify resilient stair tread manufacturer's written instructions for floor polish. Generally, floor polish is used with most vinyl products.
- E. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.
 - 1. Apply three coat(s).
- F. Cover resilient products until Substantial Completion.

END OF SECTION 09 65 13

SECTION 09 65 16 - COMMERCIAL VINYL FLOORING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.1 <u>REFERENCES</u>

- A. American Association of Textile Chemists and Colorists, AATCC 134 Electrostatic Propensity of Carpets.
- B. ASTM International (ASTM):
 - 1. ASTM C 1028 Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
 - 2. ASTM D 2859 Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
 - 3. ASTM D 3884 Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method), Abrasion Wheels- H18 with 1000grams load.
 - 4. ASTM E 492 Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine.
 - 5. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 6. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 7. ASTM E 989 Standard Classification for Determination of Impact Insulation Class (IIC).
 - 8. ASTM F 137 Standard Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus.
 - 9. ASTM F 386 Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces.
 - 10. ASTM F 925 Standard Test Method for Resistance to Chemicals of Resilient Flooring.
 - 11. ASTM F 970 Standard Test Method for Static Load Limit.
 - 12. ASTM F 1514 Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color Change.
 - 13. ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change.
 - 14. ASTM F 1700 Standard Specification for Solid Vinyl Floor Tile.
 - 15. ASTM F 1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - 16. ASTM F 1914 Standard Test Methods for Short-Term Indentation and Residual Indentation of Resilient Floor Covering.
 - 17. ASTM F 2055 Standard Test Method for Size and Squareness of Resilient Floor Tile by Dial Gage Method.
 - 18. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - 19. ASTM F 2199 Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat.

1.2 SUBMITTALS

- A. Product Data: Provide detailed data on each product to be used including but not limited to the following information as applicable:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance recommendations.
- B. Verification Samples: For each finish product specified, two sets of each type, colors and finish of resilient flooring and accessory required, indicating color and pattern of actual product, including variations, as proof of application compliance.
- C. Closeout Submittals: Submit three copies of the following:
 - 1. Maintenance and operation data includes methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
 - 2. Documentation of warranty specified herein.
- D. Flame Spread Certification: Submit manufacturer's certification that resilient flooring furnished for areas indicated to comply with required flame spread rating has been tested and meets or exceeds indicated or required standard.

1.3 QUALITY ASSURANCE

- A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, sheen and finished appearance are approved by Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Flooring material and adhesive shall be acclimated to the installation area for a minimum of 48 hours prior to installation.
- C. Store cartons of tile products flat and squarely on top of one another, not on edge.
- D. Store tubes of feature strips and borders in a horizontal position. Storage in a vertical or inclined position causes uneven weight distribution, which will spaghetti the ends of the feature strips. Store all tubes laying flat.

1.5 PROJECT CONDITIONS

- A. Environmental Requirements/Conditions: In accordance with manufacturer's recommendations. Areas to receive flooring shall be clean, fully enclosed, weather tight with the permanent HVAC set at a uniform temperature of at least 65 degrees F (18 degrees C) and less than 85 degrees (30 degrees C) 48 hours prior to and during and for not less than 48 hours after installation. The flooring material shall be conditioned in the same manner prior to installation.
- B. Close spaces to traffic during resilient flooring installation and for a period of time after

installation as recommended in writing by the manufacturer.

- C. Install resilient flooring materials and accessories after other finishing operations, including painting, have been completed.
- D. Where demountable partitions and other items are indicated for installation on top of sheet resilient flooring material, install flooring material before these items are to be installed.
- E. Concrete substrates should not exceed 82 percent RH and/or 6 lbs. X 24 hrs. X 1000 sf. moisture vapor emissions rate tested in accordance to ASTM F 2170 and ASTM F 1869.
- F. Store tubes of feature strips and borders in a horizontal position. Storage in a vertical or inclined position causes uneven weight distributions, which will spaghetti the ends of the feature strips. Store all tubes laying flat.

1.6 WARRANTY

- A. Warranty Period: Manufacturer's standard warranty against manufacturing defects and wearing for flooring and as follows:
 - 1. Van Gogh Range:
 - a. 10 year commercial warranty.
 - b. 15 year residential warranty.

1.7 EXTRA MATERIALS

- A. Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 closeout submittals requirements.
 - 1. Quantity: Furnish quantity of flooring units equal to 2 percent of amount installed. Karndean Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Mohawk Industries, which is located at: 160 South Industrial Blvd, Calhoun, GA 30701; Toll Free Tel: 800-241-4494

Email: mohawkind@mohawkind.com Web: www.mohawkind.com

- B. Substitutions: Permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00 Substitution Procedures.

2.2 RESILIENT TILE FLOORING

- A. Resilient Tile Flooring: Global Entry Planks by Mohawk Industries.
 - 1. Dimensions: 18 inches by 36 inches
 - 2. Material Compliance: ASTM F1700, BS EN 649, BSEN 654.
 - a. Reaction to Fire: ASTM E 662, ASTM E 648.
 - b. Slip Resistance: ASTM D 2047, R10 classification.

- 3. Wear Layer Thickness: 20 mil (0.5 mm).
- 4. Tile Thickness: 2.5mm.
- 5. Edge: Non-beveled edge.
- 6. Item Number and Name:
 - a. SERENO
 - b. ANTIEK

2.3 ACCESSORIES

- A. Adhesive: Manufacturer's recommended adhesive as follows.
 - 1. M95.0 Resilient Flooring Adhesive
 - a. Provide manufacturer's recommended concrete floor sealer for high moisture applications.
 - 2. M700 Pressure Sensitive Adhesive
 - a. Provide manufacturer's recommended concrete floor sealer for high moisture applications.
- B. Portland based cementitious base leveler. Gypsum based not acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect floor to be installed immediately upon arriving at job site; perform a moisture test.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. The installation of the resilient flooring shall not begin until the work of all other trades has been completed, particularly wet and overhead trades.
- E. Areas to receive flooring shall be adequately lighted during all phases of the installation process.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Using Portland based cementitious base leveler fill and cover all seams, nail heads, voids, cracks, and expansion joints. Achieve smooth, even, firmly attached substrate for best finish results. Gypsum based underlayment not acceptable with Karndean Luxury Vinyl Flooring unless it is first properly prepared.
 - 1. Encapsulate the gypsum with a premium latex primer/sealer.
 - 2. Float with a Portland cement compound using a latex additive (as recommended by the manufacturer) instead of water.
 - 3. Once substrate levelness is achieved continue with the next step.
- C. Apply concrete floor sealer to substrate in accordance with manufacturer's recommendations.

- D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- E. Concrete Substrates: The Contractor shall verify to the Owner and installer a minimum of 30 days prior to the scheduled resilient flooring installation the following substrate conditions. All substrate testing shall be documented and submitted to the Architect and Owner before commencement of the flooring installation.
 - 1. Verify that substrates are dry, free of debris, and that all curing compounds, sealers, and hardeners have properly cured.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

3.3 INSTALLING RESILIENT TILES AND PLANKS

- A. General:
 - 1. Permanent HVAC system shall be turned on and set to a minimum of 65 degrees F (20 degrees C) for a minimum of 48 hours prior to, during and 48 hours after installation. After the installations, the maximum temperature should not exceed 125 degrees F (37 degrees C).
 - 2. All products must be allowed to acclimate at least 24 to 48 hours before installation. This means product must be placed in the same room as the install that is taking place and removed from its factory packaging.
 - 3. Material shall be visually inspected prior to installation.
 - 4. Ensure that all recommendations for sub-floor and jobsite conditions are met prior to beginning the installation. Once the installation is started, Contractor and installer have accepted those conditions.
 - 5. Install in accordance with manufacturer's installation instructions for each product type and application specified.
- B. Layout and Installation:
 - 1. In order to achieve a random natural wood look, take planks and cut nominal lengths to be used on the first course; example: 10 inches (254 mm), 40 inches (1016 mm), 15 inches (381 mm), 25 inches (635 mm), 8 inches (203 mm). At the end of the first course, all cut planks remaining should be used on the next course. Position planks so the end seams are no closer than the width of the plank being installed. Maintain this approach to staggering the planks throughout the entire installation.
 - 2. Center tiles or planks in rooms and hallways so borders are not less than half a tile or plank when possible.
 - 3. Cut edges shall always be installed against a wall.
 - 4. Install using tile and plank installation techniques recommended by manufacturer.
 - 5. Install tiles, planks, borders and feature strips in locations and configurations indicated on the Drawings.
- C. Adhesive Application:
 - 1. Any spread glue has to be covered with material and rolled within the recommended time frame described on the adhesive container.

- 2. If troweled adhesive skims over, scrape up and reapply.
- 3. Install in accordance with adhesive manufacturer's recommendations.
- 4. Refer to manufacturer's literature for selection criteria for trowel size, type.
- 5. Using proper trowel size, apply adhesive in accordance with label on adhesive.
- 6. Spread a 4 inch (100 mm) wide band of adhesive around the perimeter of the area designated as an extreme condition area.
- 7. An additional 4 inch (100 mm) band should be spread at approximately 10 foot (3 m) intervals.
- 8. For transitional areas, from loose lay to another floor covering of a different height, a 4 inch (100 mm) band of adhesive should be spread across the length of the transition.

3.4 <u>CLEANING</u>

- A. Wipe off any adhesive on floor as installation proceeds. Wait 48 hours before applying the cleaning and maintenance products.
- B. Prior to installation of permanent fixtures or furniture, remove all dirt, debris, or residual adhesive and clean the floor. If desired, a protective coating may be applied at this time. Specific products and instructions are available from the manufacturer.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 **MAINTENANC**E

A. Comply with manufacturers instructions for proper cleaning and maintenance of the products.

END OF SECTION 09 65 16

SECTION 09 65 66 - RESILIENT ATHLETIC FLOORING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

A. SUMMARY

1. Section Includes: Sheet vinyl resilient athletic flooring.

B. ACTION SUBMITTALS

- 1. Product Data: For each type of product indicated.
- 2. Manufacturer Certifications:
 - a. Provide certification that accurately identifies the Original Equipment Manufacturer (OEM) of flooring furnished for this project including manufacturer's name, address and factory location.
 - i. Suppliers of Private-Label flooring for this project must identify themselves as such and fully disclose the OEM information listed above.
 - ii. All "manufacturer" requirements in these specifications must be complied with by the OEM, including warranties, certifications, qualifications, product data, test results, environmental requirements, performance data, etc.
 - b. Provide ISO 9001 certification for the OEM of the specified products.
 - c. Provide ISO 14001 certification for the OEM of the specified products.
- 3. Laboratory Test Results:
 - a. Provide certification of testing per ASTM F2772-11 and the product being furnished complies with the ASTM Indoor Sport Floor Classification specified for this project. Third-party certification required; sales literature is not sufficient.
- 4. Shop Drawings: Showing installation details and locations of borders, patterns, game lines, locations of floor inserts and seams.
- 5. Samples:
 - a. Manufacturer's color chart for selection of available floors with a minimum of 13 standard colors available, including 7 wood visuals.
 - b. Color samples:
 - i. Wood visual samples Minimum 24 inches by 36 inches to show that the appearance of wood plank pattern complies with these specifications
 - ii. Solid color samples: Minimum 6 inches by 8 inches.
- C. INFORMATIONAL SUBMITTALS
 - 1. Qualification Data:
 - a. For a qualified resilient athletic flooring Manufacturer.
 - b. For a qualified resilient athletic flooring Installer.

D. CLOSEOUT SUBMITTALS

- 1. Submit three copies of the following:
 - a. Manufacturer maintenance instructions.
 - b. Manufacturer material warranty.
 - c. Installer installation warranty.

E. QUALITY ASSURANCE

- 1. Manufacturer Qualifications:
 - a. ISO 9001 Certified.
 - b. ISO 14001 Certified.
 - c. At least ten years active experience in the manufacture and marketing of indoor resilient athletic flooring.
 - d. A provider of authorized installer training.
- 2. Installer Qualifications:
 - a. At least five years experience in the installation of resilient athletic flooring.
 - b. Experience on at least five projects of similar size, type and complexity as this project.
 - c. Employer of workers for this Project who are competent in techniques required by manufacturer for resilient athletic flooring installation indicated.
- Fire Test Characteristics: As determined by testing identical products according to ASTM E 648, Class 1, by a qualified testing agency acceptable to authorities having jurisdiction.
- 4. Athletic Performance Properties: Comply with ASTM F 2772-11 Performance Level Class 2 for force reduction, ball bounce, vertical deformation and surface friction.

F. DELIVERY, STORAGE, AND HANDLING

- Store flooring and installation materials in protected dry spaces, with ambient temperatures maintained within range recommended by manufacturer, but not less than 55 deg F (13 deg C) nor more than 85 deg F (29 deg C).
- 2. Store the indoor resilient athletic surfacing rolls in an upright position on a smooth flat surface immediately upon delivery to Project.

G. FIELD CONDITIONS

- 1. Product Installation:
 - Maintain temperatures during installation within range recommended by manufacturer, but not less than 65 deg F (18 deg C) in spaces to receive flooring 48 hours prior, during and 48 hours after installation.

- After installation, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).
- c. Prohibit traffic during flooring installation and for at least 48 hours after flooring installation.
- 2. Install flooring only after other finishing work, including painting and overhead work, has been completed.

H. WARRANTY

- 1. Special Limited Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace sports flooring that fails within specified warranty period.
 - a. Material warranty must be direct from the product manufacturer.
 - i. Material warranties from separate or third party insurance providers are not valid.
 - ii. Material warranties from private label distributors are not valid.
 - b. Failures include, but are not limited to, the following:
 - i. Material manufacturing defects.
 - ii. Surface wear and deterioration to the point of wear-through.
 - iii. Failure due to substrate moisture exposure not exceeding 90 percent relative humidity when tested according to ASTM F2170 or 8 pounds moisture vapor emission rate when tested according to ASTM F1869.
 - c. Warranty Period:
 - i. For material and manufacturing defects and surface wear-through: 15 years from date of Substantial Completion.
 - ii. For moisture vapor tolerance: 1 year from date of Substantial Completion.
- 2. Special Limited Warranty: Installer's standard form in which installer agrees to repair or replace sports flooring that fails due to poor workmanship or faulty installation within the specified warranty period.
 - a. Warranty Period: Two years from date of Substantial Completion.

I. ENVIRONMENT AND INDOOR AIR QUALITY

- 1. Indoor Air Quality Certification:
 - a. Flooring products must be FloorScore® Certified.
 - i. FloorScore® certification proves compliance with the volatile organic compound emissions criteria of the California Section 01350 standard.
 - ii. FloorScore® certification proves compliance with the testing and product requirements of the California Department of Health Services "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - iii. FloorScore® documentation must include certificate number for specified product.
 - b. Manufacturer's certification of factory applied permanent Bacteriostatic and Fungicidal Treatment throughout the flooring material, not only on its surface, designed to improve indoor air quality and reduce asthma and allergy risks associated with bacterial and mold growth.

- 2. Manufacturer Certification of Environmental Procedures:
 - a. Original Equipment Manufacturer's (OEM) ISO 14001 Certification
- J. COORDINATION
 - 1. Coordinate layout and installation of flooring with other gymnasium equipment.

PART 2 - PRODUCTS

A. SHEET VINYL ATHLETIC FLOORING

- 1. Basis-of-Design Manufacture: Subject to compliance with requirements, provide Gerflor Taraflex Multi-Use 6.2 Sports Flooring installed with full-spread adhesive.
 - a. Other Manufactures: Equal or better
- 2. Substitution Limitations:
 - a. Approval by Architect of other manufacturers does not relieve Contractor of responsibility to provide products which comply with all requirements of this specification including full-spread adhesive installation.
- 3. Product Description: Foam-backed sheet vinyl flooring designed for fully adhered athletic flooring applications.
 - a. Overall Thickness: Not less than 0.24 inch (6.2 mm)
 - b. Wear-Layer Thickness: Not less than 0.08 inch (2.1 mm)
 - c. Foam Backing: Very high density closed cell foam.
 - d. Fiberglass Grid Layers: Three-ply fiberglass layer including double layer of woven fiberglass grids and a third layer of non-woven fiberglass veil for triple-strength dimensional stability and indentation resistance. Systems with single layer of fiberglass grid or only a non-woven fiberglass veil not accepted.
 - i. Basis-of-Design Product: Gerflor D-Max+.
 - e. Seaming Method: Heat welded.
 - f. Adhesive Method:
 - i. Full-spread adhesive coverage to completely adhere flooring to substrate.
 - ii. Complete adhesive coverage to eliminate the possibility of gaps or space between the slab and flooring material where moisture could accumulate and create an environment conducive to mold growth.
 - iii. Flooring to be fully adhered to the concrete slab in all locations eliminating the possibility of waves or wrinkles forming caused by the floor shifting, moving or by rolling loads displacing it.
 - g. Traffic-Surface Texture: Wood visual shall have wood grain embossed texture for a genuine wood appearance and Solid colors to have "pebbled" embossed texture for an attractive appearance.
 - h. Bacteriostatic and Fungicidal Treatment: Manufacturer's factory-applied permanent treatment throughout the flooring material which can improve indoor air quality and reduce asthma and allergy risks associated with bacterial and mold growth.
 - i. Basis-of-Design Product: Gerflor Sanosol

- i. Applied Finish: Manufacturer's, factory-applied, permanent and UV-cured.
 - i. No-Wax finish: Published product literature identifying factory applied finish as, "No-Wax-Just clean and rinse"
 - ii. Basis-of-Design Product: Gerflor Protecsol
- j. Field-Applied Finishes: None required and not allowed.
- k. Roll Size:
 - i. Roll Width: Rolls to be a minimum width of 59 inches (1.5 m) wide.
 - ii. Roll Length: Wood visual rolls to be a minimum length of 67 feet, 3 inches (20.5 m).
- I. Color and Pattern:
 - i. As selected by Owner from manufacturer's standard colors and patterns.
 - ii. Wood pattern shall accurately simulate the true visual appearance of natural athletic wood strip flooring.
 - 1. Pattern shall replicate random-length stock by simulating non-uniform board lengths ranging from 18 inches to 48 inches with a maximum board width of 2-1/2 inches.
 - 2. Wood pattern shall not include a dark line simulating edges or ends of individual boards.
 - 3. Surface texture shall simulate realistic wood grain and not be raised or "pebbled" embossing.
- 4. Performance Criteria:
 - a. ASTM F 2772-11 Indoor Sport Floor Standard:
 - i. Provide certification of compliance for the four ASTM F2772 Indoor Sport Floor Standard performance categories:
 - 1. Shock Absorption/Force Reduction:
 - a. Class C2 (22% to 33%). Pass
 - 2. Ball Bounce:
 - a. Minimum 90%: Pass
 - 3. Surface effect/Coefficient of Friction:
 - a. Between 80-110: Pass
 - 4. Vertical deformation:
 - a. Maximum 3.5mm: Pass
 - b. Static Load Limit/Residual Indentation:
 - i. ASTM F1303; Pass, Static Load Resistance requirement of less than 0.005 inch of residual indentation as tested per ASTM F 970 at prescribed test load of 175 p.s.i.
 - 1. Less than 0.002 inch residual indentation when tested at 250 p.s.i.
 - ii. EN 1516; Pass, Less than or equal to 0.5 mm.
 - c. Resistance to Rolling Load: EN 1569; Pass.
 - d. Chemical Resistance: ASTM D 543; OK.
 - e. Impact Resistance: EN 1517; Pass.
 - f. Abrasion Resistance: EN ISO 5470; Pass.
 - g. Sound Insulation: EN ISO 717; 18 dB.
 - h. Gloss/Brightness: EN ISO 2813; Pass.
 - i. Organic Emission: ASTM D 5116; Pass
 - j. Fire Performance: ASTM E 648; Greater than 0.45 W/cm2, Class 1.

- k. Surface Maintenance Requirements: No-wax surface requiring only cleaning and rinsing.
- I. Slab Moisture Design Tolerance:
 - i. Maximum relative humidity of 90 percent when tested according to ASTM F 2170.
 - ii. Maximum moisture vapor emission rate of 8 pounds of water per 1000 sq. ft. in 24 hours when tested according to ASTM F1869.

B. ACCESSORIES

- 1. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by athletic flooring manufacturer.
- 2. Adhesives: Water-resistant type recommended by athletic flooring manufacturer for substrate and conditions indicated.
 - a. Basis-of-Design Product: Gerflor Gerfix Spray Adhesive.
 - b. Coverage Type: Full-spread application for 100% coverage.
- 3. Heat Welding Rod: As supplied by indoor resilient athletic flooring manufacturer. Color shall blend with resilient athletic flooring color.
- 4. Game-Line and Marker Paint: Complete system including primer, compatible with flooring and recommended by flooring and paint manufacturers.

PART 3 - EXECUTION

A. EXAMINATION

- 1. Verify the Following:
 - a. The area in which the indoor resilient athletic flooring will be installed is dry, weathertight and in compliance with specified requirements.
 - b. Permanent heat, lighting and ventilation systems are installed and operable.
 - c. Other work, including overhead work, that could cause damage, dirt, dust or otherwise interrupt installation has been completed or suspended.
 - d. No foreign materials or objects are present on the substrate and that it is clean and ready for preparation and installation.
 - e. Tests to verify that the moisture evaporative rate or substrate relative humidity is within the specified ranges.
 - f. The concrete slab surface pH level is within the specified range.
 - g. The concrete slab surface deviation is no greater than 3/16 inch within 10 feet (3.2 mm within 3 m) when measured according to ASTM E 1155.
 - h. The concrete slab complies with ACI 302.2R for concrete design including use of a low-permeance vapor barrier directly beneath the concrete subfloor with sealed penetrations.

B. PREPARATION

- 1. Prepare substrates according to manufacturer's written recommendations to ensure proper adhesion of resilient athletic flooring system.
- 2. Concrete Substrates: Prepare according to ASTM F 710.
 - a. Verify that substrates are dry and free of sealers, curing compounds and other additives. Remove coatings and other substances that are incompatible with adhesives using mechanical methods recommended by manufacturer.
 - b. Alkalinity Testing: Perform pH testing according to ASTM F 710. Proceed with installation only if pH readings are between 7.0 and 8.5.
- Moisture Testing: Perform ASTM F 2170 relative humidity test and proceed with installation only after substrates have maximum relative humidity of 90 percent. Or perform ASTM F 1869 calcium chloride test and proceed with installation only after substrates have maximum moisture-vapor-emission rate of 8 lbs. of water/1000 sq. ft. in 24 hours.
- 4. Use trowelable concrete based leveling and patching compound with the same moisture vapor tolerance as the adhesive to fill depressions, holes, cracks, grooves or other irregularities in substrate.
- 5. Place flooring and installation materials into spaces where they will be installed at least 48 hours before installation. Install flooring materials only after they have reached the same temperature as space where they are to be installed.
- 6. Sand the surface of the concrete slab.
- 7. Sweep and then vacuum substrates immediately before installation. After cleaning, examine substrate for moisture, alkaline salts, grit, dust or other contamination. Proceed with installation only after unsatisfactory conditions have been corrected.

C. SHEET ATHLETIC FLOORING INSTALLATION

- 1. General:
 - a. Comply with resilient athletic flooring manufacturer's installation instructions.
 - b. Take necessary precautions to minimize noise, odors, dust and inconvenience during installation.
 - c. Fit flooring neatly and tightly to vertical surfaces, equipment anchors, floor outlets, and other interruptions of floor surface.
 - d. Extend flooring into toe spaces, door reveals, closets, and similar openings unless otherwise indicated.
- 2. Lay out flooring as follows:
 - a. Minimize number of seams and place them inconspicuous areas.
 - b. Locate seams as shown on approved Shop Drawings
- 3. Adhered Flooring: Attach products to substrates using a full-spread of adhesive applied to substrate to comply with adhesive and flooring manufacturer instructions.

4. Vinyl Sheet Flooring Seams: Finish seams to produce surfaces flush with adjoining flooring surfaces. Comply with ASTM F 1516. Rout joints and use heat welding rod to permanently and seamlessly fuse sections together.

D. GAME LINES AND LOGOS

- 1. Lay out game lines and logos to comply with rules and diagrams published by National Federation of State High School Association for the sports activities indicated.
- 2. Mask flooring at game lines and logos, and apply paint of color indicated to produce clean, sharp and distinct edges.

E. CLEANING AND PROTECTION

- 1. Perform the following operations after completing resilient athletic flooring installation:
 - a. Remove marks and blemishes from flooring surfaces.
 - b. Sweep and then vacuum flooring.
 - c. Damp-mop flooring to remove soiling.
- 2. Protect flooring from abrasions, indentations, and other damage from subsequent operations and placement of equipment, during remainder of construction period.

END OF SECTION 09 65 66

SECTION 09 77 00- REINFORCED FIBERGLASS PANELS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1: GENERAL

SUMMARY

- A. Section Includes: Durable, decorative wall panels with smooth or textured finishes. Mounting hardware, adhesives, accessories and trims.
- B. Related Sections:
 - 1. Division 06 Section: Rough and Finish Carpentry.
 - 2. Division 09 Section: Gypsum Board Assemblies.

REFERENCES

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. ASTM International:
 - 1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM D256 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
 - 3. ASTM D638 Standard Test Method for Tensile Properties of Plastics.
 - 4. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 5. ASTM D2583 Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

SYSTEM DESCRIPTION

A. Performance Requirements: Provide durable, decorative wall panels which have been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 01300 Submittal Procedures Section.
- B. Product Data: Submit manufacturer's product data, storage, handling and preparation requirements and installation instructions.
- C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures. Indicate location and dimension of joints and fastener attachment.
- D. Samples: Submit selection and verification samples for finishes, colors and textures. Submit 2 samples of each type of panel, trim and fastener.
- E. General: Firm experienced in successful production of wall system similar to that indicated for the Project. Quality Assurance/Control Submittals: Submit the following:

- 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- 2. Certificates:
 - a. Submit manufacturer's certificate that products meet or exceed specified requirements.
 - b. Submit certificate of installer's qualifications.
- 3. Manufacturer's Instructions: Manufacturer's installation instructions.
- F. Closeout Submittals: Submit the following:
 - Operations and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 01 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
 - 2. Warranty documents specified herein.

QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have a minimum of 5 years experience with composite wall panel work similar in scope and size to this project.

DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 01 Product Requirements Section.
- B. Lead Time: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
 - 1. Store panels indoors.
 - 2. Lay panels flat. Do not stand panels on edge.
 - 3. Protect panels from moisture.
 - 4. Do not store panels in contact with the floor or against an outside wall.
 - 5. Do not remove protective film from panel surface until after installation (if applicable).
 - 6. Maintain optimum storage conditions of 60-75 degrees F (16-24 degrees C) at 35 55% relative humidity. Avoid extremes in temperature and humidity.
- E. Handling: Remove foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.

PROJECT/SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation and residual moisture from plaster, concrete or terrazzo work has dissipated.
 - Install panels between 60 degrees F 75 degrees F (15 24 degrees C) and relative humidity below 55%, ideally at the same conditions as the room's normal operating temperatures after building is occupied.
 - 3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.
 - 4. Do not install wall system until normal lighting conditions exist. Normal lighting conditions are described as those in place when the project is finished.

- B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
 - 1. Wall, ceilings, floors and openings must be level, plumb, straight, in-line and square

WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

MAINTENANCE

A. Extra Materials: Provide [A recommended percentage of] [Specify percentage.] additional material for use by owner in building maintenance and repair.

PART 2: PRODUCTS

COMPOSITE WALL PANELS

- A. Manufacturer: Nudo
 - 1. Contact: 1500 Taylor Avenue, Springfield, IL 62703; Telephone: (800) 826-4132, (217) 528-5636; Fax: (217) 528-8722; E-mail: info@nudo.com ; website: www.nudo.com
- B. Proprietary Products/Systems: Composite wall & ceiling panels, including the following:
 - 1. FiberLite® FRP Wall Panels:
 - 2. FiberLite: Fiberglass Reinforced Plastic (FRP) panel
- C. Texture: [Smooth,] High Pressure Laminate (HPL): NA Thickness: 0.090"
- D. Fire-Rating Class: [A]
- E. Color: [As Scheduled]
- F. Size: [4 feet x 10 feet (1.2 x 3.0 m)]
- G. Physical Properties:
 - 1. Flexural Strength (ASTM D790): -- psi.
 - 2. Flexural Modulus (ASTM D790): -- psi.
 - 3. Tensile Strength (ASTM D638): -- psi.
 - 4. Barcol Hardness (ASTM D2583): --
 - 5. Izod Impact (ASTM D256): -- ft-lb/in.
 - 6. Surface Burning Characteristics (ASTM E84): Class [A].

PRODUCT SUBSTITUTIONS

A. Substitutions: See Division 01 33 00 for Substitution procedures.

ACCESSORIES

A. Moldings: Coordinating PVC (polyvinyl chloride) molding(s)

PART 3: EXECUTION

MANUFACTURER'S INSTRUCTIONS

- A. Adhesive: Provide panel adhesive as recommended by panel manufacturer.
- B. Trim and Seam Treatment:
 - 1. Manufacturer: Acceptable to panel manufacturer.
 - 2. Manufacturer Designation: Corner molding
 - 3. Material and Color: Color matched acrylic latex caulk.
 - 4. Material and Color: Standard PVC Moldings
- C. Fasteners: Provide appropriate fasteners and accessories as required to properly complete installation.

PREPARATION

A. Comply with the instructions and recommendations of the durable, decorative wall panel manufacturer.

INSTALLATION

- A. General: Prior to installing panels, remove packaging and allow panels to acclimate to room temperature and humidity for at least 48 hours.
 - 1. Wall substrate must be dry and free from dirt, dust, grease and other contaminants. Walls must be flat and even. Remove high spots and fill low spots with material acceptable to panel manufacturer.
 - 2. Remove wallpaper, soluble or loose paint and other foreign matter that might interfere with proper adhesive bond. Painted walls must be prepared to adhesive manufacturer specifications for proper adhesion.
- B. General:
 - 1. Inspect panels for any defects immediately. Do not install panels of unacceptable quality. Field cutting of all wall systems should be accomplished using a circular saw with fine tooth carbide blade.
 - Position panel so that the saw blade enters the finished HPL side first to avoid chipping or damage. Protect decorative laminate face of panel by covering work area, do not remove protective will until after installation.
 - 3. Follow adhesive manufacturer's recommendations for appropriate height of adhesive bead left by trowel and do not allow adhesive to skin over. When interior paneling is on an exterior wall or wet area, provide a barrier sheet and/or follow the adhesive manufacturer's installation recommendations for a secure bond.
- C. Installation Using Aluminum Moldings or PVC Trims:
 - 1. Start in the corner. Mark plumb line 48 1/8 inches from corner.
 - 2. Apply adhesive directly to entire back of composite wall panel using correct trowel with 100% adhesive coverage using crosshatch pattern. Apply adhesive to within 1/2 inch of all edges of panel.
 - 3. Slide panel into molding and withdraw [1/8 inch for PVC moldings] to provide appropriate gap. Align with plumb line.
 - 4. Begin in top corner nearest molding with laminate roller, rolling down and out toward the edge without molding.
 - 5. Continue rolling down and out working across panel away from previously installed panel or initial molding. Remove all trapped air.
 - 6. Install one-piece division bar and caps or next molding by sliding onto panel.
 - 7. Repeat process, working in one direction around room.

- 8. Immediately remove all adhesive residue. To remove, clean with nonabrasive cotton cloth and warm water. If necessary, use a mild nonabrasive detergent. For cleanup with solvent based adhesives, use mineral spirits or acetone to remove residue.
- D. Installation Using Caulk:
 - 1. Plan panel layout so seams are not directly over seams of substrate.
 - 2. Apply adhesive directly to back of composite wall panel with 100% adhesive coverage using crosshatch pattern. Extend adhesive to all edges of panel.
 - 3. Install panel. Place six-penny finishing nails at 1/8 inch (3.2mm) spacing against the panel about 2 feet (610mm) apart to hold panels in place while adhesive sets and provide proper spacing for color caulk. Continue installing panels using this method, leaving nails in place during installation.
 - 4. Remove nails after adhesive sets.
 - 5. Place a narrow piece of masking tape along panel edge from top to bottom, exactly at joint edge. Firmly apply tape to both panels.
 - 6. Fill 1/8 inch (3.2mm) gap between the panels with caulk, making sure gap is completely filled.
 - 7. Tilt caulking tube back from vertical so that tip of tube advances first in direction of travel.
 - 8. Wet finger and smooth bead if necessary.
 - 9. Remove masking tape before bead cures. Clean off excess caulk with damp cloth.
 - 10. Install corner moldings as described in molding instructions.

CLEANING

- A. Clean panel surfaces in compliance with manufacturer's recommendations.
 - 1. Use a clean, damp, nonabrasive cotton cloth and a mild liquid detergent or household cleaner.
 - 2. Rinse with clean water using a clean, nonabrasive cotton cloth.
 - 3. Dry panels with a soft, clean nonabrasive cotton cloth.
 - 4. Do not use cleaners containing acid, alkali or sodium hypochlorite.

PROTECTION

A. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION 09 77 00

SECTION 09 84 00 - ACOUSTIC ROOM TREATMENTS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

SUMMARY

- A. Section Includes: Cementitious wood fiber plank acoustical wall panel system and installation accessories installed high on walls above masonry in Gymnasium as indicated and detailed on the drawings.
- B. Related Sections:
 - 1. Gypsum Drywall Systems for horizontal furring channels supporting wall panels.
 - 2. Painting & Finishing for field painting of wall panels.

REFERENCES

- A. ASTM International:
 - 1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Ceilings and Interior Systems Construction Association (CISCA):
 - 1. CISCA Code of Practices.

SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Provide acoustical wall panel assembly designed and tested to provide surface burning characteristics (ASTM E84) as follows:
 - a. Flamespread: 0.
 - b. Smoke Developed: 0.
 - 2. Provide acoustical wall panel system which has been manufactured, fabricated and installed to provide Noise Reduction Coefficient (NRC) rating as follows:
 - a. NRC rating: .45

SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit manufacturer's product data and installation instructions.
 - 1. Recommended procedures for normal cleaning and removal of stains including precautions in use of cleaning materials that may be detrimental to surfaces.
- C. Samples: Submit selection and verification samples: 12 inch × 12 inch sample for each wall panel unit required, showing full range of exposed texture to be expected in completed work.

- D. Quality Assurance/Control Submittals: Submit the following:
 - 1. Test Reports: Upon request, submit certified test reports from recognized test laboratories.
 - 2. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

QUALITY ASSURANCE

- A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.
- B. Regulatory Requirements and Approvals: Comply with requirements below.
 - Southern Building Code Congress International (SBCCI): a. SBCCI Report 9406B.
 - International Conference of Building Officials (ICBO):
 a. ICBO Research Report No. 1116.
 - 3. Building Officials and Code Administrators International, Inc. (BOCA): a. BOCA Research Report No. 86-39.
- C. Pre-installation Meetings: General Contractor, Installer and Architect shall meet on site to discuss installation prior to commencement of work.

DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirement Section.
- B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
 - 1. Prevent soiling, physical damage or wetting.
 - 2. Store cartons open at each end to stabilize moisture content and temperature.

PROJECT/SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Do not install acoustical panels until building is closed in and HVAC system is operational.
 - 2. Locate materials onsite at least 24 hours before beginning installation to allow materials to reach temperature and moisture content equilibrium.
 - 3. Maintain the following conditions in areas where acoustical materials are to be installed 24 hours before, during and after installation:
 - a. Relative Humidity: 65 75%.
 - b. Uniform Temperature: 55 70 degrees F (13 21 degrees C).

PART 2 - PRODUCTS

ACOUSTICAL WALL PANEL SYSTEM

A. Manufacturer: Tectum Inc.

- 1. Contact: 105 South Sixth Street, Newark, OH 43055; Telephone: (888) 977-9691, (740) 345-9691; Fax: (800) 832-8869; E-mail:<u>info@tectum.com</u>; website: <u>www.tectum.com</u>.
- 2. Or equal
- B. Proprietary Systems. Acoustical Wall panel systems, including the following:
 - 1. Tectum Standard Interior Wall Panels:
 - a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.
 - b. Thickness: 1 inch
 - c. Edge: Long edge beveled
 - d. Width: 47-3/4 inches (1213 mm).
 - e. Length: Length from 6 feet 12 feet in 1 foot increments (install in longest lengths possible)
 - f. Color: Natural
 - g. Mounting Style: D-20 (similar). Furring channels specified in.

PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted without prior approval.

ACCESSORIES

- A. Provide accessories as follows:
 - 1. Tectum Painted Head Drywall Screws:
 - a. Material: Steel (corrosion resistant).
 - b. Length: 1 5/8 inches
 - c. Color: Natural
 - 2. Tectum Moulding:
 - a. Material: Plastic.
 - b. Designation: CHC or CHH as recommended by manufacturer for particular panel or application specified..
 - 3. Tectum Touch-Up Paint:
 - a. Color: Natural

PART 3 - EXECUTION

MANUFACTURER'S INSTRUCTIONS

- A. Comply with the instructions and recommendations of the acoustical wall panel system manufacturer.
- B. Install materials in accordance with governing regulations, fire resistance rating requirements and industry standards applicable to work.
 - 1. Comply with CISCA Code of Practices.

EXAMINATION

A. Site Verification of Conditions:

- 1. Examine surfaces scheduled to receive directly attached acoustical units for unevenness, irregularities and dampness that would affect quality and execution of work.
- 2. Do not proceed with installation of wall panel system until unacceptable conditions are corrected.

INSTALLATION

- A. Screw head to be flush with panel surface.
- B. Cover field cut edges by means of trim or other moldings.

CLEANING

- A. Clean exposed surfaces of acoustical panel, trim, moldings and suspension members to comply with manufacturer's instructions for cleaning.
- B. Touch up any minor finish damage.
- C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

PROTECTION

A. Protect installed work from damage due to subsequent construction activity, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION 09 84 00

SECTION 09 90 00 - PAINTING AND COATING

The Conditions of the Contract and applicable requirements of Division 01 govern this section

SCOPE

A. Refer to Room Finish Schedules, notes on the drawings, Section 6 and this Section of the specifications to determine building surfaces to be painted or otherwise finished.

WARRANTY

- A. All painting and caulking shall be warranted for 2 years against becoming unserviceable or objectionable in appearance as a result of being defective or non-conforming. Without limiting the warranty scope, the work in general shall be warranted not to:
 - 1. Noticeably discolor, yellow, streak, bloom, bleak, darken or fade.
 - 2. Change sheen with excessive speed or irregularity.
 - 3. Peel, crack, blister or alligator.
 - 4. Release from the substrate or intermediate coats.
 - 5. Chalk or dust excessively.
 - 6. Stay tacky or become tacky.
 - 7. Mildew

SUBMITTALS

- A. Submit current color selection "fans" or brochures from manufacturers providing materials on the project.
- B. Submit technical data sheets describing properties and application recommendations from manufacturers providing materials on the project.
- **C.** Provide actual samples of stained work prepared by painting contractor on pieces of actual wood to be used on the project obtained from millwork supplier.

SCHEDULE

A. Based upon submittals, the Architect will prepare a paint and finish schedule identifying all materials and colors to be used on the project.

MATERIALS

- A. The bid shall be based upon all paint, enamel, latex, fillers, thinners and other materials listed in the following schedule.
- B. Thinners shall only be those recommended by the particular paint manufacturer for use with his products.
- C. Use proper colored bases to mix colored paints.Prime coats shall be colored nearly the same as finish coats.
- D. The Architect reserves the right to select a different color for each room or space and to have colors adjusted at any time before the final coat is applied.
- E. Best grade commercial products of the following manufacturers will be acceptable for use on the project.
 - 1. Sherwin-Williams
 - 2. Benjamin Moore
 - 3. Pittsburgh
 - 4. Devoe
 - 5. Pratt & Lambert
 - 6. Olympic Stain Products
 - 7. U.S. Gypsum Company

PREPARATION

- A. Deliver all materials in unbroken original packages or containers bearing manufacturer's labels.
- B. All material shall be stored and mixed only in such rooms as may be assigned for this purpose and all necessary precautions shall be taken to prevent a fire.
- C. Protect all finished surfaces and all surfaces receiving other materials, which depend on surface bonding, from becoming contaminated by any painting or coating.
- D. Coordinate and schedule painting work so as not to conflict with the work of other trades.
- E. Preparation of surfaces:
 - 1. Wood:
 - a. Sandpaper to smooth and even surface and slightly bevel sharp corners. Clean off all dust, using tack cloth if necessary. After primer has been applied fill nail and other holes and cracks with plastic wood or putty.
 - 2. Steel and Iron:
 - a. Remove grease, rust, scale and dust and touch-up any chipped or abraded places on items that have been shop coated. Where steel and iron have a heavy coating of scale, it shall be removed by wire brushing or sand blasting as necessary to produce a satisfactory surface for painting. Painting over rust and scale will not be allowed.
 - 3. Galvanized Metal:
 - a. Clean thoroughly with mineral spirits or naptha.
 - 4. General:
 - a. Before painting, hardware, accessories, electrical device plates, lighting fixtures and similar items shall be removed by the installing trade and be replaced after painting work is completed. If items are not removed prior to painting and are damaged they must be repaired or replaced at no additional cost to the Owner.

APPLICATION

- F. Apply materials in a manner to insure smooth, even, uniform coats, free from dirt, runs, brush marks, sags and laps. Apply all paint products in accordance with manufacturer's written instructions.
- G. Doors and trim and steel door frames shall be brushed or sprayed. Interior surfaces of stops, exposed to view, retaining glass shall be painted prior to installation of glass.
- H. All applications, other than on millwork, doors and frames, shall be by brush, spray or roller as recommended by coating manufacturer to produce the best finish. Semi-transparent stain shall be brushed only.
- I. All coats shall be thoroughly dry before the succeeding coat is applied. Allow at least 24 hours between coats.
- J. Sandpaper with number 00 sandpaper between all interior coats on wood or metal surfaces. Steel wool may not be used.
- K. All finishes of each type of paint shall be uniform as to sheen, color and texture.
- L. Prime and back-prime with one coat of primer all surfaces of millwork, trim and woodwork, both interior and exterior. Priming work shall be done when such millwork is first delivered to the job.
- M. Give top and bottom edges of all doors two coats of the same finish applied to faces. Edge finishes on door tops and bottoms shall be applied after all cutting and fitting of door is completed and before weatherstripping is applied.
- N. Miscellaneous ungalvanized steel not exposed in finished areas shall be touched-up to cover bolts, field welds, and all damaged and scuffed areas, immediately after erection, using the same material as used in shop prime coating. One further coat of original priming material shall be given to all surfaces after touch-up primer has dried.

TOUCH-UP & CLEAN-UP

A. On completion of the building, examine all painted surfaces. Carefully touch-up and repair marred or damaged spots, work over all surfaces that have been repaired by other trades and leave entire work in first class condition.

PAINTING FINISH SCHEDULE

- A. New interior gypsum walls and ceilings:
 - 1. Tape all joints and spread compound over nail or screw heads using perforated tape and joint compound. (Tape and float areas above ceilings which are not finished also).
 - 2. Sand first operation as required, trowel compound out to feather edge over all joints, nail or screw heads and around accessories.
 - 3. Sand second operation as required and apply one coat of combination textured paint containing sealer and primer with a simulated sand finish texture. Submit texture samples to the Architect for approval.
 - 4. Apply 2 coats Sherwin-Williams ProMar 200, Zero VOC, Interior Latex, low sheet paint.

- B. New interior exposed concrete block:
 - 1. Clean & degrease:
 - 2. 1st coat Heavy Duty Block Filler equal to Sherwin Williams B42W46
 - 2nd & 3rd coats Solvent based epoxy equal to Sherwin Williams Tile Clad, B62Z, B60VZ70
- C. Interior exterior exposed structural framing and steel joists, metal door and window frames, interior metal guard railings, handrails, interior metal ladders, primed portions of rolling overhead doors and metal lite kits in wood doors: (At frames with glass lites and lite kits in wood doors, paint inside of fixed and applied stops prior to setting glass)
 - 1. 1st coat Touch up factory primed surfaces.
 - 2. 2nd & 3rd coats Satin sheen industrial enamel.
- D. Exterior metal frames, bollards, ornamental iron gates and structural framing.
 - 1. 1st coat Touch up factory primed surfaces or apply primer (as recommended by paint manufacturer for each substrate).
 - 2. 2nd & 3rd coats Satin sheen industrial enamel.
- E. Painted interior, plywood and trim, plywood telephone/computer equipment boards:
 - 1. 1st coat enamel undercoat
 - 2. 2nd & 3rd coats semi-gloss alkyd enamel.
- F. Interior and exterior mechanical, plumbing and electrical equipment, including machinery, roof top A/C units, electrical switches and panels, meters, and conduits, uninsulated water and sewer lines and similar items (excluding copper) exposed to view: Mask all equipment nameplates and information plates or tags.
 - 1. 1st coat on primed or factory painted equipment Touch-up scars and scratches with primer.
 - 2. 1st coat on black steel Maintenance primer.
 - 3. 2nd & 3rd coats Satin sheen industrial enamel.
- G. Stained wood sills, cabinets and shelving, and interior wood trim and railings
 - 1. Apply paste filler and satin sheen oil stain. Color as selected by Architect.
 - 2. Apply 3 coats clear satin sheen varnish.
- H. Interior and exterior mechanical, plumbing and electrical equipment, including machinery, roof top A/C units, electrical switches and panels, meters, and conduits, uninsulated water and sewer lines and similar items (excluding copper) exposed to view: Mask all equipment nameplates and information plates or tags.

- 1. 1st coat on primed or factory painted equipment Touch-up scars and scratches with primer.
- 2. 1st coat on black steel Maintenance primer.
- 3. 2nd & 3rd coats Satin sheen industrial enamel.

COMPLETION

A. Furnish Owner a typewritten list of paint schedule in duplicate, listing manufacturer's names, types of paint and color numbers or custom mix formulas.

END OF SECTION 09 90 00

SECTION 10 00 00 - SPECIALTIES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

GENERAL

A. Cooperation by the Contractor with all other trades for work under this section of the specifications is mandatory, so that all phases of the work may be may be properly coordinated without delays or damage to other parts of the work.

WORK INCLUDED

A. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or specified herein, including all labor, materials, equipment and incidentals necessary and required for their completion.

SUBMITTALS

- A. Provide brochures indicating gauges, kinds of materials, types of finishes and fabricating procedures.
- B. Provide shop drawings indicating size, quantity, attachment methods, connections, weight and applicable performance data.

MATERIALS

- A. Toilet Accessories:
 - 1. Approved manufacturers:
 - a. Bradley
 - b. Bobrick
 - c. Parker
 - d. Fort Howard
 - 2. Refer to drawings for specific items and model numbers.
- B. Fire Extinguisher Cabinets:
 - Ambassador series, 1012F10RT/Academy series, 1026W10 w/ FE letters, ADAC option (ADA compliant) and Fire-FX fire rated tub option semi-recessed mounted, return trim, rolled edge, steel fire extinguisher cabinet with color epoxy tub (interior and exterior), door and trim as manufactured by J.L. Industries, 4450 W. 78th Street Circle, Bloomington, Minnesota 55435. Telephone 612-835-6850. Color as selected by Architect.
 - 2. Provide complete with Cosmic 10E, ten pound ABC factory charged fire extinguisher.

C. Fire Extinguishers:

- 1. Provide surface mounted complete Cosmic 10E, ten pound ABC factory charged fire extinguishers where shown on drawings.
- D. Toilet Partitions and Urinal Screens:
 - 1. Provide Ampco Products Inc., overhead braced, solid plastic high density polyethylene toilet partitions and urinal screens as shown on the drawings.
 - 2. Install using continuous design stainless steel brackets and hinges as well as stainless steel knobs, latches, coat hooks, etc.
 - 3. Colors to be selected by Architect from standard non-premium finishes.
- E. Room Identification Signage:
 - 1. Allowance:
 - a. The contractor shall include in his proposals the following sums for the purchase of room identification signage as selected by the Owner and/or Architect: \$2,000.00. Installation costs are not part of the allowance and should be included in the proposal separately.
- F. Building Plaque:
 - 1. Provide cast aluminum tablet as manufactured by the Southwell Company, PO Box 288, San Antonio, TX 78291.
 - Tablet to be maximum 18"x 30" in size and cast of virgin ingots of F-214 Aluminum Alloy. Casting shall be free of pits and gas holes and all letters shall be sharp and hand tooled. Border and faces of raised letters are to be satin finish and background to be leather texture. Border style shall be bevel edge and letter style shall be Helvetica. Mounting type shall be for attachment to gypsum board / metal stud walls.
 - 3. Architect shall provide layout of plaque typically including name and location of project, date, names of school officials, contractor's name and town as well as architect's name and town.
 - 4. Contractor will provide actual "rubbing" of plaque, based upon architect's layout, for final approval prior to casting.
 - 5. Upon completion, plaque shall be chemically cleaned and etched and treated with alodine and then sprayed with two coats of clear acrylic lacquer. Background color to be black.
- G. Fire Department "Knox-Box":
 - 1. Provide 3200 Series Recessed Mount rapid entry system "Knox-Box" as required by the City of Victoria Fire Department and manufactured by the Knox Company, 17672 Armstrong Ave., Irvine, CA 92614. Telephone (800) 552-5669.

- 2 Finish to be weather resistant TGIC polyester powder coat in aluminum color.
- 3. Coordinate box keying with the Fire Department.
- H. Handicap Parking Sign:
 - 1 Provide Model SS01, 12"x 18", traffic sign stating "RESERVED PARKING" and including international handicap symbol with no arrows as manufactured by Best Manufacturing Sign Systems, 1202 North Park Ave., Montrose, CO 81401. Telephone 1-800-235-2378.
 - 2. Lettering shall be green on white background. Handicap symbol shall be white in a blue box.
 - 3. Provide additional 12"x 6" sign stating "VAN ACCESSIBLE" directly below above described sign when designated on plans. Lettering shall be white on blue background with white border.
 - 4. Mount on galvanized steel post set in concrete with bottom of lowest sign 5'-0" above paving.
- I. Projection Screens:
 - Provide Luma 2, heavy duty spring roller type wall mounted screen as manufactured by Draper Screen Company, Inc., 411 South Pearl Street, Spiceland, IN 47385, phone (765) 987-7999, or equal. Provide projection screens at locations shown on plans, coordinate exact location with Architect.
 - 2. Case shall be 22 gauge Steel, flat back design, with embossed, baked-on plastisol finish in white with 12 gauge endcaps, finished to match case, to have integral roller brackets. Screen viewing area shall be 6' x 8' or 8' x 8' (refer to drawings) with fiberglass matte white viewing surface which is flame and mildew resistant.
 - Provide 6" heavy gauge angle steel with baked enamel finish extension brackets to allow markerboard clearance. Color to match projection screen cover. Provide suitable brackets for flush and pocket ceiling mounts

END OF SECTION 10 00 00

SECTION 10 73 10 – PROTECTIVE COVERS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

A. Design and installation of extruded aluminum canopies.

REFERENCES

- A. The Aluminum Association Aluminum Design Manual 2010.
- B. American Welding Society AWS D1.2/D1.2M: 2008

SUBMITTALS

- A. Product Data: Submit six (6) complete sets of manufacturer's product information, specifications, component performance data and installation instructions for walkway cover components and accessories.
- B. Shop Drawings: Submit six (6) complete sets of detailed drawings, layout of cover system, bent locations, all mechanical joint locations with complete details, connections, jointing and accessories. Include details bent anchorage. Include plan dimensions, elevations and details.
- C. Samples: Provide color chart including manufacturer's full range of colors for the finishes selected. Upon initial color selection by Architect, provide 3 inch square actual color samples of each finish selected on the substrate specified.
- D. Design Data: Provide structural design calculations for the proposed cover, signed and sealed by a professional engineer, licensed in the state of Texas, who professes his discipline to be structural engineering. Design calculations shall state that the cover system design complies with the wind requirements of ASCE 7, the stability criteria of applicable building code, and all other governing criteria.

QUALITY ASSURANCE

- A. Manufacturer Qualifications: At least ten years experience in the design, fabrication, and erection of extruded aluminum walkway cover systems.
- B. Installer Qualifications: Have walkway covers installed by manufacturer, third party installation is not acceptable. Installer Qualification: Firm with not less than three (3) years experience in installation of aluminum walkway covers of type, quantity and installation methods similar to work of this section.
 - 1. Codes and Standards: Comply with provisions of the following except as other-wise indicated: International Building Code, latest addition with amendments, if any. AWS (American Welding Society) standards for structural aluminum welding.
 - 2. Manufacturer: Obtain aluminum covered walkway system from only one (1) manufacturer, although several may be indicated as offering products complying with requirements.

- 3. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to insure proper fitting of work. However, allow for adjustments within specified tolerations wherever taking of field measurements before fabrication might delay work.
- 4. Shop Assembly: Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- 5. Coordination: Coordinate work of this section with work of other sections, which interface with covered walkway system (sidewalks, curbs, building fascias, etc.).
- 6. Damaged Units: Replace roof deck panels and other components of the work, which have been damaged or have deteriorated beyond successful minor repair.

PRODUCTS

MANUFACTURERS

- A. The design is based on products fabricated by: AVAdek Walkway Cover Systems & Canopies, 12130 Galveston Road BLDG 1, Webster, TX 77598, 713-944-0988, <u>www.avadek.com</u>
 - 1. Comparable products by the following manufacturers also will be acceptable:
 - a. Dittmer Architectural Aluminum, 800-822-1755, www.ditt-deck.com.
 - b. E.L. Burns Company, 800-576-2722, www.burnscovers.com
 - c. Architectural Metal Systems, 888-621-5020, <u>www.ametalsystems.com</u>
 - d. Mapes Industries, Inc. 800-228-2391, <u>www.mapes.com</u>
 - 2. Substitutions: Comparable products of other manufacturers will be considered under standard substitution procedures.
- B. Other extruded aluminum walkway cover manufacturers wishing to submit equivalent system proposals on this project must request prior approval from the Architect for their products.
- C. Submit requests for approval at least seven (7) days prior to proposal date, so that proper notification of approval, if granted, can be given to all proposers by addendum.
- D. Those requesting prior approval must submit sufficient technical information regarding their products so that the Architect can adequately compare equity to products currently specified. Any and all variations from Architect's drawings and specifications must be clearly and completely described in request for substitution.
 - 1. Submit evidence of having operated a successful business of manufacturing and installing complete extruded aluminum walkway cover systems.
 - a. Business must have been in operation under submitted name and ownership for a minimum of ten (10) years.
 - b. Submit a list of successfully completed projects of similar scope, size and complexity within the state of Texas. List shall include job name, date of completion, architect's firm name, address and phone number, owner's name with representative and phone number.
 - c. Submit complete shop drawings for above completed jobs.
 - d. Submit complete details with structural properties (moment of inertia, section modules, modules of elasticity, etc.) for all proposed sections (beams, columns, decking and other structural members).

MATERIALS

- A. All components shall be 6063, 6061 or 6005 alloy extruded aluminum.
- B. Components shall be sized to comply with live load and wind load rquirements of the project and shall not be less than the dimensions shown on the plan.
- C. The thickness of aluminum deck panels shall be at least .080" thick.
- D. Flashing shall be .040" thick.
- E. All bolts and fasteners shall be stainless steel of finished to match adjacent components and sized by canopy engineer.

FINISHES

- A. The finish and color selection of each component shall be chosen from the manufactuer's standard selections and shall include:
 - 1. Polester Baked Enamel
 - 2. Flouropolymer
 - 3. Anodized, Bronze & Champagne

EXECUTION

FABRICATION

- A. General.
 - 1. General contractor shall field verify all bent locations, dimensions and elevations shown on shop drawings prior to fabrications.
 - 2. Shop Assembly: Assemble components in shop to greatest extent possible to minimize field assembly.
 - 3. Comply with indicated profiles, dimensional requirements and structural requirements. Use sections true to details with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture, free from defects impairing strength and durability.
 - 4. Welding: In accordance with ANSI/AWS D1.2.
 - 5. Bent Construction: Factory weld beams with neatly mitered corners to form one-piece rigid bents. Make welds smooth and uniform using an inert gas shielded arc. Perform suitable edge preparation to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Rigid mechanical joints may be used only if fully welded bents cannot be shipped on local, state, or federal highways without a special permit from the department of transportation (mechanical joints, if required, shall consist of stainless steel bolts with a minimum of two (2) bolts per fastening. Bolts and nuts shall be installed in a concealed manner using utilizing 1/2" thick by 1 1/2" aluminum bolt bars welded to structural members. All such mechanical joist must be detailed on shop drawings showing all locations).
 - 6. Deck Construction: Fabricate from extruded modules that interlock in a self-flashing manner. Positively fasten interlocking joints at 8 inches on center creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Assemble deck with sufficient camber to offset dead load deflection.

- B. Beams: Provide open-top tubular extrusion, top edges thickened for strength and designed to receive deck members in self-flashing manner. Provide structural ties in tops of all beams.
- C. Deck: Extruded self-flashing sections interlocking into a composite unit. Provide welded plate closures at deck ends. Shop fabricate to lengths and panels widths required for field assembly. Depth of sections shall comply with structural requirements. Provide shop induced camber in deck units with spans greater than 16'- 0" to offset dead load deflections. Welded dams are to be used at non-draining ends of deck.
- D. Fascia: Manufacturer's standard shape. Provide fascia splices where continuous runs of fascia are jointed. Locate splices to be in line with bents and fasten in place on hidden or non-vertical surfaces.

EXAMINATION

A. Verification of Conditions: Verify that all concrete, masonry, and roofing work in the vicinity is complete and cleaned. Examine all adjacent work / surfaces for conditions that would prevent quality installation of this system. Do not proceed until defects are corrected.

DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle covered walkway system components as recommended by manufacturer. Handle and store in a manner to avoid deforming members and to avoid excessive stresses.

ERECTION

- A. Erect protective cover true to line, level, and plumb.
- B. Provide hairline miters and fitted joints.
- C. Install roof deck sections, accessories and related flashing in accordance with manufacturer's instructions. Provide roof slope for rain drainage without ponding water. Align and anchor roof deck units to structural support frames.
- D. Assemble all components in a neat, workmanlike manner.

CLEANING

A. Remove protective coverings at time in project construction sequence which will afford greatest protection of work. Clean all finished surfaces as recommended by manufacturer. Maintain in a clean condition during construction.

PROTECTION

A. Advise general contractor of protection and surveillance procedures, as required to ensure that work of this section will be without damage or deterioration at time of substantial completion. Protect all materials during and after installation.

WARRANTY

- A. Manufacturer shall warrant the entire system against defects in labor and materials for a period of one (1) year commencing on the date of substantial completion as established in Division One of these specifications.
- B. Intention of this warranty is the manufacturer will come onto the jobsite and do all necessary to effect corrections of any deficiencies.
- C. Prima Facie Evidence of defects in labor and material may include but is not limited to, one or more of the following:
 - 1. Moisture leaks.
 - 2. Metal failure including excessive deflection.
 - 3. Fastener failure.
 - 4. Finish failure.

END OF SECTION 10 73 10

SECTION 12 21 00 - WINDOW BLINDS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

WORK INCLUDED

- A. The Contractor shall provide and install 1" Riviera mini-blinds as manufactured by Levelor Lorentzen, Inc., complete with valance and definition edging (side and bottom channels) at all exterior windows. Color as selected by the Architect.
- B. All requests for substitution much be submitted in accordance with procedures outlined the Instructions to Bidders.

SUBMITTALS

- A. Provide installation plans showing locations and brochures indicating, materials, construction, installation and attachment information.
- B. Provide actual material samples for all items requiring color selections.

INSTALLATION

- A. All blinds shall be securely attached and installed in strict accordance with the manufacturer's written instructions.
- B. All blinds shall be fully adjusted and tested for proper operation upon completion of installation.

END OF SECTION 12 21 00

SECTION 12 30 00 - CASEWORK

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

SCOPE

- A. Provide and install all base cabinets, upper cabinets, tall cabinets, special use cabinets, countertops, backsplashes, fillers and grounds specified herein and shown on the drawings.
- B. Provide and install sinks located in casework units. Provide removable backs in all casework necessary to gain access to plumbing connections and/or chases.
- C. Prove and install grommets in countertops for electrical cords; coordinate location with drawings. Show all locations on countertop plans during submittal process.

SUBMITTALS

- A. Submit shop drawings in accordance with the requirements of Article 3.12 of the General and Supplementary Conditions, complete with either catalog cut sheets or physical samples of all required hardware. Drawings shall indicate cabinet style, size, clear depth dimensions, filler requirements, and section information necessary for proper installation of all equipment. Provide an equipment list for all accessories furnished by the casework manufacturer as required by these documents. Provide profile of all countertops with dimensions and finished end locations.
 - Plastic Laminate Color Charts: The architect will attempt to select colors from the plastic laminate selections preferred by the subcontractor; however, if the standard colors do not prove to be entirely satisfactory the architect reserves the right to make selections from the full range of colors and patterns offered by any of the manufacturers listed herein.
 - 2. Provide one full size cabinet as selected by the Architect from the submitted shop drawings for review of construction, finishes, and specified hardware. Once approved and in useable condition at time of installation this cabinet may be used as part of the final work.

QUALITY ASSURANCE

- A. The casework manufacturer shall ensure the final casework structure is safe and stable when carrying the maximum intended loads, as measured against the load ratings of the fully extended, specified sliding drawer and shelf hardware.
- B. The installer shall designate an individual in his organization who is responsible for quality review and assurance that the work installed under this section of the work meets the quality standards established herein.

DELIVERY AND STORAGE

- A. Do not deliver casework until the location for which casework is to be installed has been climatized; humidity level changes do not exceed 20 percent and temperature changes do not exceed more than 15 degrees in any 24 hour period.
- B. Upon delivery, locate casework in each area where it is to be installed. Do not install cabinets where wet work has not been completed. Cover and protect from other trades.

WARRANTY

A. Provide one year warranty protecting against defective materials and workmanship.

PART 2 PRODUCTS

MANUFACTURERS

- A. The drawings have been established using LSI Corporation of America, Inc. model numbers. Some model numbers may be modified to reflect certain requirements for this project. Where these modifications are different from the standard products furnished, deviations from these modifications will not be allowed. The following is a list of acceptable manufacturers of plastic laminated casework:
 - 1. LSI Corporation of America, Inc. Minneapolis, MN, 612-559-4664
 - 2. Terrell Manufacturing Co., San Angelo, 915-655-7133
 - 3. Tru-Bilt, Calmar, IA 319-562-3261
 - 4. Case Systems, Midland, MI 517-835-7773
 - 5. Alpha & Omega Casework, Taylor, TX, 512-587-3771
 - 6. TMI, Dickinson, ND, 701-225-6716
 - 7. Westmark Products Inc., Tacoma WA, 206-531-3470
 - 8. Victoria Cabinet Works, 361-578-0263
 - 9. Ameritek Designs, Inc. 281-442-7767
 - 10. Texas Woodwork Interiors
- B. Plastic Laminate Manufacturers:
 - 1. Wilsonart
 - 2. Formica
 - 3. Nevamar
 - 4. Pionite
- C. Particle Board: Shall have a minimum density of 45 lbs. per cubic foot with a moisture content no to exceed 8% and shall be mat formed three ply construction. Approved manufacturers:
 - 1. Lousiana-Pacific
 - 2. Weyerhaeuser
 - 3. Temple-Eastex
 - 4. Kirby Forest Products
- D. Plywood: Shall be 7 ply veneer core 3/4" material and 9 ply for 1 1/8" material. Species shall be Douglas Fir. Grade shall be B faces with interior veneers grade C or better. Voids in interior cores exceeding 5 square inches will be subject to rejection. All plywood shall be manufactured in accordance with the U.S. Products Standards PS-1. All plywood shall be marked for exterior use and shall be adhered with waterproof glue. Where drawings or specifications indicate the use of plywood, particle board will not be accepted.

E. Hardware:

- 1. Hinges shall be five knuckle 2 3/4" overlay type, .095 gauge with hospital tips. Provide a dull chrome US26D finish. Hinges shall be Gamblo Company, Inc. or equal Stanley. If alternate hinges are used approval of sample hinge will be required prior to placement of any casework on the project.
- 2. For doors less than 48" in height provide 2 hinges. For doors greater than 48" in height provide 4 hinges.
- 3. Pulls shall be Stanley 4484 US26D (equal Epco M2-304 US26D)
- 4. Drawer slides in all cases shall maximize the clear inside depth of the case. Manufacturers:
 - a. Knape & Vogt
 - b. Grant
 - c. Accuride
 - d. Hafele
- 5. Heavy duty 50 lbs. rating equal to KV 1300SC.
- 6. File drawers shall be equipped with 100 lb. ratings, equal to KV 1429 full extension slides. All file drawers shall have file suspension brackets equal to Pendalflex File Frame Systems.
- 7. Magnetic Catches: Epco 592-WS at all doors. Provide two catches for all doors in excess of 36" in height. Equal manufacturer: Stanley.
- 8. Shelf Supports: KV #347 or Hafele # 282.11.707 metal inserts spaces at 1 1/4" centers.
- 9. Locks: National M2-3704 construction core five pin tumbler lock keyed differently unless specified otherwise. Provide two keys per lock, master keyed, with a total of 6 master keys. Equal manufacturer: Best Lock Corporation.
- 10. Elbow catches at all inactive leaves shall be lves 2A3.
- 11. Cloths Hanger Rod and Flanges shall be KV 660 rods with two #734 flanges.
- 12. Grommets: 2" as manufactured by Doug Mocket or equal.
- F. Edging:
 - 1. All exposed edges shall be covered with .020 or 3mm PVC applied with hot melt glue under heat and pressure to provide a complete seal. Color as selected by Architect. "T" barb edging will not be accepted.
 - 2. Provide .020 PVC edge at all case bodies.
 - 3. Provide 3mm edge at all doors, drawers, aprons, work surfaces and counter tops.
 - 4. Colors as selected by the Architect from full range of colors to match plastic laminate.
 - a. One color will be selected for doors, drawers and aprons.
 - b. One color will be selected for countertops.
- G. 1/4" hardwood plywood shall be stain grade 5 ply veneer core plywood used at all drawer bottoms, no exceptions.
- H. Retractable Keyboard Tray
 - 1. Manufacturer: 3M
 - 2. Model No.: AKT60LE
 - 3. Locations: All locations indicated on drawings, refer to schedule and elevations.

LAMINATE FINISHES

- A. Decorative vertical surfacing laminate (.032) shall be at all exposed surfaces such as doors, drawers, exposed walls, open shelving units, ie., backs, shelves, and interiors of open cases.
- B. Decorative general purpose laminate (.055) shall be used at all countertops and backsplash surfaces. Where rolled edge or post-formed coved backsplashes are indicated provide post-forming grade plastic (.042).
- C. Cabinet liner (.030) shall be Wilson-Art #1573-CL "Solid Frosty White" or equivalent. Not other color will be acceptable. The cabinet liner shall be used for balancing exterior surface laminates.
- D. Backer, .020" thick, shall be placed on all unexposed surfaces. And specifically at all undersides of countertops and backs of backsplashes. Backer shall be adhered to counters under heat and pressure.
- E. Pressure Fused Melamine Laminate, Frosty White in color shall be used in areas behind closed doors. Only High Quality Thermofused 80 to 100 gram PSM minimum Melamine will be accepted. Melamine must meet NEMA LD3-1991, GP-20, and ALA 1992 minimum performance standards, including 600 cycles in the Resistance to Wear Test and 19 to 20 inches in the Resistance to Impact Test. Note: Impact and Wear Test exceed minimum standards.

WORKMANSHIP

- A. All parts shall be machined for accurate fit and assembled with appropriate fasteners resulting in level and plumb units without discernable tool marks. Modified or special units shall be constructed with similar details.
- B. Cabinet Sub-base: To be separate and continuous (no cabinet bodies sides-to-floor). water resistant exterior grade plywood with concealed fastening to cabinet bottom. Ladder-type construction of unfinished fronts for the application of coved base material furnished by other sections.
- C. Schedule of Materials:
 - 1. Walls 3/4"
 - 2. Tops and Bottoms 3/4"
 - 3. Horizontal Dividers 3/4"
 - 4. Vertical Dividers 3/4"
 - 5. Shelves 1"
 - 6. Backs 3/8"
 - 7. Finished Back Panels 3/4"
 - 8. Countertops 1 1/8" (1 1/4" finished thickness)
 - 9. Backsplashes 3/4"
 - 10. Countertop Supports 1 1/4"
 - 11. Aprons 3/4"
 - 12. Toe Boards 3/4"
 - 13. Drawer Sides 1/2"
 - 14. Drawer Bottoms 1/4"
 - 15. Fillers 3/4"

D. Drawer Construction:

- Option 1: All drawers shall be constructed of minimum .50 inch hardwood sides, front and back assembled in drawer press with glued and doweled joinery. Drawer bottoms shall be 1/4 hardwood plywood matching species of drawer sides and shall be let into drawer sides, front and back. Provide a continuous bead of hot melt glue around perimeter of underside of drawer bottom firmly lock the drawer bottom in place. (Lacquer or C.L. finish at interior of drawer.)
- 2. Option 2: Fabricate all drawer boxes using 1/2 inch, 9-ply laminated hardwood plywood. The four corners of the drawers are machined for lock shoulder joints, glued, and stapled. The top edges of the drawer box sides and back are radiused. Drawer bottom is let in on four sides and securely glued underneath with a continuous bead of glue around the perimeter of the drawer bottom. Additional bottom braces are used on drawers over 24" wide. All components have one coat of clear waterproof sealer. Drawer boxes are screw-attached to separate drawer fronts.
- 3. Option 3: Drawer fronts shall be applied to separate drawer body component sub-front. Drawer sides shall be doweled and glued to receive front and back, machine squared and held under pressure, to set.
- E. Note that at all sink cabinets, plywood cores shall be used as the substrate for both the cabinet and countertop.

<u>UNITS</u>

- A. Items of casework by room shall be as indicated on the drawings. Plan and/or elevations shall indicate casework to be provided.
- B. Manufacturer shall provide custom built units where indicated and as necessary to meet job conditions.

<u>KEYING</u>

- A. Items of casework to receive locks shall be keyed as follows:
 - 1. Each room of casework shall be keyed alike and keyed to one master key system.
 - 2. Locks shall be keyed to a schedule submitted by the casework supplier with the shop drawing for review and approval by the Owner and the Architect.

PART 3 EXECUTION

EXAMINATION

A. Prior to shipment, the Casework manufacturer shall verify the casework structure is safe and stable when carrying the maximum intended loads, as measured against the load ratings of the fully extended, specified sliding drawer and shelf hardware. Verify that slide mounting surfaces are securely attached to the casework structure.

INSTALLATION

A. All casework items shall be installed by the casework supplier at locations indicated in the drawings.

- B. Casework supplier shall make all cutouts necessary to receive plumbing items.
- C. Securely anchor wall units to surrounding walls. Take special care to assure that casework with sliding drawers and/or sliding shelves are securely anchored to prevent tip-over of the casework when fully loaded drawer or shelf is fully extended.
- D. Coordinate installation of work furnished by the various trades to assure properly functioning equipment at the completion of the job.
- E. Furnish scribe fillers required to complete the installation.
- F. Verify lengths of countertops, splashes, and bases. All tops 8'-0" or less to be one piece construction.
- G. Any tackboards, markerboards, maprails, or mirrors shown on the drawings are for coordination purposes only and are not part of the Casework Section.
- H. Obtain appliance and equipment submittals from the General Contractor in order to coordinate opening sizes, etc. for equipment.

END OF SECTION 12 30 00

SECTION 31 31 16 - TERMITE CONTROL

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUBMITTALS

- A. Provide manufacture's technical data and application instructions.
- B. Submit manufacture's certification that products are in compliance with current environmental protection statutes.

PRODUCTS

- A. Provide emulsible concentrated insecticide for dilution with water, specially formulated to prevent termite infestation.
- B. Acceptable Termicides:
 - 1. Permathrin (Dragnet FT, FMC Corp.; Torpedo, ICI Americas, Inc.)
 - 2. Cypermethrine (Prevail FT, FMC Corp.; Demon, ICI Americas, Inc.)
 - 3. Fenvalerate (Gold Coast Tribute, Dupont)
 - 4. Bifenthrin (Biflex TC, FMC Corp.)
- C. Dilute with water to concentrate level recommended by manufacturer.
- D. Other solutions may be used as recommended by the Contractor if approved for intended application by local authorities having jurisdiction. Use only soil treatment solutions that are not harmful to plants.

EXECUTION

- A. Examine the following:
 - 1. Verify that soil surfaces are sufficiently dry to absorb toxicant, and ready to receive treatment.
 - 2. Verify that the area is well ventilated.
 - 3. Verify that anticipated weather conditions comply with label recommendations prior to application.
 - 4. Commencement of operations indicates acceptance of conditions.
- B. Remove all wood and cellulose-containing material from around foundation beams or slabs. Eliminate termite access to moisture.
- C. Solution Application:
 - 1. Apply soil treatment solution according to current EPA regulations.
 - 2. Add chemically inert coloring agent to solution to indicate which areas have received treatment.
 - 3. Apply solution as overall treatment under interior slab (both suspended structural floors and slabs on grade) and attached slab or walks areas.
 - 4. Apply to inside of foundation walls and areaways and around plumbing penetrations.
 - 5. Apply solution along outside edge of building, 3 inches above grade prior to backfilling around foundation.

- 6. Allow minimum 12 hours for drying after application, before beginning vapor barrier, reinforcing placement and other construction activities.
- 7. Post signs in areas of application with warning that soil treatment solution has been applied.
- 8. Reapply soil treatment solution to areas disturbed by subsequent excavation and other construction activities following application.
- 9. Inspect and reapply treatment solution if necessary after heavy rainfalls subsequent to initial application.

WARRANTY

- A. Upon completion of initial application provide to the Owner the option of purchasing an annual inspection and treatment contract as well as a warranty against termite damage.
- B. Owner shall reserve the right to purchase or reject the annual inspection and treatment contract as well as the damage warranty at his sole discretion.

END OF SECTION 31 31 16