PROJECT MANUAL

D.P. CULP EXPANSION & RENOVATION
FOR
EAST TENNESSEE STATE UNIVERSITY

RELEASE PACKAGE 2
MAIN BUILDING SET

SBC Project No. 166/005-01-2014CM

PREPARED FOR:
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Nashville, Tennessee 37214

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FOODSERVICE

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MECHANICAL, PLUMBING & ELECTRICAL ENGINEERING

ROSS/FOWLER LANDSCAPE ARCHITECTURE URBAN DESIGN & PLANNING
LANDSCAPE ARCHITECT

CONSTRUCTION DOCUMENTS

VOLUME 1 – DIVISIONS 00 THRU 14
VOLUME 2 – DIVISIONS 21 THRU 33
March 1, 2018
PROJECT DIRECTORY AND DESIGNERS’ SEALS

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  - 00 31 26 Asbestos Survey Information Available to Bidders [TBR] 1
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D.P. Culp Center [TBR SBC No. 166/005-01-2014CM] 00 01 10 - 1

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<td>Variable Frequency Motor Drives</td>
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<td>Sleeves, Escutcheons, &amp; Sleeve Seals for HVAC Piping</td>
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<tr>
<td><strong>23 05 29</strong></td>
<td>Hangers &amp; Supports for HVAC Piping &amp; Equipment</td>
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<td><strong>23 05 33</strong></td>
<td>Heat Tracing for Exterior Chilled Water Piping</td>
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<tr>
<td><strong>23 05 48</strong></td>
<td>Vibration Isolation for HVAC</td>
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<tr>
<td><strong>23 05 53</strong></td>
<td>Identification of HVAC &amp; Piping Equipment</td>
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<td><strong>23 05 93</strong></td>
<td>Testing, Adjusting &amp; Balancing for HVAC</td>
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</tr>
<tr>
<td><strong>23 07 13</strong></td>
<td>Duct Insulation</td>
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<tr>
<td><strong>23 07 19</strong></td>
<td>HVAC Equipment &amp; Piping Insulation</td>
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<tr>
<td><strong>23 08 00</strong></td>
<td>Commissioning of HVAC Systems</td>
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<tr>
<td><strong>23 08 13</strong></td>
<td>Sensor Point Calibration Check Sheet</td>
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<tr>
<td><strong>23 08 16</strong></td>
<td>Terminal Box Point Calibration Check Sheet</td>
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<td><strong>23 09 23</strong></td>
<td>Direct Digital Control (DDC) System for HVAC</td>
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<td><strong>23 21 13</strong></td>
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<tr>
<td><strong>23 21 14</strong></td>
<td>Exterior &amp; Underground Chilled Water Distribution Systems</td>
<td>6</td>
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<tr>
<td><strong>23 21 16</strong></td>
<td>Hydronic Piping, Valves &amp; Specialties</td>
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<tr>
<td><strong>23 21 23</strong></td>
<td>Hydronic Pumps</td>
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<td>Sheet Metal Ductwork – Low Pressure</td>
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<tr>
<td><strong>23 31 15</strong></td>
<td>Sheet Metal Ductwork – Medium Pressure</td>
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<tr>
<td><strong>23 36 00</strong></td>
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<td><strong>23 37 13</strong></td>
<td>Sheet Metal Specialties</td>
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<td><strong>23 41 00</strong></td>
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## DIVISION 26 – ELECTRICAL

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<td>Basic Electrical Materials &amp; Methods</td>
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<td>Outlet &amp; Junction Boxes</td>
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<td>Commissioning of Electrical Systems</td>
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<td>26 24 16</td>
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<td>26 28 13</td>
<td>Disconnect Switches</td>
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<td>26 32 13</td>
<td>Generator Set</td>
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<td>26 36 00</td>
<td>Automatic Transfer Switches</td>
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<td>Transient Voltage Surge Suppressors</td>
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<td>Voice &amp; Network Horizontal Cabling System</td>
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## DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

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<td>Excavation, Backfilling and Compaction</td>
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<td>Landscape Boulders &amp; River Stone</td>
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<td>Drilled Steel Minipiles (Micropiles)</td>
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<td>Pavement Joint Sealants</td>
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<td>32 14 00</td>
<td>Permeable Clay Brick Pavers</td>
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<td>32 16 00</td>
<td>Concrete Curbs and Walks</td>
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<td>32 31 20</td>
<td>Chain Link Fencing</td>
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<td>Aluminum Louver Fencing</td>
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<td>32 91 19</td>
<td>Topsoiling and Finish Grading</td>
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<td>32 92 19</td>
<td>Sodding, Seeding and Groundcover</td>
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## DIVISION 33 – UTILITIES

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<td>Site Drainage System</td>
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## DIVISION 41 – MATERIAL PROCESSING AND HANDLING EQUIPMENT

No work proposed or sections required for this Contract

---

END OF SECTION
REQUEST FOR GMP

For Project:  D.P. Culp Addition and Renovations
East Tennessee State University,  D.P. Culp Center
TBR  SBC No. 166/005-01-2014 CM

A.  A Guaranteed Maximum Price (GMP) is requested for the Work described in this Project Manual and the associated drawings and addenda. You are to obtain bids for trade subcontracts, and develop the proposal GMP in accordance with the CM/GC Master Contract.

B.  The GMP shall be for:

☐ a new Contract.
☒ an amendment to an existing Contract.

C.  The GMP shall offer alternates as specified. In addition, voluntary alternates:

☐ may be proposed, up to ___________ in number.
☒ may not be proposed.

D.  Contract Bond, in the amount of 100% of the Contract Sum, on the Owners standard form is required. If this proposal is for an amendment, a rider to the existing bond acknowledging the amendment and the revised Contract Sum is required. A Three-Year Roof Bond is:

☒ required, for $100,000.00
☐ not required.

E.  Substantial completion of this Work shall be achieved in the number of calendar days Contract Time allotted each Phase below, from and including the Commencement of each, and accepting the conditions for Liquidated Damages, per day, in the amount set forth for each, wholly and severally for each Phase:

<table>
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<th>Commencement</th>
<th>Contract Time</th>
<th>Liquidated Damages</th>
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<td>Release Package 1: Site Utilities and Structural Steel</td>
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<td>Release Package 2: Building Package</td>
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<td>$1000</td>
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END OF SECTION
INSTRUCTIONS TO CM/GC FOR PRODUCING THE GMP

A. Subcontractors that have been disqualified from participating in State Building Commission projects may not be recommended for any part of this Work, and shall not be allowed to perform any part of this Work. The CM/GC and its subcontractors shall not knowingly utilize the services of an illegal immigrant in the performance of this Work, and shall not knowingly utilize the services of any subcontractor, sub-subcontractor, or consultant who utilizes the services of an illegal immigrant in the performance of this Work.

B. The CM/GC shall present the GMP with an acknowledgement of all addenda.

C. If the GMP includes work of a subcontract trade regulated by state licensing laws, the CM/GC shall identify the subcontractor’s license information called for by licensing law.

D. The CM/GC shall provide the following information explaining the derivation of costs:

1. Standard forms provided for documenting the GMP are recommended for the convenience of the Owner, to provide the CM/GC with a basic format most easily evaluated and accepted by the Owner. These forms are reproduced in this project manual, and are available as Excel spreadsheets in the Designers’ Manual posted on the Owner’s website. Standard forms include:
   Section 00 42 23 GMP Summary
   Section 00 42 71 GMP List of Trade Subcontracts
   Section 00 42 75 GMP Disclosure of General Conditions
   Section 01 26 55 Form for Price of Work

2. Provide a Cumulative Summary when adding scope or phases to an existing GMP Contract, and show the history of the current GMP, and the effect of the amending the new GMP to the existing GMP. No standard form is provided, but a format similar to the GMP Summary is preferred.

3. GMP Summary shall show the cost elements of trade subcontracts, general conditions, self-performance, CM/GC contingency, fee, and a total of these, with percentages for self-performance, contingency, and fee. If alternates are required and/or volunteered, these shall be shown distinct from the cost of the base work, and the cost elements named above provided for each. The standard form accommodates this information as if there are three required and three volunteered alternates; however, it is not intended to infer a required number of alternates for a particular project. The Owner normally expects quality pre-construction services to produce no alternates.

4. GMP List of Trade Subcontracts shall show hard bids distinct from allowances and estimates. If there are alternates, these shall be shown distinct from the cost of the base work, similar to the GMP Summary. The standard form accommodates this information. List only those allowances that are specified. If an allowance is part of a trade subcontract, show the allowance portion as an allowance, and show the remainder of the trade in the Estimates or Hard Bids, as applicable. Trades may only be so designated to the extent that they are being procured through bidding, either before or after the GMP agreement or amendment, in accordance with the Master Contract. Portions of the Work that the CM/GC will procure through direct purchase without bidding cannot be Trades, and must be a part of Self-Performance. An exception to the requirement of bidding a trade can be in accordance with specification section 01 29 16 paragraph 1.03.F.

5. Bid Tabulation of Trade Subcontracts shall show the various trade bids in a manner that facilitates easy comparison and determination of the low bidder, with notations explaining post-bid adjustments and rejections. Copies of the bids shall also be provided, to allow the Designer and Owner the opportunity to correlate the Bid Tabulation to the bids. No standard format is provided.
6. The Self-Performance portion of the GMP shall be itemized using the Form for Price of Work, showing the costs, overhead, and profit in a manner similar to that required for change order price itemization. The standard form accommodates this information.

7. GMP Disclosure of General Conditions shall list the line items included in the original proposal by which the CM/GC was selected, and the comparable costs included in the specific GMP being presented, identifying and explaining deviations. The standard form accommodates this information based on commonly used line items, but is not necessarily all-inclusive of line items applicable in this instance.

E. The proposal is to be submitted to the Owner and copied simultaneously to the Designer.

F. Once submitted, the proposal must be firm for thirty (30) days for the Owner to evaluate and complete the award or amendment, including five (5) days allowed for the proposer to sign and return award or amendment documents, once provided by the Owner, plus all required bonds and insurance documents.

END OF SECTION
ASBESTOS SURVEY
INFORMATION AVAILABLE TO BIDDERS

ASBESTOS INVESTIGATION AND REPORT:

A. An investigation has been performed at the project site to determine the presence and probable extent of asbestos in the existing building materials. This investigation was conducted, and a report obtained, solely for design purposes and is not a part of the Contract Documents.

B. The use and interpretation of this information is entirely the responsibility of the using party. The Owner is not responsible for variations in the actual composition of existing materials. Bidders shall decide for themselves the character of the material to be encountered.

C. The report of the findings of this investigation is on file in the Designer’s office, and may be reviewed there by any prospective Bidder of Record. Bidders must call ahead to schedule an appointment. A copy will be provided to any Bidder of Record upon request.
GEOTECHNICAL INFORMATION AVAILABLE TO BIDDERS

SUB-SURFACE INVESTIGATION AND REPORT:

A. Sub-surface investigation has been performed at the project site. This investigation was conducted, and a report obtained, solely for design purposes and is not a part of the Contract Documents.

B. The use and interpretation of this information will be entirely the responsibility of the using party. The Owner is not responsible for variations in the sub-surface conditions. Bidders shall decide for themselves the character of the material to be encountered.

C. The report of the findings of this investigation is on file in the Designer's office, and may be reviewed there by any prospective Bidder of Record. Bidders must call ahead to schedule an appointment. A copy will be provided to any Bidder of Record upon request.
AVAILABLE INFORMATION REGARDING
OWNER’S SYSTEM OFFICE ACCESS

1.01 LOCATION

A. The Office of Facilities Development (OFD) physical and mailing address at the Tennessee Board of Regents (TBR) system office is:

Tennessee Board of Regents
Office of Facilities Development
1 Bridgestone Park
Nashville, Tennessee 37214-2428

B. The general contact phone number for TBR OFD is 615-366-4431.

1.02 ACCESS TO TBR SYSTEM OFFICE

A. Meetings related to OFD projects may occur on-site or elsewhere at the involved institution, the designer’s or contractor’s office, or the TBR system office, as befits the needs of those organizing the meeting. Public bid openings are considered meetings.

B. The 1 Bridgestone Park Building is in general an ADA compliant accessible building.

C. Anyone who wishes to enter the TBR System Office, whether to attend a meeting or deliver a bid or proposal or any other purpose, should contact one of the staff members shown below, or the staff member specifically hosting the meeting if known, and make known their intent to enter. Contact may be made in person, by writing, by email, by telephone, or otherwise, and should be received no later than 4:30pm on the third TBR business day prior to the arrival, unless specifically announced otherwise.

For meetings related to bid or proposal solicitations
Rilla Froggatt
615-366-3908
rilla.froggatt@tbr.edu

For other meetings and as back-up to Ms. Froggatt
Tammy Ray
615-366-4493
tammy.ray@tbr.edu

D. Anyone with a disability, when making their intent to attend a meeting known, per C above, should also at that time request services needed to facilitate attendance. TBR staff responding to such requests will obtain specific information and coordinate accommodations with building management personnel, and then advise the person who made the request.

END OF SECTION
### GMP SUMMARY

**Project:**
give SBC project number and name

**Presented by CM/GC:**
fill in name of CM/GC

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- self-performance (% of GMP):
- contingency (% of trades, GCs, Self):
- fee (% of GMP):

**GMP Summary**
00 42 23 - 1

February 2016 OFD s004223
Page 1 of 1
## GMP LIST OF TRADE SUBCONTRACTS

**Project:** Give SBC project number and name  
**Presented by CM/GC:** Fill in name of CM/GC

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# GMP Disclosure of General Conditions

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Notes:
- All costs should be calculated based on the original proposal and adjusted as needed.
- Deviations should be documented with a reason for any changes.

Posted in XLS format
General Work for CM/GC
February 2016 OFD s004275 page 1 of 1

GMP Disclosure of General Conditions
00 42 75 - 1
Agreement

Between Owner and Contractor

where the Basis of Payment is a STIPULATED SUM

Use only with the coordinated documents identified in the current Designers' Manual for projects of the State Building Commission of Tennessee and the Tennessee Board of Regents

AGREEMENT

made as of the day of in the year of

BETWEEN the Owner: STATE OF TENNESSEE
via the Contracting Agency: Tennessee Board of Regents

and the Contractor:

the Project:

the Designer:

The Owner and the Contractor agree as set forth below.
ARTICLE 1
THE WORK AND THE CONTRACT DOCUMENTS

1.1 The Contractor shall perform all the Work required by the Contract Documents for the Project identified on page one.

1.2 The Contract Documents are identified in the Conditions of the Contract (General, Supplementary, and other Conditions). These form the Contract and constitute the entire agreement between the Owner and the Contractor, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. An enumeration of the Contract Documents appears in paragraph 1.4.

1.3 Terms used in this Agreement which are defined in the Conditions of the Contract shall have the meanings designated in those Conditions.

1.4 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:
ARTICLE 2
TIME OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

2.1 The Work to be performed under this Contract shall be commenced on the date stipulated in the Notice to Proceed; and, subject to authorized adjustments, Substantial Completion shall be achieved.

2.2 Liquidated Damages, as set forth in paragraph 9.12 of the Conditions of the Contract, are

ARTICLE 3
CONTRACT SUM

3.1 The Owner shall pay the Contractor in current funds for the performance of the Work, subject to additions and deductions by Change Order as provided in the Contract Documents, the Contract Sum of

3.2 The Contract Sum is determined as follows:

3.3 The following Unit Prices will be used as specified:
This Agreement entered into as of the day and year first written above as witnessed:

**BY CONTRACTOR:**

Signature: 

Name: 

Title: 

**AND BY OWNER:**  STATE OF TENNESSEE  
Tennessee Board of Regents

APPROVED: 

APPROVED: 

APPROVED: 

BY: 

**END of AGREEMENT FORM** for the Project titled:
STATE OF TENNESSEE
DEPARTMENT OF FINANCE AND ADMINISTRATION
ACH (AUTOMATED CLEARING HOUSE) CREDITS (Not Wire Transfers)

NAME__________________________________________

Federal Identification Number or Social Security Number
(under which you are doing business with the State)

I (We) hereby authorize the State of Tennessee, hereafter called the STATE, to initiate credit entries to my (our) (select type of account) ______ CHECKING or ______ SAVINGS account indicated below and the depository named below, hereinafter called DEPOSITORY, to credit the same to such account.

This authority is to remain in full force and effect until the STATE has received written notification from me (or one of us) of its termination in such time and in such manner as to afford the STATE and DEPOSITORY a reasonable opportunity to act on it.

Have you ever received payments from the State through ACH? ______ (Yes or No). If yes, do you intend for this account information to replace existing account information currently used by the State? ______ (Yes or No). If yes, please specify account that should be changed: ABA No. ______ Account No. ______. Is this authorization only for certain types of payments? ______ (Yes or No). If yes, please indicate types:

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

Many banking institutions use different numbers for ACH. Please call your bank for verification of ACH transit and account number.
Bank official contacted: _____________________________________ Phone No. ______________________

DEPOSITORY/BANK NAME _____________________________BRANCH ____________________________
CITY ____________________________________________________STATE ___________________________
ACH TRANSIT / ABA NO. _____________________________ACCOUNT NO. _________________________
NAME(S) __________________________________________________________________________________
(Please print names of authorized account signatory)

DATE _______________________SIGNED X ______________________SIGNED X _____________________

PLEASE ATTACH A VOIDED CHECK (OR FOR SAVINGS ACCOUNTS, A DEPOSIT SLIP):

PLEASE INDICATE ADDRESS TO WHICH YOU WOULD LIKE YOUR REMITTANCE ADVICES ROUTED WHEN PAYMENTS ARE PROCESSED:

_______________________________________________________________________
_______________________________________________________________________
Contact name: __________________________________ Telephone No.: __________________

FOR STATE USE ONLY:
CONTACT AGENCY – ______________________________
CONTACT PERSON – _____________________________
PHONE NUMBER – _____________________________

FA-0825 (Rev. 4/96)
CONTRACT BOND
standard form for construction contracts under the State Building Commission of Tennessee

BOND NO. ____________________

Know all men by these presents: that we

(hereinafter called the "Principal") and

(hereinafter called the "Surety") do hereby acknowledge ourselves indebted and securely bound and held unto

(hereinafter called the "Owner"), and in the penal sum of

good and lawful money of the United States of America, for the use and benefit of those entitled thereto, for the payment of which, well and truly to be made, we bind ourselves, our heirs, our administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

But the condition of the foregoing obligation or bond is this:
Whereas, the Owner has engaged the principal for the sum of

to complete the Work of the project titled:

as more fully appears in a written agreement or contract bearing the date of

a copy of which said agreement or contract is by reference hereby made a part hereof, as fully and to the same extent as if copied at length herein, and it is the desire of the Owner that the Principal shall assure all undertakings under said agreement or contract and shall assure and protect all laborers and furnishers of material on said Work both as provided by Tennessee Code Annotated Sections 4-15-102(f)(2) and 12-4-201 through 12-4-206, and any and all amendments thereto, and shall assure the prompt payment of claims as provided by Tennessee Code Annotated Sections 12-4-207 through 12-4-208, and any and all amendments thereto. The Principal shall also comply with provisions of Tennessee Code Annotated Sections 12-4-401 through 12-4-415, and any and all amendments thereto, pertaining to the payment of the prevailing wage rate.
Now, therefore, if the Principal shall fully and faithfully perform all undertakings and obligations under the contract hereinafter referred to and shall fully indemnify and hold harmless the Owner from all costs and damage whatsoever which it may suffer by reason of any failure on the part of the Principal to do so, and shall fully reimburse and repay the Owner any and all outlay and expense which it may incur in making good any such default, and shall fully pay for all of the labor, material and work used by the Principal and any immediate or remote sub-contractor or furnisher of material under him in the performance of said contract, in lawful money of the United States, as the same shall become due, then this obligation or bond shall be null and void, otherwise to remain in full force and effect.

And for value received, it is hereby stipulated and agreed that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or to the specifications accompanying the same shall in any wise affect the obligation under this bond, and notice is hereby waived of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the specifications.

In witness whereof the Principal has hereunto affixed its signature and Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this ______ day of ______________, 20____.

Executed in __________ counterparts.

Witness:

______________________________________________  ________________________________________
(name of Principal)  (name of Surety)

______________________________________________  ________________________________________
(authorized signature)  (signature of Attorney-in-fact)

______________________________________________  ________________________________________
(name of signatory)  (name of Attorney-in-fact)

______________________________________________  ________________________________________
(title of signatory)  (Tennessee license number of Agent or Attorney-in-fact)

______________________________________________
(countersignature of resident Agent if not same as Attorney-in-fact)

Surety Company issuing bond shall be licensed to transact business in State of Tennessee by Tennessee Department of Commerce and Insurance. Bonds shall have certified and current Power-of-Attorney for the Surety’s Attorney-in-Fact attached. Attorney-in-Fact who executes bond on behalf of Surety shall be licensed by and a resident of State of Tennessee, and shall affix license number to bond; or, countersignature by a licensed agent who is a resident of State of Tennessee, and the agent’s license number, shall be affixed to the bond in addition to the signature of the Attorney-in-Fact.
THREE YEAR ROOF BOND
standard form for construction contracts under the State Building Commission of Tennessee

BOND NO. ____________________

GENERAL INFORMATION:
Principal: ____________________________
Surety (Name): ____________________________
(Address): ____________________________
Building Owner: ____________________________
Project: ____________________________

Project Contract Date: ____________________________

KNOW ALL MEN BY THESE PRESENTS:
That we, the Principal and the Surety, are held and firmly bound unto the Building Owner in the amount of

for the payment thereof in good and lawful money of the United States of America the Principal and the Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

Whereas, Principal has, by written agreement referenced above, entered into a contract (hereinafter referred to as "the Contract" and hereby referenced herein) with the Owner for the construction of the Project identified above.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall fully indemnify the Owner for all loss that the Owner may suffer by reason of any defective material and/or workmanship in the materials furnished for and the installation of the above referenced Project roofing system which become apparent during the period of three (3) years from the date of Substantial Completion of the above referenced Project roofing system, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Surety hereby agrees that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or to the specifications accompanying the same shall in any way affect the obligations under this bond, and notice is hereby waived of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the specifications.
IN WITNESS WHEREOF the Principal has hereunto affixed its signature and Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this ____ day of __________, 20__. Executed in __________ counterparts.

Witness:

____________________________________  ______________________________________
(name of Principal)  (name of Surety)

____________________________________  ______________________________________
(authorized signature)  (signature of Attorney-in-fact)

____________________________________  ______________________________________
(name of signatory)  (name of Attorney-in-fact)

____________________________________  ______________________________________
(title of signatory)  (Tennessee license number of Agent or Attorney-in-fact)

____________________________________  ______________________________________
(countersignature of resident Agent if not same as Attorney-in-fact)

Surety Company issuing bond shall be licensed to transact business in State of Tennessee by Tennessee Department of Commerce and Insurance. Bonds shall have certified and current Power-of-Attorney for the Surety’s Attorney-in-Fact attached. Attorney-in-fact who executes bond on behalf of Surety shall be licensed by and a resident of State of Tennessee, and shall affix license number to bond; or, countersignature by a licensed agent who is a resident of State of Tennessee, and the agent’s license number, shall be affixed to the bond in addition to the signature of the Attorney-in-Fact.
SUPPLEMENTARY CONDITIONS
REGARDING ALL CONTRACTS USING OFD CONDITIONS FOR GENERAL WORK.

MODIFICATIONS TO
OFD s007213 for General Work
(a modified AIA Document A201-1997)

GENERAL CONDITIONS
OF THE CONTRACT FOR CONSTRUCTION

The following supplements modify, change, delete from or add to "General Conditions of the Contract for Construction", and any other Conditions preceding these by section number for this Contract. Where a portion of Conditions is altered by these Conditions, the unaltered portion shall remain in effect.

--------------------------- ARTICLE 1 ---------------------------
GENERAL PROVISIONS

Add the following section:

1.1.4 The Project
Add to this section:
The Project is identified in the first page of the Agreement with an Owner’s project number in the format of 999/999-99-9999XX. This project number may differ from the number as used on other Contract Documents. This Owner’s project number is to be shown in all correspondence related to the project.

--------------------------- ARTICLE 3 ---------------------------
CONTRACTOR

3.4.7 Prevailing Wage Scale:
Delete this section in its entirety.

Add the following section:

3.22 Financial Records:

3.22.1 The Contractor shall maintain documentation for all charges under this Contract. The books, records, and documents of the Contractor, insofar as they relate to work performed or money received under this contract, shall be maintained for a period of three (3) full years from the date of the final payment and shall be subject to audit at any reasonable time and upon reasonable notice by the State, the Comptroller of the Treasury, or their duly appointed representatives. The financial statements shall be prepared in accordance with generally accepted accounting principles.

--------------------------- ARTICLE 9 ---------------------------
PAYMENTS and COMPLETION

9.10.6 Add: “If there is no Contract Bond, the final Certificate may be withheld until the prospect of final payment is advertised 30 days for the benefit of those to whom the Contractor may be indebted.”

END OF SECTION

INSURANCE and BONDS

11.1.1.5 Delete “other than to the Work itself”.
Add the following section:
11.1.2.6 Builder’s Risk Insurance (BRI) for the full amount of the Contract Sum, unless the Work consists entirely of hazardous materials abatement or other demolition with no constructive patching or renovating, in which case there will be no BRI.

11.3.1 Delete first sentence and substitute:
“The Contractor shall purchase from and maintain, with a company or companies licensed to do business in Tennessee by the Department of Commerce and Insurance, property insurance written on a builder’s risk “all risk” or equivalent policy form in the amount of the initial Contract Sum plus value of subsequent Contract modifications for the covered project at the site on a replacement cost basis.”

11.3.1.1 Delete the last two sentences and substitute, “Any deductibles shall be the responsibility of the Contractor.”

11.3.1.2 Delete this section.

11.3.1.4 Delete the clause in its entirety and substitute: This property insurance shall cover portions of the work stored off the site and also portions of the work in transit. The Contractor shall present a certificate of insurance demonstrating coverage of the property stored off the site or in transit at the time payment for that portion of the work is presented.

11.3.2 At beginning of first sentence delete “The Owner shall purchase…” and substitute “The Contractor shall purchase…”.

11.3.6 Substitute all references to “Owner” with “Contractor”, and substitute all references to “Contractor” with “Owner”.

11.3.8 Delete clause.

11.3.9 At the end of the section delete all after “shall be performed by the Contractor”.

END OF SECTION
SECTION 00 73 30

SUPPLEMENTARY CONDITIONS

A. GENERAL CONDITIONS

The General Conditions of the Contract for Construction, Standard Form of the American Institute of Architects, A201, 2007 edition, a copy of which is enclosed, is hereby incorporated as part of these Contract Documents.

B. SUPPLEMENTAL GENERAL CONDITIONS

The following supplements modify, change, delete from or add to the General Conditions of the Contract for Construction, AIA Document A201, 2007 edition. Where any article of the General Conditions is modified or any paragraph, subparagraph, or clause thereof is modified or deleted by these Supplementary General Conditions, all the remaining divisions of the article, paragraph, subparagraph, or clause not so specifically modified or deleted shall remain in effect. This document contains the A/E modifications primarily intended as the governing conditions for the A/E documents; and not intended to conflict with the Owner’s conditions. If any conflict should arise, that portion of this Document will be superseded by the TBR General and Supplementary Conditions.

ARTICLE 1

GENERAL PROVISIONS

1.1 Basic Definitions

Add the following new paragraphs:

1.1.9 DEFINITION OF TERMS

1.1.9.1 General Definitions: Definitions of construction terminology to be as defined in the Contract Documents or as stated in the "AIA Architect’s Handbook of Professional Practice". Proprietary (trade name) terms shall have definitions based on industry standards. Other definitions are as follows

1.1.9.2 Calendar Day: A 24-hour time period beginning and ending at midnight.

1.1.9.3 Furnish (or supply): To obtain and deliver to the project or predetermined site, unload, inspect for damage and store (protected from the elements) ready for installation.

1.1.9.4 Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean and make ready for use.

1.1.9.5 N.I.C. (Not In Contract): Work not indicated to be performed by the General Contractor’s forces in either the Contract Documents or the Agreement.

1.1.9.6 Products: New or existing materials, new or re-used fixtures, components, equipment, machinery and systems, which forms the Work (not including the equipment and machinery used for conveying, erection, fabrication and preparation of the Work).
1.1.9.7 Provide: To furnish (or supply) and install.
1.1.9.8 Working Day: A calendar day when Contract Work is performed. Unless stipulated in the Agreement, working days will be Monday thru Friday with Saturdays and Sundays reserved as lost time (weather) days or contractor's optional (non-overtime) working days. Major legal holidays will not be classified as working days.

1.2 Correlation and Intent of the Contract Documents

1.2.1 Add the following at the end of this subparagraph:

In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:
- The Agreement.
- Addenda, (those of later date regarding similar items having precedence).
- The Supplementary Conditions.
- The General Conditions of the Contract for Construction.
- Division 1 of the Specifications.
- Drawings and Divisions 2 thru 41 of the Specifications.
- Coordination with Owner equipment installation requirements.
- The A/E’s interpretation of the intent in question.

In case of inconsistency within the Documents, the drawings illustrate graphic intent and the specifications identify materials and procedures. Provide the scope of Work coordinated in accordance with both. Should the Drawings and Specifications appear to be in disagreement with each other relative to the quality or quantity of work required, the better quality and/or greater quantity shall govern, and shall be provided, unless instructions are otherwise furnished to the Contractor by the Architect in writing.

Add the following Subparagraphs:

1.2.4 Execute Work as per Contract Documents. Make no changes therefrom without having first received written permission from the Architect. Where detailed information is lacking, before proceeding with Work, refer matter to Architect for clarification.

1.2.5 If the Contractor observes any errors, discrepancies or omissions in the Contract Documents, he shall promptly notify the Architect, requesting clarification. If the Contractor proceeds with Work affected by such errors, discrepancies or omissions without receiving such clarification, he does so at his own risk. Any adjustments involving such circumstances made by the Contractor, prior to approval by the Architect, shall be at the Contractor's risk and the settlement of any complications or disputes arising therefrom shall be at the Contractor's sole expense.

ARTICLE 2

OWNER

2.2 Information and Services Required of the Owner

2.2.3 This subparagraph is modified to read as follows:
The Owner shall not be responsible for furnishing surveys or other information as to the physical characteristics of, legal limitations of or utility locations for the Project site, except as included in these Contract Documents. The Contractor shall confirm the location of each utility; shall excavate and relocate or dispose of each on-site utility and shall cap each utility as required by the Work or as may be included in the Specifications.

2.2.4 Add at the beginning of this subparagraph, "Upon receipt of a written request from the Contractor, the Owner shall…"

2.2.5 Delete paragraph and replace with the following:
2.2.5 The Contractor will be furnished, free of charge, an electronic file of the Drawings and Project Manual. Printed sets may be reproduced by the contractor at any time using these PDF format files at the cost of reproduction.

Add the following subparagraph.
2.2.6 The Contractor shall, within 21 calendar days of receipt of any information furnished by the Owner, verify and confirm the accuracy of the furnished information. In case of any inaccuracies, the Contractor shall promptly notify the Owner, who shall correct any such inaccuracy. Failure to notify the Owner within the 21 calendar days shall act to bar any claims by the contractor arising from the inaccuracy of any such information.

2.3 Owner’s Right to Stop the Work
2.3.1 Delete the word "repeatedly" in the first sentence of this subparagraph.

ARTICLE 3

CONTRACTOR

3.1 General
Add the following to 3.1.1:
The Contractor represents and warrants the following to the Owner in addition to any other representation and warranty given by the Contractor to the Owner, as an inducement to the Owner to enter into the Owner-Contractor Agreement. The representatives and warranties shall survive the execution of the Contract Documents and final completion of the Work and final payment therefore;
3.1.1.1 The Contractor is financially solvent, able to pay all debts as they mature, has sufficient working capital to complete the Work and perform all obligations of the Contract Documents in an efficient & capable manner;
3.1.1.2 The Contractor shall furnish the labor, tools, materials, supplies, and equipment required to complete the Work and perform all obligations of the Contract Documents and has sufficient experience & competence to do so;
3.1.1.3 The Contractor is authorized to do business in the state where the Project is located and is properly licensed by all necessary governmental, public and other Authorities Having Jurisdiction over the Project.
3.1.1.4 The parties executing the Owner-Contractor Agreement are authorized to do so; and are familiar with all aspects of the project, including all applicable codes, ordinances, regulations, laws and decrees which will affect the work.

Add the following to 3.1.3
No entity shall arbitrarily field modify the intent of this Contract Work without first obtaining the approval of the A/E of Record. Record changes as specified in Division 1.
3.2 **Review of Contract Documents and Field Conditions by Contractor**

Add to 3.2 the following:

3.2.1 add the following; “The accuracy of grades, elevations, dimensions or locations of existing conditions is not the responsibility of by the Architect/Engineer or the Owner; the Contractor is responsible for verifying all conditions.”

3.2.5 Mechanical and Electrical Drawings are diagrammatic only. Actual work involved shall be installed from approved shop drawings with all measurements obtained at the work site.

3.2.6 Dimensions that are lacking shall be obtained from the Architect. In no case shall drawings be scaled.

3.2.7 Where there is a conflict in or between the Drawings and Specifications, the Contractor shall be deemed to have estimated on the more expensive way of doing the work and/or the greater quantity required. Only changes or interpretations covered by Addenda or written from the Architect will be permitted during construction of the work.

3.4 **Labor and Materials**

3.4.2 Add the following at the end of this subparagraph:

See Substitution requirements specified in Article of the Instructions to Bidders (ITB). When the ITB is provided by the Owner, after the Contract has been executed, the Owner and the A/E will consider a formal request for the substitution of products in place of those specified only under the conditions of the General Requirements (Division 1 of the Manual, Section 01 25 00 – Substitution Procedures).

3.4.3 Add the following at the end of this subparagraph:

The Owner reserves the right to reject any Subcontractor or Material Supplier.

3.4.4 Add the following new subparagraphs:

3.4.4 The Contractor shall place orders for materials and equipment to be incorporated into the Work as soon as possible after the award of the Contract and receipt of approvals where applicable. The Contractor shall keep the Architect informed as to the availability of all specified materials and equipment. Nothing herein shall relieve the Contractor from its obligation to complete its Work as required by the Contract Documents on a timely basis.

3.4.5 See Section 01 60 00, Product Requirements and Section 01 73 00 Execution Requirements, for additional procedures and requirements.

3.5 **Warranty**

Add the following to subparagraph 3.5:

3.5.1 The Contractor shall guarantee his workmanship and materials for a period of one year from the date of acceptance by the Architect. Should defects develop within the guarantee period, the Contractor shall, upon written notice of same, remedy the defects and reimburse the Owner for all damage to the other work, whether caused by the defects or the work of correcting same.
The standard one-year warranty period shall start on the date that a Certificate of Substantial Completion is issued for the portion of the project in question.

In the case of replacement or repair due to failure within the guarantee period, the guarantee on that portion of the work shall be extended for a period of one (1) year from the date of such replacement or repair.

3.9 **Superintendent**

3.9.3 Add the following:
3.9.3.1 Superintendent shall be satisfactory to the Owner in all respects, and the Owner shall have the right to require the Contractor to remove any Superintendent from the Project whose performance is not satisfactory to the Owner, and to replace such Superintendent with a Superintendent who is satisfactory to the Owner. Contractor shall not replace the Superintendent without the consent of the Owner, except with another Superintendent who is satisfactory to the Owner.

Add to 3.9 the following Subparagraph:
3.9.4 Contractor shall have direct control and management of all construction operations and be responsible for the satisfactory overall performance of his suppliers and subcontractors in order that the entire Work be coordinated and supervised.

3.10 **Contractor’s Construction Schedules**

Add the following:
3.10.4 Refer to Section 01 32 16, Construction Schedule for procedures and requirements of Construction Schedule.
3.10.5 Construction schedules (submitted or not) which are at variance with the Agreement shall not relieve the contractor of liability or contractual obligations. The Owner’s or Architect’s receipt of or silence to a submitted schedule shall not render Owner or Architect liable for contractor damages incurred because of non-compliance or untimely performance.

3.11 **Documents and Samples on Site**

Add to 3.11 the following Subparagraph:
3.11.1 Refer to Specification Section 01 78 39, Project Record Documents, for requirements of record documents.

3.12 **Shop Drawings, Product Data and Samples**

Add to 3.12 the following Subparagraph:
3.12.11 Refer to Specification Section 01 33 23, Shop Drawings, Product Data and Samples, for additional procedures and requirements.

3.13 **Use of Site**

Add the following paragraphs:
3.13.1 Lands and Rights-of-Way: The Owner will furnish land and rights-of-way necessary for the completion of Work. The Owner will acquire the land and right-of-way with reasonable promptness. If lands / rights-of-way are not obtained before construction begins, then begin the Work on the land and
rights-of-way the Owner has acquired previously. No claim for damages will be allowed because of delay in obtaining remaining lands and rights-of-way.

3.13.2 Should the Owner be prevented from proceeding with the Work, before or after commencement, because of litigation, or because of the Owner’s inability to obtain lands or rights-of-way for the Work, Contractor shall not be entitled to make or assert claim for damage because of the delay, or to withdraw from Contract except by consent of the Owner. Time for completion of work will be extended to such time the Owner determines will compensate for time lost by the delay; such determination to be set forth in writing.

3.13.3 Work on or next to Private Property: Concerning Work on or next to private property, take every precaution to avoid damage to owners’ buildings, grounds and facilities. Be responsible for repair of damage to same. Carefully remove and protect fences, hedges, landscape elements and other site items within construction limits. Install original landscape and other site items when construction is completed.

3.13.4 Where ditches or excavations cross adjacent property, carefully remove sod before construction and replace sod when backfilling has been completed. If sod is damaged or not handled properly, replace it with new sod equal to existing sod at no additional expense to the Owner. Grade, fertilizer and seed grassed areas, when construction is completed. Follow requirements set out in these Specifications. Restore private property owners’ facilities and grounds to as good as or better than their original condition when construction is completed.

3.13.5 Remove large trees, or other facilities within actual construction limits that cannot be preserved and replaced. The Owner will assume responsibility for settling with property owner for loss of all trees or facilities within construction area. All items to be removed will be designated on Drawings. Be responsible to trees or facilities not designated.

3.14 Cutting and Patching of Work

Add to 3.14 the following Subparagraph:
3.14.3 Refer to Specification Section 01 73 29, Cutting and Patching, for additional procedures and requirements.

3.19 Add the following new paragraph:

3.19 LIEN WAIVERS AND NOTICES OF COMMENCEMENT

3.19.1 The Contractor will obtain from all its Subcontractors and Suppliers, regardless of tier, a lien waiver, at the time they enter into an agreement to provide labor, materials, equipment and/or supplies for the Project, of all lien rights they have with respect to the Project or the balance of the Contract Sum in the form of the Lien Waiver included in the Contract Documents or in such other form requested by the Owner and immediately deliver a copy of the executed lien waivers to the Owner. By entering into an agreement to provide labor, materials, equipment and/or supplies for the Project, such Subcontractors and Suppliers agree to provide such lien waivers to the Contractor.

Upon receipt of Notices of Furnishing, the Contractor will deliver copies of the Notices of Furnishing to the Owner. The Contractor will provide such Subcontractors and Suppliers a copy of its Performance Bond and Payment Bond.
ARTICLE 4
ARCHITECT

4.1 General

Add the following new subparagraph:

4.1.1 All uses of the terms “Architect”, “Architect/Engineer” or “A/E” refer to the Architect or Engineer of Record, or the authorized representative of that discipline.

4.2.4 Communications Facilitating Contract Administration

Add the following subparagraphs:

4.2.4.1 Direct communication between the Contractor and Engineering Consultants will be allowed provided that the Architect receives prior notification; and the contents of the conversation are documented and immediately submitted to the Architect for processing; or, if direct contact with the Engineer of Record will help expedite a solution in a more timely manner (followed by documentation to the Architect).

4.2.7.1 The Contractor shall not submit any shop drawings or portion of a submittal that is merely a tracing or copy of a Contract Document. Each submittal shall be prepared by the Contractor or a subcontractor/supplier of the Contractor. The A / E shall have the authority to reject any submittal that violates this provision, and no extension of the Contract Time shall be given because of such rejection. Submittal instructions are outlined in Section 01 33 23 – Shop Drawings, Product Data and Samples.

4.2.7.2 After the second rejection of a submittal, the A/E will invoice the Owner for additional services at the standard rates for all time accrued until submittal conforms to design intent. The Owner will deduct this fee from the progress payments.

Add the following Article:

4.3 Claims and Disputes

4.3.1 No increase in Contract Sum shall be granted due to improper submittals (outlined in Section 01 33 23).

4.3.2 Refer to subparagraph 1.1.8.8 for the definition of a working day. No time extensions will be granted if the number of workable weekend days exceeds the number of lost days documented during the course of the construction.

ARTICLE 5
SUBCONTRACTORS

5.2 Award of Subcontracts and Other Contracts for Portions of the Work

Add the following subparagraph:
5.2.2.1 The Contractor shall not contract with a person or entity not licensed in the state where project is located or not bonded for the amount of the proposed work. Submit as outlined in Section 01 33 23-Shop Drawings, Product Data and Samples

**ARTICLE 6**

**CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

6.1 **Owner’s Right to Perform Construction and to Award Separate Contracts**

Add the following to subparagraph 6.1.2:

6.1.2.1 The general contractor shall coordinate all Owner and future work that affects the work of all related trades performing work of this Contract.

**ARTICLE 7**

**CHANGES IN THE WORK**

7.1 **General**

Add the following new subparagraph:

7.1.4 Contractors shall mark Change Orders on the as built copy of the Drawings.

7.3 **Construction Change Directives**

Add the following subparagraph 7.3.11:

7.3.11 The allowance for the combined overhead and profit included in the total cost to the Owner shall be based on the following **maximums** (unless otherwise stipulated in the Agreement):

- **7.3.11.1** Cost to which overhead and profit is to be applied for all entities shall be determined following Subparagraph 7.3.7 of the A201.
- **7.3.11.2** For the Contractor, Work done by the Contractor’s own forces, 15 percent of the cost.
- **7.3.11.3** For the Contractor, Work done by the Subcontractor, 5 percent of the amount due the Subcontractor.
- **7.3.11.4** For each Subcontractor / Sub-subcontractor involved, Work done by that Subcontractor’s or Sub-subcontractor’s own forces, 10 percent of the cost.
- **7.3.11.5** For each Subcontractor, for Work done by the Subcontractor’s Sub-subcontractors, 5 percent of the amount due the Sub-subcontractor.
- **7.3.11.6** When both additions and credits are in any one change, the allowance for overhead and profit shall be figured on the basis of net change.
7.3.11.7 The maximum total percentage of the combined overhead & profit for all Work shall not exceed 20% of the actual base cost of the proposed change in work.

7.3.11.8 In order to verify quotations (for adds & deducts), all change documentation shall be accompanied by complete itemizations of costs (labor, material, subcontracts, etc) for amounts that exceeds $500.00.

**ARTICLE 8**

**TIME**

8.2 **Progress and Completion**

Add the following:
8.2.4 Project completion to be as indicated on the Form of Proposal.

8.3 **Delays and Extensions of Time**

Add the following subparagraph:

8.3.4. The following conditions will not justify a time extension claim:
8.3.4.1 A work day where at least seven hours of available work time and interior or covered work is possible.
8.3.4.2 A work day where interior / covered work is possible.
8.3.4.3 Any weekend that could have been utilized as make-up working days due to inclement weather as defined in subparagraph 1.1.8.8. (The use of weekends and holidays as standard work days must be stipulated in the Agreement and thus would void these days as make-up days.)
8.3.4.4 Delays due to product delivery or material preparation unless a change in work affects construction time.
8.3.4.5 Improper submittals as outlined in Section 01 33 23.

**ARTICLE 9**

**PAYMENTS AND COMPLETION**

9.2 **Schedule of Values**

Add the following subparagraph:
9.2.1 Schedule of Values shall be closely coordinated with the Construction Schedule such that the percentages of Work completed closely related to the values for the Work shown on the request for payments. The initial Schedule of Values (per 9.2) shall remain constant on each successive Application for Payment. Values assigned to changes in the Contract Sum shall be added to the Schedule of Values as an additional line item identified as a Change Order.
9.3 **Applications for Payment**

Add the following Clauses to Subparagraph 9.3.1:

9.3.1.3 The Form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment supported by AIA Document G703, Continuation Sheet.

9.3.1.4 The Contractor shall submit his Application for Payment on or before the twenty-fifth (25th) day of each month for work completed to that date.

9.3.1.6 “The procedure for the payment process is outlined in Section 01 29 00 – Payment Procedures. The retainage (5% unless stipulated otherwise in the Agreement) shall be withheld from all progress payments until substantial completion is determined. Refer to 9.8.5 for Payment of Retainage.

9.3.1.7 The full Contract Retainage may be reinstated if the manner of completion of the Work and its progress do not remain satisfactory to the Architect, or for other good and sufficient reasons.

9.3.1.8 Funds retained will be paid to the Contractor within 30 days after the Contractor has completed his obligations under this Contract.

Add the following Clause to Subparagraph 9.3.3:
9.3.3.1 Upon each application for payment, the Contractor shall submit to the Owner for review and use, a signed affidavit from each subcontractor, material or equipment supplier, laborer, or other parties which have provided goods, services, or equipment for the work covered under this contract, which states that they have received payment, less any retainage percentage, for all materials, supplies, labor, equipment, etc., which cost was included in all previous applications for payment. Such affidavit shall further release and waive all liens, claims, security interests, encumbrances, etc., for which an amount has been indicated and paid on a prior application for payment, except that the contractor, subcontractor, or material or equipment supplier may retain a security interest, lien claim, or encumbrance in the items supplied only to the extent of the retained percentage. Failure to provide the affidavit will result in a reduction of the application for payment equal to the amounts of all prior amounts paid which remain unaccounted for as a result of the payment affidavit.

9.5 **Decisions to Withhold Certification**

Add the following subparagraphs:

9.5.1.8 Rejection of the Work or any portion of the Work by any Authority Having Jurisdiction over the Project, or by the Owner’s lender.

9.5.4 In the event the Contractor shall cause the Architect to perform Additional Services and incur expenses concerning Change Orders, interpretations of the Documents, or defects / deficiencies in the Work, the Owner will withhold compensation for expense from the next Payment due to pay to the Architect. The Contract Amount shall be reduced by such amount.
9.6 **Progress Payments**

Add the following to Subparagraph 9.6.6:
“…nor shall any such Certificate of Payment, Payment, use or occupancy be construed as constituting the completion of work by the Contractor.”

Add the following Subparagraphs 9.6.8 through 9.6.13 to 9.6:

9.6.8 Upon commencement of the Work, an escrow account shall be established in a financial institution chosen by the Contractor and approved by the Owner.

9.6.9 The escrow agreement shall provide that the financial institution will act as escrow agent, will pay interest on funds deposited in such account in accordance with the provisions of the escrow agreement and will disburse funds from the account upon the direction of the Owner as set forth below. Compensation to the escrow agent for establishing and maintaining the escrow account shall be paid from interest accrued in the escrow account.

9.6.11 The interest earned on funds in the account shall accrue for the benefit of the Contractor until the completion date named in the Construction Contract or the expiration of any authorized extension of such date. Interest earned after such date shall accrue for the benefit of the Owner. Cost of compensation to the escrow agent paid out of interest earned shall be borne by the Contractor.

9.6.12 When the Contractor has fulfilled all of the requirements of the Contract providing for reduction of retained funds, the escrow agent shall release to the Contractor one-half of the accrued funds, but none of the interest thereon. When the Work has been fully completed in a satisfactory manner and the Architect has issued a final Certificate for Payment, the escrow agent shall pay to the Contractor the full amount of funds remaining in the Account, including net balance of the interest paid to the account, but less any interest that may have accrued for the benefit of the Owner, which shall be paid to the Owner.

9.6.13 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor, the escrow agent shall make payment to the Contractor as provided in Subparagraph 9.10.3.

9.10 **Final Completion and Final Payment**

Add to 9.10 the following Subparagraph:
9.10.6 Notwithstanding anything to the contrary contained in this Article 9, the Owner shall not be obligated to make final payment until after a Final Certificate for Payment has been issued by the Architect and the Project has been finally inspected and approved by the appropriate building inspectors, and, where required by law, a Certificate of Occupancy relative to the Project has been issued by an appropriate governmental authority.

**ARTICLE 10**

**PROTECTION OF PERSONS AND PROPERTY**

10.2 **Safety of Persons and Property**
10.2.2 Add the following at the end of this subparagraph: Contractor shall provide and maintain first aid and fire protection as required by national, state, and local authorities.

10.2.4 Add the following at the end of this subparagraph: When the use or storage of these types of materials or equipment is anticipated or scheduled, the Contractor shall give the Owner a minimum of 72 hours advance notice.

Add the following:
10.2.9 The Contractor acknowledges that the safety of the Owner's employees and guests and the safety of the general public is of the utmost importance. The Contractor will take no action which would jeopardize the safety of the Owner's employees or guests, or of the general public, and, without the Owner's written approval, shall take no action which would interfere with any of the Owner's activities. The Contractor shall also follow all NES safety rules.

10.4 **Emergencies**

10.6.1 Add the following at the end of this subparagraph: The Contractor shall provide the Owner a list of names and telephone numbers of the designated employees for each Subcontractor to be contacted in case of emergency during non-working hours. A copy of the list will also be displayed on the job site.

**ARTICLE 11**

**INSURANCE AND BONDS**

Delete the contents of this Article and replace with the following:
11.1 All requirements for insurance and bonds shall be provided by TBR.

**ARTICLE 12**

**UNCOVERING AND CORRECTION OF WORK**

12.3 **Acceptance of Nonconforming Work**

Add the following at the end of this subparagraph:

The acceptance of nonconforming Work by the Owner shall be by written Change Order signed by the Owner's authorized representative. No person has authority to accept nonconforming Work except pursuant to such written Change Order.

**ARTICLE 13**

**MISCELLANEOUS PROVISIONS**

13.3 **Written Notice**

Add the following clause at the end of this subparagraph: "or by facsimile transmission to the last known facsimile number of the party receiving the notice provided a copy is also sent to the last known business address by first class mail."
Add the following new article:

ARTICLE 16

EQUAL OPPORTUNITY

16.1 Equal Opportunity

16.1.1 The Contractor shall not, and it will ensure that its Subcontractors, regardless of tier, shall not discriminate against any employee or applicant for employment because of race, religion, age, sex, disability, Vietnam era veteran status, color or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion, transfer recruitment or recruiting advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship.

16.1.2 The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of nondiscrimination. The Contractor shall and will ensure that its Subcontractors, regardless of tier, shall, in all solicitation or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without race, religion, age, sex, disability, Vietnam era veteran status, color or national origin.

16.2 Affirmative Action

The Contractor and every subcontractor shall comply with affirmative action guidelines and requirements established by Tennessee and federal law and produce evidence of such compliance.

END OF SUPPLEMENTARY CONDITIONS
SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 GENERAL PROJECT DESCRIPTION

A. Project Description: The scope of this project consists of the construction of an addition and the renovation of, the DP Culp Center on the Campus of East Tennessee State University. Construction on the 3-story facility will consist of a 28,000 sf addition and 135,000 sf of renovation.

B. The Project is being constructed under a single phase Contract.

C. A geotechnical engineering subsurface investigation has been performed for this project. The report will be made available to all bidders.

1.02 DESCRIPTION OF WORK

A. The following is a brief description of Contract Work for this project: Release Package 2 is the Renovation and Expansion of ETSU's DP Culp University Center. The 228,000 square foot, 3 story facility will have 135,000 sf of space renovated and 28,000 sf of space added to the Building. The renovation and addition will include complete renovation and reconfiguration for all phases of work for parts of the building, a new exterior skin and roof to some areas of the building and site upgrades around the building including new terraces and balcony.

1.03 PROJECT SCHEDULE

A. Prepare a detailed construction procedure and schedule and submit it to the A / E for approval. Such procedure and schedule must be approved in writing by the A/E prior to the start of construction work.

B. Completion of the work within the time frame allotted is critical to the project and the schedule will be strictly adhered to. Contractor shall be responsible for the expediting of the fabrication and delivery of materials and equipment and shall coordinate delivery of same with the approved construction schedule to allow for completion within the time period specified in the Form of Proposal.

1. It is recognized that the work can be unavoidably affected or influenced by governing regulations, natural phenomena including weather conditions and other forces outside the Contract Documents. However, every effort must be made to keep the project on schedule due to the firm deadline established by the Owner for this particular phase of the work.

1.04 MISCELLANEOUS PROVISIONS
A. Performance Requirements for Completed Work: Provide the final and completed project complete and ready for use in every respect by the completion date specified herein.

1. Contract Documents indicate the intended occupancy and utilization of the building and its individual systems and facilities. Compliance with all applicable governing regulations, codes and standards is intended and required for the work and for the Owner's occupancy and utilization.

2. In addition to the requirement that every element of the work comply with applicable requirements of the Contract Documents, it is also required that the work as a whole comply with all applicable industry standards and governing codes and regulations.

END OF SECTION
PART 1 - GENERAL

1.01 Include in Contract Sum the allowances stated in Contract Documents. Designate in construction progress schedule the delivery dates for products specified under each allowance.

1.02 Refer particularly to Conditions section 3.8 for inclusions and exclusions not specified below.

1.03 Administration of allowances

A. Contractor’s duties in selection of products under allowances
   1. Assist the Designer and Owner in determining qualified suppliers or installers.
   2. Obtain bids from suppliers and installers when requested by the Designer.
   3. Make appropriate recommendations for consideration of the Designer.
   4. Notify the Designer promptly of:
      a. Reasonable objections against a supplier, or party under consideration for installation.
      b. Effect on the Construction Schedule anticipated by selections under consideration.

B. Adjustment of costs
   1. Continuously monitor the use of each allowance and the anticipated use to complete the Work. Do not exceed an allowance.
   2. If an allowance is at risk of being exceeded, request a modification to increase the allowance in a timely manner to avoid delay in the Work.
   3. If all of the Work of an allowance is complete and there is unexpended allowance remaining, request a modification to decrease the allowance to equal the amount that has been used.

END OF SECTION
PART 1 - GENERAL

1.01 SECTION INCLUDES identification of each Alternate by number, and describes the basic changes to be incorporated into the Work if a particular alternate is made a part of the work by specific provisions in the Agreement between the Owner and the Contractor.

1.02 RELATED SECTIONS are referenced in the definition of each Alternate.

1.03 COORDINATION of related work and modifications to surrounding work as required to properly integrate each Alternate, and to provide the complete construction required by the Contract Documents, is the responsibility of the Contractor.

1.04 DESCRIPTION OF ALTERNATES:

Alternate #1 – Existing building exterior surface cleaning

Base Bid: Standard construction close-out building cleaning per section 01 74 00.

Alternate: In addition to the base bid work noted above, provide pre-construction existing building exterior surface cleaning as outlined in Section 04 01 21 and as noted on the drawings.
PART 1 - GENERAL

1.01 SUBSTITUTIONS:

A. Substitute products should not be ordered and shall not be installed without written approval or acceptance from Designer. Contractor assumes all risks associated with premature ordering and installation of substitute products.

B. The specifically named manufacturers, products, and systems, and descriptive characteristics used in the Contract Documents normally serve only to establish a level of quality and a performance standard. Unless specific restriction is placed upon an item in the specifications, Contractor may submit proposals for substitutions. The Owner reserves the right to disallow substitutions. Contractor assumes risks associated with possible rejection of proposals for substitution submitted during the life of the contract.

C. Delays caused by tardiness of Contractor in preparing and forwarding submittals do not constitute an acceptable basis for consideration of substitute products. Delays due to factors which were in effect prior to project bidding do not constitute an acceptable basis for consideration of substitute products.

1.02 SUBSTITUTION REQUEST FORM:

A. Requests for substitutions shall be submitted to Designer on the form exhibited as Section 01 25 33, or in a similar format which provides the same or more information.

B. When making requests for substitutions, Contractor assumes the following responsibilities:

1. To have personally investigated the proposed substitute product and determined it is equal or superior in all respects to that specified;

2. To provide the same warranty for substitute that Contractor would for that specified;

3. To provide complete cost data, and waive all claims for additional costs related to substitution which subsequently become apparent; and

4. To coordinate installation of the accepted substitute, making such changes as may be required for Work to be complete in all respects.

END OF SECTION
SECTION 01 25 33
PRODUCT SUBSTITUTION REQUEST FORM

To:  

Attn:  

Specified Item:  

Project:  

Proposed Substitute:  

1. The following are attached (Mark all that apply):
   - Complete Description
   - Laboratory Tests
   - Catalog
   - Spec Data
   - Information on the availability of maintenance services and replacement materials for proposed substitute(s)
   - Names, addresses, and phone numbers of fabricators and suppliers for proposed substitute(s)

2. This substitution will have the following effects on dimensions, gauges, weights, etc.:

3. This substitution will have the following effects on wiring, piping, ductwork, etc.:

4. This substitution will have the following effects on other trades:

5. This substitution will have the following effect on construction Schedules:

6. The proposed substitute(s) differs from the specified product(s) in quality and performance as follows:

7. Manufacturers guarantees for the substitute(s) and the specified product(s) are (check one):
   - the same
   - different (If different, explain below)
8. If the proposed substitution is accepted, it will result in:
   - [ ] no cost impact
   - [ ] a cost increase of
   - [ ] a cost decrease of
   (If change in cost is indicated, itemization on specified Cost Itemization Form is attached)

9. License fees or royalties are pending on the proposed substitute.
   - [ ] No
   - [ ] Yes (if yes, explain below)

10. The undersigned or the firm represented shall pay for additional studies, investigations, submittals, redesign, and analysis by the Designer necessitated by this substitution request.

Submitted by:
   Sign here: ___________________________  Date: ____________

   Name: ____________________________
   type or print: ____________________________
   for: ____________________________
   Name of firm: ____________________________

Address:
   Street address: ____________________________
   and mailing address if different: ____________________________
   City, State, and Zip Code: ____________________________

Designer’s Review Comments:
   - [ ] Accepted
   - [ ] Accepted as noted
   - [ ] Rejected
   - [ ] Rejected (received too late)
   - [ ] Rejected (submittal incomplete)

   Additional comments:

   For the Designer:
   Signature here: ____________________________  Date: ____________
SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 SUPPORTING DOCUMENTATION for PROPOSALS or CLAIMS


B. For a change in the Work, specifically describe proposed change, or briefly describe the proposed change with specific reference to a completely descriptive attachment, such as a Request for Proposal from the Designer.

C. For a change in Contract Sum, state briefly the reason for change, state the amount, and provide itemization of values on the following forms, or similar forms providing the same information:
   1. Section 01 26 54 Form for Price Summary: listing the itemizations of work by subcontractors and the Contractor that together apply to an entire related change in work.
   2. Section 01 26 55 Form for Price of Work: detailing the quantities, units, costs, and extensions for materials, equipment, and labor, subtotaled, plus overhead, and profit related to a specific proposed change in the Work.
   3. Section 01 26 56 Form for Price of Time: if applicable, deriving an average cost per day.

D. For a change in Contract Time:
   1. Fully describe the extent of and reasons for the change and effect of the change on the construction schedule, and attach a revised Progress Schedule. Take into account weekends, holidays, and the specified standard baseline for weather delays during the period of the requested extension.
   2. For a change based on weather-related delay, provide and attach:
      a. applicable specified Weather Delay Reports, or, if none is specified, daily work logs that describe actual local weather conditions and their impact on progress.
      b. National Oceanic and Atmospheric Administration (NOAA) weather data, for corroboration.
      c. NOAA comparative data on normals, means, and extremes if such data or another weather baseline is not already provided in Contract Documents.

1.02 SIGNATURES for Change Order:

A. Form shall be similar in format and content to Section 01 26 40, and signed by authorized representatives of each of the entities required by Conditions of the Contract.

B. Normal procedure shall be that:
   1. Designer prepares and submits supporting documents to Owner.
   2. Owner produces and signs three (3) counterparts of form; transmits by fax, e-mail, or other means, informational copies to its Construction Representative, Designer, and Contractor; and forwards.
   3. Owner’s Construction Representative receives counterparts, and brings them to next Progress Meeting, unless urgency and opportunity make for a more timely execution.
   4. Designer and Contractor both sign all three (3) counterparts at Progress Meeting. Each retains a counterpart, and the Owner’s Construction Representative retains the third for the Owner.

END OF SECTION
PART 1 - GENERAL

1.01 EXTENSIONS OF CONTRACT TIME

A. If the basis exists for an extension of time in accordance with paragraph 8.3 of the Conditions, an extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for that month.

1.02 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

A. The Owner has reviewed weather data available from the National Oceanic and Atmospheric Administration and determined a Standard Baseline of average climatic range for the State of Tennessee.

B. Standard Baseline shall be regarded as the normal and anticipatable number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the Work and is not eligible for extension of Contract Time.

C. Standard Baseline is as follows:

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>11</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>6</td>
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<td>5</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

1.03 ADVERSE WEATHER and WEATHER DELAY DAYS

A. Adverse Weather is defined as the occurrence of one or more of the following conditions which prevents exterior construction activity or access to the site within twenty-four (24) hours:

1. precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure
2. temperatures which do not rise above 32 degrees F by 10:00 a.m.
3. temperatures which do not rise above that specified for the day's construction activity by 10:00 a.m., if any is specified
4. sustained wind in excess of twenty-five (25) m.p.h.
5. standing snow in excess of one inch (1.00")

B. Adverse Weather may include, if appropriate, "dry-out" or "mud" days:

1. for rain days above the standard baseline;
2. only if there is a hindrance to site access or sitework, such as excavation, backfill, and footings; and,
3. at a rate no greater than 1 make-up day for each day or consecutive days of rain beyond the standard baseline that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the Designer.

C. A Weather Delay Day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the contractor's scheduled work day, including a weekend day or holiday if Contractor has scheduled construction activity that day.
1.04 DOCUMENTATION and SUBMITTALS

A. WEATHER DELAY REPORT:
   1. Use a copy of Section 01 26 25 as a Weather Delay Report, indicating for each calendar month the
days on which construction activity affecting the critical path of the Work was prevented by weather
conditions.
   2. In the column for the cause, indicate measurement of precipitation, temperature, wind, or other
influencing factors.
   3. Describe the construction activity that was scheduled, on the critical path, and delayed.
   4. At the end of the month, add up the number of days delay, subtract the baseline number given in this
Section, and show the resulting claimable days in excess of baseline.
   5. Submit a copy of the completed report with the next application for payment. Reports submitted with
applications for payment do not constitute a claim or preliminary claim for extension of time.

B. When making a claim for a time extension based on weather delay(s):
   1. Submit a copy of all reports completed since the last month for which a time extension was previously
claim, or the commencement of Work if no previous claim, through the last month for which delay is
being claimed. Claims for time extension based upon weather delays are unjustified if a submitted
report does not corroborate the claim or if no report was submitted when it was required with an
application for payment.
   2. Submit daily jobsite work logs showing which and to what extent construction activities have been
affected by weather on a monthly basis.
   3. Submit actual weather data to support claim for time extension obtained from nearest NOAA weather
station or other independently verified source approved by Designer at beginning of project.
   4. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and
submit in accordance with the procedures for Claims established in Article 15 of the Conditions, and
the applicable General Requirements.
   5. If an extension of the Contract Time is appropriate, it shall be implemented in accordance with the
provisions of Article 7 of the Conditions, and the applicable General Requirements.

END OF SECTION
# SECTION 01 26 25
## WEATHER DELAY REPORT

<table>
<thead>
<tr>
<th>Date</th>
<th>Weather Condition Causing Delay</th>
<th>Work Scheduled on Critical Path for This Day That Was Delayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>30</td>
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<td>31</td>
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</tbody>
</table>

Total number of days this month with delay due to weather

Baseline number from Section 01 26 20

Total – Baseline = Claimable Days
SECTION 01 26 40
FORM FOR AMENDMENT, CHANGE ORDER, OR DIRECTIVE

[ ] Amendment  
[ ] Change Order  
[ ] Construction Change Directive

Modiﬁcation Number:

PROJECT:

Original Contract Date:
This Change initiated:

The following changes in the Contract are hereby directed:

<table>
<thead>
<tr>
<th>Item</th>
<th>Reference</th>
<th>Work</th>
<th>Contract-Sum</th>
<th>Contract-Time</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

The original Contract Sum ................................ ................................ ......................... $
Net Change previously authorized ................................ ................................ .............. $
The Contract Sum prior to this Modiﬁcation ................................ ................................ $
This modiﬁcation ( increases / does not change / decreases ) the Contract Sum...... $
The new Contract sum, including this modiﬁcation ................................ ....................... $
This modiﬁcation ( increases / does not change / decreases ) the Contract Time....... 
The new Contract Time, including this modiﬁcation ................................ ........................
The last day of the Contract Time, including this modiﬁcation .................................

CONTRACTOR  
Signed

OWNER
Signed

DESIGNER
Signed

Name
&
Date
For

Name
&
Date
For

Name
&
Date
For
## SECTION 01 26 54
### FORM FOR PRICE SUMMARY

**Cells with red underline (if viewed in color) are for you to fill in. Others are protected.**

Rounding off is permitted if rounding up for decreases and rounding down for increases. Math functions in XLS show rounded to nearest penny, but carry exact value for calculations. Let embedded math do its work.

This XLS spreadsheet is available on Owner's website, Designers' Manual, Bidding Documents, listed by its Section number and title.

### Costs and Allowances

<table>
<thead>
<tr>
<th>Work by Subcontractors</th>
<th>Name of Subcontractor</th>
<th>Costs and Allowances</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

**Subtotal:** 0.00

**General Contractor mark-up on Subtotal:** __% = 0.00

**Subtotal for General Contractor for work by subcontractors:** 0.00

**Work by General Contractor**

<p>| | | |</p>
<table>
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</tbody>
</table>

**Subtotal (including Subcontractors and the General Contractor):** 0.00

**Bond Premium:** __% = 0.00

**Total:** 0.00

---

Posted in XLS format

*July 2012 OFD s012654 page 1 of 1*
### Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Material</th>
<th>Equipment</th>
<th>Labor</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Unit Cost</td>
<td>Extension</td>
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</tbody>
</table>

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Let embedded math in "extension" columns do its work.

This XLS spreadsheet is available on Owner's website, Designers' Manual, Bidding Documents, listed by its Section number and title.
<table>
<thead>
<tr>
<th>Description</th>
<th>Period Cost</th>
<th>Period</th>
<th>Cost Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superintendent Salary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superintendent Vehicle</td>
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<td></td>
<td></td>
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<tr>
<td>General Use Vehicles</td>
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<td></td>
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<tr>
<td>Field Office</td>
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<td></td>
<td></td>
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<tr>
<td>Field Office Equipment</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fax Machine</td>
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<tr>
<td>Copier</td>
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<td>Typewriter</td>
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<tr>
<td>Calculator</td>
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<td>Telephone Service</td>
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<td>Shed</td>
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<td>Trailer</td>
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<tr>
<td>Safety Program</td>
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<td></td>
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<tr>
<td>Cleaning</td>
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<td></td>
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<tr>
<td>Site Toilet(s)</td>
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<td></td>
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</tr>
</tbody>
</table>

Subtotal of Costs:

10% for Overhead:

Subtotal with Overhead:

5% for Profit:

Total per day:
PART 1 - GENERAL

1.01 DEFINITION

A. The CM/GC-GMP Contingency and the Reserve Fund are defined in the CM/GC Master Contract Attachment 1 Scope of Services and Deliverables.

B. The CM/GC-GMP Reserve Fund is an accumulation from trades that were estimated at the time that the GMP was agreed upon and are later bid to complete the trade bidding. Trades that bid less than estimated add the difference to Reserve. Trades that bid more than estimated deduct the difference from Reserve. Once all estimated trades are bid and awarded, if there is a net negative Reserve, the amount is charged to the GMP Contingency, regardless whether the GMP Contingency has sufficient balance to cover the charge. The Reserve does not accumulate from savings through substitutions, reductions in Work, nor unused remainders of allowances; rather, such savings are to be returned to the Owner through an appropriate modification as soon as they occur.

1.02 CM/GC-GMP CONTINGENCY LOG

A. Maintain a Contingency Log on the specified form, showing for each item a sequence number, brief caption description, individual cost, the portion of that cost currently incurred for Total Completed and Stored to Date of applications for payment, and whether the item needs or has received concurrence required by 1.02.C. If there are Phases, make sequence numbering subordinate to each Phase, grouping the items by Phase, and provide a subtotal for each Phase.

B. Providing a copy of Log to Owner and Designer constitutes written advisement for items clearly fitting definition.

C. When providing an updated Log that contains items not clearly fitting Contingency definitions that have not been given written concurrence by Owner and Designer accepting the inclusion in the Contingency, identify such items and obtain written concurrence from Designer and Owner in the form of their initials upon a copy of the Log next to each such item.

1.03 RESERVE FUND LOG

A. Maintain a Reserve Fund Log on the specified form, showing for each estimated trade:
   1. the Name of the successfully bidding subcontractor engaged for the trade, once trade bidding is actually completed. Until then, while trade bidding is pending, leave the subcontractor blank;
   2. the Date for trade bidding, whether pending a future occurrence, or actually having occurred; or, when an exception to trade bidding has been authorized by the Owner, the date of authorization;
   3. the Description of the trade, and, if the amount of the trade is split between multiple line items in the schedule of values, the line items of the Schedule of Values that together account for the full amount of the trade;
   4. the Estimated Value of the trade as agreed;
   5. the Actual Price of the trade, once trade bidding has actually occurred and subcontracts awarded based upon bidding; and,
   6. the Effect on Reserve, which is the Estimated Value minus the Actual Price.

B. The Reserve Log spreadsheet calculates the Effect on Reserve once a Name is filled in. This formula is filled in for enough rows to fill most or all of the first page. If the Log requires further rows, copy the formula into the additional rows.

C. List the estimated trades in the order they are listed in the agreement and amendments, if any.

D. As trade bidding is completed for each trade, report the results, identifying the trade(s) procured, and providing an updated copy of the Reserve Log, bid tabulation, and a copy of the bids received.
E. Except as may be allowed according to paragraph F immediately below, if an estimated trade is not procured by bidding, it loses its status as an estimated trade and instead becomes a scope gap to be paid from the GMP Contingency. In this case, enter this in the Reserve Log with “scope gap” as the Subcontractor, the effective date as the Date, the Description unchanged, the Estimated Value unchanged, zero as the Actual Price, and the resulting increase Effect on Reserve.

F. Owner may authorize an exception to the requirement of bidding a trade when: the trade is a relatively small add to an existing subcontracted trade; or, if the trade is relatively small and impractical to procure through bidding; or, if the trade has been specified as proprietary or sole-source; or, if the trade is work that can only be provided by a local utility or government. In such exceptional cases, the CM/GC will provide an itemized cost for that trade using specification section 01 26 55; or, if a local utility or government, then whatever is their customary means of presenting their costs.

G. If Owner authorizes a transfer of Reserve into Contingency, enter this in the Reserve Log with the name of the Owner employee authorizing the transfer as the Subcontractor, the authorization date as the Date, “Owner authorized transfer” as the Description, zero as the Estimated Value, the amount of authorized transfer as the Actual Price, and the resulting decrease Effect on Reserve.

H. Attach current copy of Reserve Log to each counterpart of each Application for Payment.

1.04 EFFECT ON THE SCHEDULE OF VALUES
A. Include only values consistent with the current Contingency Log and Reserve Log. To the extent that 1.02.C requires concurrence for items, include only values consistent with concurrences received.

B. Include a single line item in the Schedule of Values for the Reserve Fund. If there are no phases in the Schedule of Values, include a single line item in the Schedule of Values for the CM/GC-GMP Contingency, and represent values as for other line items.

C. If there are Phases in the Schedule of Values:
   1. include an overall line item for the portion of the CM/GC-GMP contingency not included in a Phase;
   2. include also a line item in each Phase for its portion of the CM/GC-GMP contingency;
   3. initially, set CM/GC-GMP contingency values at full value for overall, and zero for each phase;
   4. as costs are assigned to CM/GC-GMP Contingency, to the extent costs are applicable within phases, increase scheduled value of applicable Phase, and reduce scheduled value of overall CM/GC-GMP contingency, so their sum remains constant; and,
   5. represent values for each CM/GC-GMP contingency line item as for other line items.

D. Include estimated trades as distinct line items in the Schedule of Values, initially showing these at their Estimated Value, later adjusting them to their Actual Price as the trade bidding is completed.

1.05 EFFECT ON APPLICATIONS FOR PAYMENT:
A total completed and stored to date for an estimated trade cannot be included in an application for payment until the procurement has been completed and the effect on Reserve shown in the Reserve Log.

1.06 EFFECT ON PROGRESS SCHEDULE AND PUBLIC ADVERTISEMENT:
A. In the Progress Schedule, show the bid dates for each estimated trade as also shown in the Reserve Log. In the Progress Schedule, include the period during which the trade will be released for solicitation of its trade bids.

B. Inform the Owner’s bidding coordinator specifically when each trade enters solicitation, and ensure that the bidding coordinator has posted the public advertisement for the suitable period approved by the Owner’s project manager.

END OF SECTION
<table>
<thead>
<tr>
<th>Date</th>
<th>Credit</th>
<th>Charge</th>
<th>Remaining Contingency</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Date</td>
<td>Description</td>
<td>Estimated Value</td>
<td>Actual Price</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>-------------</td>
<td>-----------------</td>
<td>--------------</td>
</tr>
</tbody>
</table>

**Current Reserve:** 0.00

**SECTION 01 29 18**

**FORM FOR CM/GC GMP RESERVE FUND LOG**

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**Reserve Fund Log**

**01 29 18 - 1**

**Posted in XLS format**

**General Work for CM/GC**

**July 2015 OFD s012918 page 1 of 1**
PART 1 - GENERAL

1.01 Basic Requirements
   
   A. Retainage escrow requirements are mandated by Chapter No. 340 House Bill No. 966 Public Acts of 1985 which was passed by the Tennessee General Assembly.
   
   B. Conditions of Contract, in accordance with State law, require retainage to be deposited into an interest-bearing escrow account if the Contract Sum $500,000 or greater. Compliance is mandatory and cannot be waived.
   
   C. Failure to have the escrow account operational by the time of the contractor's second application for payment can result in delay of payment or inability of the Owner to make payment. Any such delay or inability to pay will not be grounds for relief under the prompt payment statutes.
   
1.02 The banking institution handling the retainage escrow account must be in an appropriate custodial care agreement with the State Treasurer. If not already in such an agreement, a banking institution can request such an agreement from the State Treasurer, subject to meeting eligibility requirements of TCA section 12-4-108(c).

1.03 Getting Started
   
   A. Shortly after award of Contract, the Tennessee Department of Finance and Administration (F&A) will send the Contractor its latest information for starting the account. This information typically includes:
      1. procedural guide
      2. forms, including the basic application, colloquially referred to as “Form A”.
      3. list of banks that currently have agreements with the State to host retainage escrow accounts
   
   B. Getting help
      1. The instructions from F&A will include a name and phone number to call for help:
         a. If the Contractor needs help completing Form A.
         b. If the Contractor plans to use a lending institution that does not have a current agreement with the State for hosting retainage escrow.
      2. At the time this standard specification is written (see bottom left of page) the contact person for help in setting up new escrow accounts and completing Form A is Mary Mansour at (615)741-1317.
   
   C. To avoid delays in setting up the escrow, and possible delays in payment, do not wait to be contacted by F&A as described above. Instead, if the Contract Sum is $500,000 or greater, as soon as the Contract is awarded, take the Form A that is page 2 of this Section, get it filled out and executed with the escrow bank, and have the bank send the original wet-signature Form to
      
      ATTN: Mary Mansour
      Tennessee Department of Finance and Administration
      Office of Business and Finance
      Suite 2000 William R. Snodgrass Tennessee Tower
      312 Rosa L. Parks Avenue
      Nashville TN 37243-0294

1.04 A sample of Form A is provided on page 2 of this Section. Otherwise, this is the …
FORM A
APPLICATION FOR THE SUBSTITUTION OF SECURITIES FOR ALL AMOUNTS RETAINED ON STATE BUILDING COMMISSION CONSTRUCTION CONTRACTS

Date: ________________________________

RE: Contract Number: ________________________________

Project No.: ________________________________

Location: ________________________________

Dear State Building Commission:

Pursuant to the provisions of Tennessee Code Annotated, Sections 12-4-108,

hereby requests that whenever payment for which certain amounts are retained by the State Building Commission as determined by the subject construction contract, the amount so retained be substituted for approved securities, as designated by the Tennessee State Treasurer.

The undersigned Contractor hereby appoints ________________________________ (Name of Banking Institution)

located at ________________________________ (Complete Address of Banking Institution)

agent and attorney-in-fact to receive all amounts retained by the State Building Commission under the provisions of the subject construction Contract and to purchase Retainage Securities of the following type: ________________________________ (Description & Account Number)

The appointed Banking Institution, as indicated by the acceptance signature shown below, agrees to enter or has already entered into a Trust Agreement with the Tennessee State Treasurer to act as custodian and servicing agent of Retainage Securities and to perform all assigned duties and responsibilities with respect thereto as set forth in the Trust Agreement, which is herein incorporated by reference.

Very truly yours,

(Signature of Authorized Representative of Contractor) (Title)

ACCEPTED:

(Signature of Authorized Officer of Banking Institution) (Title)

CONTACT PERSON (BANK) ________________________________

PHONE NUMBER ________________________________
SECTION 01 29 73
SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 RELATED SECTIONS

A. Phases are normally set forth in the Agreement and in the Summary of Work specification, normally from 01 10 00 to 01 10 19, but may differ in this Project Manual.

B. Applications for Payment and the final statement of accounting are normally specified in sections from 01 29 00 to 01 29 99, such as OFD standard Section 01 29 76, but may differ in this Project Manual.

C. Allowances are normally specified in sections from 01 21 00 to 01 21 99, such as OFD standard sections 01 21 13 and 01 21 15. Allowances associated with Unit Prices are normally in sections from 01 22 00 to 01 22 99, such as OFD standard sections 01 22 13 and 01 22 15. The arrangement of sections may differ in this Project Manual.

1.02 FORM and APPROVAL

A. The form for schedule of values shall be AIA Document G703 Continuation Sheet.

B. If objected to by Designer, revise and resubmit to Designer's satisfaction prior to submitting application for payment. If during construction, a line item's total completed and stored to date for payment purposes exceeds or is anticipated to exceed allocations, revise and resubmit a schedule of values such that no values of completed work exceed their allocations.

1.03 ALLOCATION OF VALUES

A. If the Work is divided into defined portions ("Phases"), intended to have distinct commencement, duration, or completion requirements, divide the allocation to correspond to the Phases, providing a sub-total for each Phase; then within each Phase, subdivide the allocations as specified in the following paragraphs.

B. Provide at least these three line items to account for General Requirements:
   1. Mobilization, staging, and general start-up costs.
   2. Construction administration and temporary facilities, prorated over the course of the project.
   3. Maintenance of Record Documents, prorated over the course of the project.

C. If sitework is included, other than minor sitework incidental to a building or major structure, include sitework in single line item or group of line items. Within the group, categorize site utilities, roads and parking, and appurtenances according to general type and physical separation. If allowances are stipulated in the Work relating to sitework, provide a line item for each such allowance, including quantity allowances associated with Unit Prices.

D. For each involved building or major structure:
   1. If allowances are stipulated in the Work, provide a line item in the Schedule of Values for each allowance, including quantity allowances associated with Unit Prices.
   2. If the Contract is a CM/GC contract based on a Guaranteed Maximum Price (GMP) with estimated trades identified as a part of the GMP, provide a distinct line item for each estimated trade.
   3. Categorize by major trades or units of work corresponding to the current Progress Schedule, and relate to the Divisions and Sections of the Specifications.
   4. Further subdivide as desired, but maintain a distinct and identifiable correspondence to this allocation.

E. Account for Modifications by incorporating them into the appropriate allocations, or with a line item for each, until incorporating each into the appropriate allocations for the final statement of accounting.

END OF SECTION
SECTION 01 29 76
APPLICATIONS AND CERTIFICATES FOR PAYMENT

PART 1 - GENERAL

1.01 SUBMITTAL:
A. In each application for payment, according to its context, provide:

<table>
<thead>
<tr>
<th>Counterpart or Copy</th>
<th>Progress Payment</th>
<th>Reducing Retainage upon SC</th>
<th>Final Payment</th>
<th>Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>counterpart</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>G702 Application</td>
</tr>
<tr>
<td>copy</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>G703 Continuation</td>
</tr>
<tr>
<td>copy</td>
<td>no</td>
<td>no</td>
<td>YES</td>
<td>Final Accounting</td>
</tr>
<tr>
<td>copy</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>Contingency &amp; Reserve Logs (if CM/GC)</td>
</tr>
<tr>
<td>copy</td>
<td>if any</td>
<td>if any</td>
<td>no</td>
<td>Off-Site Stored Materials documents</td>
</tr>
<tr>
<td>counterpart</td>
<td>no</td>
<td>no</td>
<td>YES</td>
<td>Affidavit of Payment</td>
</tr>
<tr>
<td>counterpart</td>
<td>no</td>
<td>YES</td>
<td>YES</td>
<td>Consent of Surety with Power of Attorney</td>
</tr>
<tr>
<td>copy</td>
<td>no</td>
<td>no</td>
<td>YES</td>
<td>Statement of continuing insurability</td>
</tr>
<tr>
<td>copy</td>
<td>no</td>
<td>if any</td>
<td>if any</td>
<td>U&amp;O permit</td>
</tr>
<tr>
<td>copy</td>
<td>no</td>
<td>YES</td>
<td>YES</td>
<td>Data Binder Receipt(s)</td>
</tr>
<tr>
<td>copy</td>
<td>no</td>
<td>no</td>
<td>YES</td>
<td>Roof Warranty or warranties</td>
</tr>
<tr>
<td>copy</td>
<td>no</td>
<td>no</td>
<td>YES</td>
<td>Report of Subcontractors and Suppliers</td>
</tr>
<tr>
<td>copy</td>
<td>YES</td>
<td>if any</td>
<td>if any</td>
<td>Visitor Log</td>
</tr>
<tr>
<td>copy</td>
<td>YES</td>
<td>if any</td>
<td>if any</td>
<td>Weather Delay Report</td>
</tr>
<tr>
<td>copy</td>
<td>YES</td>
<td>no</td>
<td>no</td>
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</tr>
<tr>
<td>copy</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>Submittal Log</td>
</tr>
</tbody>
</table>

B. Provide application documents assembled in order listed above, on 8½” x 11” pages, except 11” x 17” pages can be used for Progress Schedules and Submittal Logs if folded to fit an 8½” x 11” size. Orient all pages as shown below. Provide application sets bound with a single clip (no staple) affixed to the upper left of the G702 first page (according to its orientation).  

C. Counterpart documents shall be original instruments with wet signatures and embossed or wet-stamped seals, in each set of application documents.

D. Provide a draft submission, including attachments, as a PDF attached to an email, to Designer and to the Owner’s construction representative three (3) days prior to actual submittal.

E. Provide actual submission of five (5) sets of the application documents to the Designer at Progress Meeting, Substantial Completion inspection meeting, or final inspection meeting. If submitted outside of these meetings, provide conveyance of application to Designer, from Designer to Owner’s construction representative, and from Owner’s construction representative to Owner’s central office.
1.02 INCLUSIONS AND CALCULATIONS:

A. Accurately represent all values with two decimal places, calculated to the penny.

B. STORED MATERIALS: those suitably stored on-site but not yet incorporated into the Work can be included; and, those suitably stored off-site can be included if documented in accordance with later provisions of this Section.

C. On CM/GC contracts, the total completed and stored to date for estimated trades can only be included once bids have been taken, subcontracts awarded, and the actual price reconciled to the Reserve Log.

D. Calculation of Retainage and amounts withheld:
   1. Credit for completed work and stored materials, and deductions for incomplete work, comprise the “Total Completed and Stored to Date”. The “Total Completed and Stored to Date” shall not include the value of Punch List items that remain incomplete after Substantial Completion.
   2. Retainage is calculated as a percentage of “Total Completed and Stored to Date”: 5% prior to Substantial Completion; 2% after Substantial Completion; then, none at final payment. In the continuation sheets, showing retainage at individual line items is not required and is discouraged, as it promotes rounding errors. Retainage should only be shown at Phase sub-totals, if Phases exist, and when retainage rates vary between phases.
   3. Other amounts withheld (i.e., potential liquidated damages or in response to subcontractor claims of non-payment) can be added to the continuation sheet and deducted from the Total Completed and Stored to Date, or can be deducted from the resulting Current Payment Due after retainage and prior payments are accounted.

E. If a billing period would cross a State fiscal year (ending June 30, starting July 1), provide separate pay requests for the portion of work performed in each fiscal year.

1.03 FORMS, FORMAT, and CONTENT:

A. G702 Application: Use AIA Document G702 Application and Certificate for Payment
   1. For Project identification, include the Owner’s project number featured prominently, institution name, and work name, which is normally the Project title shown in the Agreement.
   2. Provide a unique, sequential application number.
   3. Include the Contractor’s address exactly as provided in the ACH Form.
   4. Show the County where the Work is located, normally where AIA captions “Contract for”.

B. G703 Continuation: Use AIA Document G703 Continuation Sheet itemized with the line items and values of the Schedule of Values accepted by Designer, and values and percentages for each line item. If there are Phases, include a sub-total for each Phase as well as a grand total.

C. Final Accounting: Allocate final Contract Sum as if modifications had been fully incorporated in Contract Sum at award of Contract, and shall follow the same format as the Schedule of Values.

D. GMP Contingency Log and Reserve Log, only if a CM/GC contract.

E. Off-Site Stored Materials: If any, provide:
   1. Statement identifying where materials are stored, and assuring that materials are tagged to identify them for use in the project.
   2. Bill(s) of sale for materials claimed that list(s) all items.
   3. Certificate of insurance covering materials claimed, recognizing Owner's right to make claims.

F. Affidavit of Payment of Debts and Claims: Provide counterpart using AIA Document G706, when requesting final payment for the Work or reduction of retainage to zero for any portion of the Work.
G. Consent of Surety:
   1. If seeking reduction in retainage prior to Final Payment for the entire Work, or final payment on only a portion of the Work, provide counterpart using AIA Document G707A Consent of Surety to Reduction in Retainage, or a similarly formed letter.
   2. If seeking Final Payment, provide counterpart using AIA Document G707 Consent of Surety Company to Final Payment, or a similarly formed letter.
   3. If Contractor has listed exceptions in the Affidavit of Payment, Surety's consent shall acknowledge such exceptions.
   4. If Contract is not bonded, Consent of Surety is not required, and Owner will instead advertise a public notice of settlement, and wait 30 days for responses, before accepting the application.
   5. Provide counterpart of Power of Attorney with Consent of Surety.

H. Insurance Certificate: If seeking final payment, provide certificate of insurance for products and completed operations as required by Conditions of the Contract sections 9.10.2(2) and 11.1.2.1.c.

I. Statement of continuing insurability: if seeking final payment, a letter written to the effect required by Conditions of the Contract section 9.10.2(3).

J. Use & Occupancy Permit (some jurisdictions have a different name): provide copy with first application following substantial completion.

K. Data Binder Receipt:
   1. with first application following substantial completion, provide copy of document identifying to whom Contractor delivered the Operating and Maintenance Data Binders.
   2. with application for final payment, provide copy of document identifying to whom Contractor delivered Project Data Binders.

L. Roof Warranty or warranties, if any required on the Owner’s Section 07 50 35 standard form.

M. Report of Subcontractors and Suppliers, on the standard form.

N. Visitor Log for the period covered by application. After substantial completion, provide Log(s) for periods prior to substantial completion that have not been provided in a prior application.

O. Weather Delay Report for all calendar months completed, up to the date of substantial completion, and not previously submitted.

P. Progress Schedule, updated and current, indicating progress through the period covered by application and scheduled progress through completion of Work. This is not required with the request for final payment.

Q. Shop Drawing Log for entire project through the period covered by application. If there has been no shop drawing log activity since a previous copy was submitted with a previous application, a single page can be substituted saying so and identifying which pay request had the latest up-to-date log. If a log is long and has many of its early pages unchanged since a previous copy was submitted with a previous application, a single page can be substituted for the earlier unchanged pages saying so and identifying which pay request had the latest copy of those pages.

1.04 CERTIFICATION

A. Designer, if in disagreement with the amounts claimed in an application, may either return application to Contractor for revision and resubmittal, or revise application by hand to indicate corrections Designer considers appropriate.

B. Designer, finding an application complete and correct, will certify the application and return one of the sets to Contractor to indicate the action taken.

END OF SECTION
SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General coordination procedures; Coordination Drawings.
   2. Administrative and supervisory personnel.
   3. Requests for Interpretation (RFIs).

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

1.02 RELATED SECTIONS

A. Project Meetings: Section 01 31 19.

1.03 DEFINITIONS

A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.04 INFORMATIONAL SUBMITTALS

A. Key Personnel Names: Within 15 (calendar) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
   1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.05 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other contractors for maximum accessibility for required maintenance, service and repair.
   3. Make adequate provisions for items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure operations are carried out with consideration given to conservation of energy, water and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner’s property.

1.06 COORDINATION DRAWINGS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
   a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
   b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
   c. Indicate required installation sequences and for anticipated replacement of components during the life of the installation.
   d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
   e. Indicate required installation sequences.
   f. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with
submitted equipment and minimum clearance requirements. Provide sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

g. Complete sufficient demolition to confirm dimensions and clearances before submitting drawings.

h. Preparation of coordination drawings of the Work specified in divisions 21 through 28 shall include the following procedure:

1) Ductwork shop drawings shall be prepared indicating bottom of duct elevations.

2) A reproducible of these drawings shall be given to the subcontractors responsible for Division 21 through Division 28 work, and they shall each review the drawing for conflicts with their work.

3) Contractor shall hold coordination meetings at which coordination conflicts will be resolved. Contractor to document agreed to coordination resolution.

4) Installation of work may not proceed without resolution of coordination conflicts by the Contractor. Work not installed in accordance with the agreed to coordination documents is subject to replacement if conflicts remain, with related costs borne by the Contractor.

2. Sheet Size (inches): At least 8-1/2 by 11, but no larger than 30 by 42.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.

2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.

3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.

4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.

5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.

6. Mechanical and Plumbing Work: Show the following:
   a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
   b. Show plumbing lines. Notate code required slope elevations.
   c. Dimensions of major components: dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
   d. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
   a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger and racks of smaller conduit are required.
   b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
   c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
   d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System: Show locations of standpipes, mains piping, branch lines, pipe drops, sprinkler heads and inspected test valve drains.

9. Review: Consultant will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Consultant determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Consultant will so inform Contractor, who shall make changes as directed and resubmit.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings or program and system as approved by Architect.

2. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.

3. BIM File Incorporation: Develop and incorporate coordination drawing files into Building Information Model established for Project.
   a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.

   a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
   b. Execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

1.07 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work. Include special personnel required for coordination of operations with other contractors.

1.08 REQUESTS FOR INTERPRETATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
   1. Project name.
   2. Date.
   3. Name of Contractor.
   5. RFI number, numbered sequentially.
   7. Drawing number and detail references, as appropriate.
   8. Field dimensions and conditions, as appropriate.
   9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or Sum, Contractor shall state impact in the RFI.
   10. Contractor's signature.
   11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
      a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. Hard-Copy RFIs: Identify each page of attachments with the RFI number and sequential page number.

D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above. Attachments shall be electronic files in Adobe Acrobat PDF format.

E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow 15 days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:
   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for approval of Contractor's means and methods.
   d. Requests for coordination information already indicated in the Contract Documents.
   e. Requests for adjustments in the Contract Time or Contract Sum.
   f. Requests for interpretation of Architect's actions on submittals.
   g. Incomplete RFIs or RFIs with numerous errors.

2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.

3. Architect's action on RFIs that may result in a change to the Contract Time or Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within 7 days if Contractor disagrees with response.

G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.09 PREINSTALLATION CONFERENCE

A. Conduct a preinstallation conference onsite before each construction activity that requires coordination with other trades; were required in specification sections.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
   b. Options.
   c. Related RFIs.
   d. Related Change Orders.
   e. Purchases.
   f. Deliveries.
   g. Submittals.
   h. Review of mockups.
   i. Possible conflicts.
   j. Compatibility problems.
   k. Time schedules.
   l. Weather limitations.
   m. Manufacturer's written recommendations.
   n. Warranty requirements.
   o. Compatibility of materials.
   p. Acceptability of substrates.
   q. Temporary facilities and controls.
   r. Space and access limitations.
   s. Regulations of authorities having jurisdiction.
   t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

PART 2 - PRODUCTS
Not Used

PART 3 – EXECUTION
Not Used

END OF SECTION
### PART 1 - GENERAL

**1.01 SCHEDULING AND ATTENDANCE**

A. The Designer, in cooperation with the Owner and the Contractor, will schedule and administer a Pre-Construction Conference, periodic Progress Meetings, and other specially called or required meetings.

B. Representatives of the Owner and the Designer will attend.

C. Representatives of the Contractor, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents. In the case of the Contractor, the representative shall be one who is authorized to sign change orders.

**1.02 PRE-CONSTRUCTION CONFERENCE**

A. A Pre-Construction Conference will be scheduled and conducted at the project site prior to the issuance of the Notice to Proceed.

B. The Pre-Construction Conference shall be attended by the Contractor's:
   1. (Office) Job Manager
   2. (Field) Job Superintendent
   3. Major subcontractors' representatives
   4. Major suppliers' representatives
   5. Others, as desired.

C. The Pre-Construction Conference is intended to be an opportunity for the Contractor to review administrative, procedural, and temporary facilities requirements of the Contract Documents, and to ask questions concerning the Work.

**1.03 PROGRESS MEETINGS**

A. Progress Meetings will be scheduled and conducted at the project site, typically twice-monthly, or when deemed advisable by the Designer.

B. Progress Meetings shall be attended by the Contractor's:
   1. (Office) Job Manager
   2. (Field) Job Superintendent
   3. Subcontractors' representatives, as befits the agenda
   4. Suppliers' representatives, as befits the agenda
   5. Others, as appropriate.

C. Progress Meetings are intended to include a monthly opportunity for the Contractor to submit applications for payment, signing of change orders by Designer and Contractor, a general review of the progress of the Work, and identifying and mitigating impediments to timely completion.

D. Progress Meetings will be scheduled and conducted until final completion.

### END OF SECTION
PART 1 - GENERAL

1.01 SUBMITTALS LOG

A. If any shop drawings, product data, or sample submittals are required by the Contract Documents, maintain a submittals log to record the status of submittals made to the Designer.
   1. Submit three (3) copies with each application for payment.
   2. Clearly identify the Project.
   3. Record activities with respect to shop drawings, product data, samples, and such other submittals which are required by the Contract Documents.
   4. Indicate for each submittal made to date:
      a. Title or name, and type of submittal.
      b. Date submitted to the Designer.
      c. Date returned by the Designer.
      d. General nature of the Designer’s response.

1.02 VISITOR LOG

A. Maintain visitor log in the field office (or with the Project Superintendent when no field office is required) to record visits by all persons not a part of the Contractor’s forces, materials suppliers, or subcontractors’ forces, until substantial completion of the entire Work.
   1. Submit a copy with each counterpart of each application for payment, covering the period since the last log(s) submitted.
   2. Clearly identify the Project.
   3. Use the form of specification Section 01 31 93, and indicate:
      a. Visitor name and affiliation.
      b. Date and time of visit.
      c. Length of time on site.

END OF SECTION
Please print information below if you represent the Owner, institution, Designer or a consultant, a testing agency engaged by the Owner or Designer, a regulatory authority, or yourself as a private individual. Please estimate how long you will be on site, rather than logging out when you leave.

Persons who are employed by the Contractor, a subcontractor, a sub-subcontractor, a supplier, or a testing agency engaged by any of these, are NOT VISITORS, and should not log in on this Log.

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PART 1 - GENERAL

1.01 INITIAL PROGRESS SCHEDULE

A. Submit within 21 days of award of the Contract, and not later than the date of submission of the first application for payment. Clearly identify the Project on the schedule.

B. Outline the orderly progress of the Work as planned from the Notice to Proceed through Substantial Completion on the contractually required date. Categorize the Work by Phase (if Phases are specified), major work area, and distinct trade or team, and divide into individual activities of one month or less duration each. Provide an identifiable relationship to the schedule of values. Identify projected monthly progress, points of 50% completion, Substantial Completion, and final completion, and other major milestones. If included in the Work, Commissioning activities and Storm Water Pollution protection Plan (SWPPP) activities shall be among those major milestones. If planting or landscaping that is seasonally sensitive is included in the Work, show that portion of Work distinctly during a seasonally appropriate time.

C. A bar chart or critical path method is acceptable, or other method which is approved by the Designer. Since requests and claims for extension of time require demonstrating effect upon the critical path of Work, a critical path method schedule is recommended, and may be required as supporting documentation to prove validity of a requested or claimed time extensions.

1.02 SUBMITTALS SCHEDULE

A. Submit with the initial Progress Schedule. Clearly identify the Project, and format in a manner similar to the initial progress schedule, utilizing the same method, or make a part of the initial Progress Schedule.

B. Identify submittals to be made. Show date for submission and date by which Designer should respond, allowing sufficient time for review.

C. Designer may require revision of schedule if times allotted for review are insufficient.

1.03 UPDATED PROGRESS SCHEDULE

A. Submit a copy attached to each counterpart of applications for payment.

B. Clearly identify the Project. Format in a manner similar to the initial progress schedule, utilizing the same method.

C. Indicate:

1. Work as initially scheduled.
2. Actual progress through the period covered by the current application for payment.
3. Planned progress through Substantial Completion, including extensions of time made by change order or construction change directive.

D. If actual progress falls behind projections, show how the backlog is to be made up so that the Work will be completed on time.

END OF SECTION
SECTION 01 33 23
SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1  GENERAL

1.01  SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.02  DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information not requiring Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.03  GENERAL REQUIREMENTS

A. Requirements of this Section are in addition to those of the General Conditions.

B. This Section includes procedures for processing:
   1. Shop drawings.
   2. Product data.
   3. Samples.
   4. Certificates of compliance.
   5. Reports.
   7. Design data.
   8. Other submittals listed.

C. Submittals as approved do not constitute a change order.

D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Coordinate transmittal of different submittal types for related parts of the Work so processing will not be delayed because of need to review concurrently for coordination. A/E reserves the right to withhold action on concurrent coordination submittals until related submittals are received.

E. Submittals Schedule: See Section 01 32 15, for submittals and time requirements for scheduled performance of related construction activities.
   1. Submittals received prior to receipt of the initial Submittals Schedule will be rejected.
   2. Submittals received prior to the time they are indicated on the Submittal Schedule to be submitted will be rejected.
F. Make all submittals far enough in advance of scheduled dates for installation to provide sufficient time for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

1. Delays caused by the tardiness of the Contractor in preparing and forwarding submittals will not be an acceptable basis for an extension of the Contract completion date or for consideration of alternate products which do not meet the specified requirements of this Project Manual.

2. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

3. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

4. Resubmittal Review: Allow 7 days for review of each resubmittal.

5. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is necessary, allow 10 days for initial review of each submittal.

6. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to consultants, allow 10 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

G. Identification: Place a permanent label or title block on each submittal for ID.

1. Indicate name of firm or entity that prepared each submittal on label or title block.

2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by Architect.

3. Include the following information on label for processing and recording action taken:
   a. Project name.
   b. Date.
   c. Name and address of Architect.
   d. Name and address of Contractor.
   e. Name and address of subcontractor.
   f. Name and address of supplier.
   g. Name of manufacturer.
   h. Submittal number or unique identifier, including revision identifier.
      1) Submittal number shall use Specification Section number.
   i. Number and title of appropriate Specification Section.
   j. Drawing number and detail references, as appropriate.
   k. Location(s) where product is to be installed, as appropriate.
   l. Other necessary identification.

H. Notify Architect in writing at time of submittal of deviations from the requirements of the Contract Documents. In addition, highlight, encircle, or otherwise specifically identify deviations.

I. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:
a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Submittal and transmittal distribution record.
k. Remarks.
l. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

J. Resubmittals: When Architect requires that a submittal be resubmitted, comply with requirements of this section; Identify changes made since previous submittal.

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

L. Electronic Files: At Contractor's written request, copies of Architect's electronic files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
1. Execute Electronic File Transfer Agreement provided by the Architect to obtain files.
2. The electronic files are provided for the Contractor's convenience and their use will be at the Contractors risk.
   a. There are no assurances that the information in the electronic files is current. All dimensions must be field-verified.

1.04 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Section.

B. Product Data
1. Submit only pages which are pertinent.
a. Mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number.
b. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
2. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information not applicable.
3. Stamp and sign each set of manufacturer's product data before submitting
to Architect to certify compliance with Contract Documents.

4. Number of Copies Required: Submit two paper copies of Product Data, and in portable data file (.pdf) format, unless otherwise indicated. When submitting for Concurrent Consultant Review, submit two copies to Consultant and one copy to Architect. Architect will return one copy. Mark up and retain returned copy as a Project Record Document.
   a. Reproduction and cost of reproduction of processed Product Data for distribution to concerned parties is Contractor’s responsibility.

C. Shop Drawings

1. Reproduction of any portion of the Contract Documents for use as submittals for Shop Drawings is not acceptable.

2. Submit Shop Drawings in a clear and thorough manner.
   a. Title each drawing with Project name.
   b. Identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.

3. Identify the following:
   a. Requirements of the individual section of Project Manual.
   b. Field measurements.
   c. Field construction criteria.
   d. Relation to adjacent or critical features of the Work or products.
   e. Conformance of submittal with Contract Document requirements.

4. Each sheet of Shop Drawings shall be stamped and signed by Contractor before submitting to Architect. Certify compliance with requirements of Contract Documents.

5. Review by the Architect shall not relieve Contractor from his responsibility in preparing and submitting proper Shop Drawings in accordance with his current obligations.

6. All submissions which, in the opinion of the Architect are incomplete, contain errors or have not been checked or only superficially checked, will be returned unchecked by the Architect for resubmission.

7. Fabrication of products or start of work before required Shop Drawings are approved by A/E and returned to Contractor shall be at Contractor’s risk.

8. Number of Copies Required: Submit two paper copies of each submittal, and in portable data file (.pdf) format, unless indicated otherwise. When submitting for Concurrent Consultant Review, submit two copies to Consultant and one copy to Architect. Architect will return one copy. Mark up and retain one returned copy as a Project Record Drawing.
   a. Reproduction / cost of reproduction of processed shop drawings for distribution to concerned parties is Contractor’s responsibility.
   b. This procedure is to be followed for each submission of a drawing or group of drawings until they are finally approved by the Architect.

D. Office Samples: Submit Samples for review of kind, color, pattern and texture to check these characteristics with other elements and to compare characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples Required: Submit two sets of Samples. Architect will retain one Sample set; the other will be returned.
      1) Submit a single Sample where workmanship, assembly details, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least two sets of paired units that show approximate limits of variations.

E. Mock-Up Samples: Where samples are specified in the individual sections for use in constructing mock-ups, comply with requirements for "Office Samples", and process transmittal forms for mock-ups to provide a record of activity.

F. Submittals Schedule: See Section 01 32 15, Construction Schedules.

G. Schedule of Values and Application for Payment: Outlined in the Agreement.

1.05 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.
   1. Number of Copies: Submit one copy of each submittal, unless otherwise indicated. Architect will not return copy.
   2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
   3. Test and Inspection Reports: None required due to project scope.
B. Coordination Drawings: See Section 01 31 00, Coordination Drawings.

C. Contractor's Construction Schedule: See Section 01 32 15, Progress Schedules and Reports.

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
   1. Name of evaluation organization.
   2. Date of evaluation.
   3. Time period when report is in effect.
   4. Product and manufacturers' names.
   5. Description of product.
   6. Test procedures and results.
   7. Limitations of use.
M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment; as required for the project close-out, Operating and Maintenance Data.

Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name / version of software, if any, used for calculations. Include page numbers.

R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating product or equipment. Include name of product and name, address and telephone number of MFR. Include the following, as applicable:
   1. Preparation of substrates.
   2. Required substrate tolerances.
   3. Sequence of installation or erection.
   4. Required installation tolerances.
   5. Required adjustments.
   6. Recommendations for cleaning and protection.

S. Manufacturer's Field Reports: Prepare written information documenting factory authorized service representative's tests and inspections. Include the following, as applicable:
   1. Name, address, and telephone number of factory-authorized service representative making report.
   2. Statement on condition of substrates and their acceptability for installation of product.
   3. Statement that products at Project site comply with requirements.
   4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   6. Statement whether conditions, products, and installation will affect warranty.
   7. Other required items indicated in individual Specification Sections.
T. Manufacturer's Field Reports: Prepare written information documenting factory authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

U. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

V. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect, except as required in "Action Submittals" Article.

1.06 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit two copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional. When submitting for Concurrent Consultant Review, submit two copies to Consultant and one copy to Architect.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 2 PRODUCTS
Not Applicable

PART 3 EXECUTION

3.01 CONTRACTOR'S REVIEW
A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

3.02 ARCHITECT’S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Reference the General Conditions for Architect’s review responsibilities. Approval of a specific item does not indicate approval of an assembly of which the item is a component. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
   1. REVIEWED
   2. APPROVED
   3. APPROVED AS CORRECTED
   4. REVISE AND RESUBMIT
   5. REJECTED.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION
SECTION 01 35 13
SPECIAL PROJECT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. The existing building will remain partially occupied within the construction site. The adjacent buildings, roads and parking areas will remain occupied and fully functional during construction. No interruption of services for all buildings will be permitted. Consult and carefully schedule with the Owner to achieve this aim.

1.02 PROCEDURES WITHIN SITE AREA ON BUILDING SITE

A. Performance of Work
   1. The adjacent properties will be occupied throughout the entire course of construction. As such, contractors and their personnel are restricted to the areas of and access to the building site only.
   2. Access must be maintained to public streets and all adjacent areas that border the site in a safe and sanitary manner.

B. Conduct: Contractor and workmen are to be quiet and non-offensive. Radios are prohibited. **No interaction with the public will be allowed.**

C. Dress Code
   1. Required Apparel: Shirt, long pants, sturdy work boots appropriate for work activities; all suitably clean.
   2. Not Permitted: Offensive graphics or messages on clothing, short pants, tank tops, sandals, open toed shoes, bare torso, bare feet.

D. Areas under construction shall be separated from occupied areas by suitable barriers. See Section 01 50 00 for additional requirements. In no instances may public streets be blocked or the clear lane width reduced unless approval has been granted by all Authorities Having Jurisdiction and permits have been issued at least 30 calendar days prior to the need of the occurrence.

E. No utilities or services may be interrupted without full consent of and prior scheduling with the Utility Companies and the adjacent properties affected.

1.03 UTILITY SHUT-DOWN

A. Advance notice required: Contractor to request, a minimum 30 days in advance, the Owner's permission to shut down electric power, gases or systems to their properties. Request to be in writing and indicate the area(s) affected, time and date shut-down requested to commence, and anticipated duration of shut-down. Approved time and date may not be as requested, will be at times least disruptive to Owners, and may be during non-normal working hours.
   1. Disclaimer: No additional payments will be allowed due to Contractor's difficulties due to being held to the above restrictions.
1.04 NOISE AND SAFETY

A. Unless so otherwise indicated in the Contract as allowable; Prohibited methods and materials include, but not limited to:
1. Use of explosives.
2. Use of jack hammers or similar equipment which can cause structure-borne vibration detrimental to the use of the occupied facilities.

B. Construction Working Hours: Work Hours, including noise and other restriction limitations, shall be as indicated in the Contract.

1.05 EXISTING FACILITIES

A. The primary construction zone is defined in the Construction Managers phasing documents.

B. Exterior doors should be secured at all times, unless being used for construction purposes. The CM/GC is responsible for security.

1.06 NO SMOKING POLICY

A. Smoking is prohibited on site, including electronic cigarettes.

1.07 SITE AND BUILDING ACCESS

A. Existing driveways and entrances which serve the premises must be maintained. They must be available to the Owner and public at all times. Do not use these areas for parking or storage of materials.
1. Do not unreasonably encumber the site with materials or equipment. Confine stock piling of materials and location of storage trailers to the areas indicated on the drawings or as directed by the Architect.
2. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on the site.

END OF SECTION
PART 1  GENERAL

1.01  SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality-control services required by Architect, Owner, Construction Manager or authorities having jurisdiction are not limited by provisions of this Section.

1.02  RELATED SECTIONS

A. Cutting and Patching (for repair and restoration of construction disturbed by testing and inspecting activities): Section 01 73 29.

B. Specific test and inspection requirements: Divisions 02 through 49 Sections.

1.03  DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.

C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged. Refer to article 1.07 of this section for additional requirements regarding mockups in paragraphs I, J, K & L

1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on the project site, consisting of multiple products, assemblies and subassemblies.

2. Panel(s) to reflect all exterior envelope assembly components; and is to be reviewed by the Commissioning Agent prior to start of building Work.
D. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards. [see 1.07.G this section]

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or entity engaged by GC as employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application and similar operations. Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

J. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.04 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.05 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
1.06 SUBMITTALS

A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
   1. Indicate manufacturer and model number of individual components.
   2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

D. Reports: Prepare and submit certified written reports that include the following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Ambient conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and re-inspection.

E. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.07 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
   1. **NRTL**: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. **NVLAP**: A testing agency accredited according to NIST’s National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
   1. Contractor responsibilities include the following:
      a. Provide test specimens representative of proposed products and construction.
      b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
      c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
      d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
      e. Build laboratory mockups at testing facility using personnel, products and methods of construction indicated for the completed Work.
      f. When testing is complete, remove test specimens, assemblies, mockups and laboratory mockups; do not reuse on Project.
   2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction. Allow 7 days for initial review/re-review of each mockup.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work. Cover mock-ups to protect them from deterioration and weathering.
6. Demolish / remove mockups when directed, unless otherwise indicated.

K. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings or in areas specified. Coordinate installation of exterior envelope materials and products for which mockups are required in individual specification sections, along with supporting materials.

L. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections in Divisions 02 through 49.

1.08 QUALITY CONTROL

A. Contractor Responsibilities: Engage a qualified testing agency to perform Tests and inspections. Perform quality-control services required by authorities having jurisdiction, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
7. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

   1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   3. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect, Engineer, Construction Manager, and Owner with copy to Contractor and to authorities having jurisdiction.
   4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
   5. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   1. Access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
   4. Facilities for storage and field-curing of test samples.
   5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
   6. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.09 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Contractor will engage a qualified testing agency to conduct special tests and inspections required by IBC as the responsibility of the Contractor, and as follows:

B. Special Tests and Inspections: Conducted by a qualified special inspector as
required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Owner promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality control service to Architect with copy to Owner and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2  PRODUCTS (Not Used)

PART 3  EXECUTION

3.01 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.01 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Comply with requirements of Section 01 73 29, Cutting and Patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION
SECTION 01 41 13

FIRE RESISTANCE RATINGS REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Requirements of this Section apply to the Work of all other Sections.

1.02 STANDARDS

A. Standards, codes and regulations published by Manufacturer's Associations, governmental agencies, referenced fire resistance rating and other regulatory authorities form a part of these Specifications as minimum requirements.

B. Where differences occur between the Contract Documents and such standards, the most restrictive requirement shall apply.

C. Supply all materials and perform all work in accordance with the fire rating assembly and installation procedures, and in conformance with published trade and manufacturer's association standards, unless specifically noted otherwise.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM)

B. National Fire Protection Association (NFPA)

C. Underwriters' Laboratories (UL)

PART 2 MATERIALS

2.01 MATERIALS AND PRODUCTS

A. See individual assembly specifications for materials and products used in fire ratings assembly.

B. References and standards listed in the individual fire rated assembly specification sections apply to the work of this section.

PART 3 EXECUTION

3.01 INSTALLATION

A. Refer to drawings for locations, extent and fire rated assembly to be used. See individual fire rating assembly specification sections for installation requirements and procedures of materials and products used.
B. General: Use materials, fabrication, construction personnel and installation methods identical with those indicated and planned for the final Work.

END OF SECTION
PART 1 - GENERAL

1.01 CODES AND REGULATIONS

A. The Regulatory Requirements used for Tennessee Board of Regents projects are listed below as a convenience and may not be inclusive of all that apply. Others may also apply. Comply with all pertinent codes, standards, regulations and laws.

<table>
<thead>
<tr>
<th>Document</th>
<th>Source</th>
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<tr>
<td>2. NFPA 101 Life Safety Code, 2012 No provision of the preceding cited publications shall be adopted that conflicts: The installation and service standards of portable fire extinguishers and fixed fire extinguisher systems in Tenn. Comp. R. &amp; Regs. 0780-02-14-.02; and, The standards for engaging in the liquefied petroleum gas business in Tenn. Comp. R. &amp; Regs. 0780-02-17-.02. Paragraph (1) of this rule shall not be construed as adopting any provision of the cited publications which establishes: and optional or recommended, rather than mandatory, standard or practice; or, any agency, procedure, fees or penalties for administration or enforcement purposes inconsistent with the statute or rules. 2008 National Electrical Code</td>
<td>National Fire Protection Association 1 Batterymarch Park Quincy, Massachusetts 02169-7471 (800) 344-3555</td>
</tr>
<tr>
<td>3. 2007 Tennessee Elevator Safety Board Rules Chapter 0800-3-4 Elevators, Dumbwaiters, Escalators, and other Lifts 2007 Board of Boiler Rules Chapter 0800-3-3 Boiler Inspections</td>
<td>Tn. Dept. of Labor and Workforce Development Div. of Boiler, Elevator &amp; Amusement Device Inspection 220 French Landing Drive Nashville, TN 37243-1006 (615) 741-2123</td>
</tr>
<tr>
<td>4. ASHRAE standard 62.1-2013 Ventilation for Acceptable Indoor Air Quality</td>
<td>American Society of Heating, Refrigerating &amp; Air Conditioning Engineers 1791 Tullie Circle NE Atlanta, Georgia 30329 (404) 636-8400</td>
</tr>
<tr>
<td>5. Tennessee Chapters 0780-2-1, Electrical Installations 0780-2-2, Codes &amp; Standards 0780-2-3, Plan &amp; Spec Review 0780-2-18, Equitable Restrooms</td>
<td>Department of Commerce and Insurance Fire Prevention Division Codes Enforcement Section 500 James Robertson Parkway Nashville, Tennessee 37243-1162 (615) 741-2981</td>
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| 6. | ADA Title II, State and local government facilities must follow the requirements of the 2010 standards, including both the Title II regulations at 28 CFR 35.151 and the 2004 ADAAG at 36 CFR part 1191, appendices B and D. In the few places where requirements between the two differ, the requirements of 28 CFR 35.151 prevail. The compliance date is March 15, 2012, for all newly constructed or altered State and local government facilities permitted after this date.  
ADA Title III, Public accommodations and commercial facilities must follow the requirements of the 2010 standards, including both the Title III regulations at 28 CFR part 36, subpart D and the 2004 ADAAG at 36 CFR part 1191, appendices B and D. In the few places where requirements between the two differ, the requirements of 28 CFR part 36, subpart D prevail. The compliance date is March 15, 2012, for all newly constructed or altered facilities permitted after this date. |
|   | U.S. Department of Justice  
Civil Rights Division,  
Disability Rights Section- NYA  
950 Pennsylvania Ave, NW  
Washington, DC 20530  
(202) 514-4609 |
| 7. | TDEC Division of Water Pollution Control  
Tennessee water quality control act of 1977 (TCA 69-3-101) |
|   | Tennessee Department of Environment and Conservation Division of Water Pollution Control  
401 Church Street  
Nashville, TN 37243  
(615) 532-0625 |
SECTION 01 43 25
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 CONTRACTOR'S RESPONSIBILITIES

A. Employ and pay for the services of an independent testing laboratory, approved by the Designer, to perform specified services and testing. Employment of laboratory does not relieve Contractor's obligations to perform the Work of the Contract.

B. Coordinate and pay for inspections and testing required by law, ordinance, rules, regulations, orders, or approvals of public authorities as required by the Contract Documents.
   1. Furnish copies of Products Test reports as required.
   2. Furnish incidental labor and facilities to facilitate inspections and tests and for storage and curing of test samples.
   3. Notify the lab sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
   4. Make arrangements with lab and pay for additional samples and tests required for Contractor's convenience.

1.02 TESTING LABORATORY

A. Qualifications:
   1. Meet "Recommended Requirements for Independent Laboratory Qualification", published by the American Council of Independent Laboratories, and Basic requirements of ASTM E 329 "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".
   2. Be authorized to operate in the State of Tennessee.
   3. Submit copies to the Designer of the report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection with the memorandum of remedies of any deficiencies reported by the inspection.

B. Duties and limitations of authority:
   1. Perform specified inspections, sampling, and testing of materials and methods of construction and promptly submit five copies of the written report of each test and inspection to the Designer.
   2. Laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, approve or accept portions of the Work, or perform duties of the Contractor.

END OF SECTION
PART 1  GENERAL

1.01  GENERAL REQUIREMENTS

A. Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the International Building Code (IBC), edition currently enforced.

B. The program of Special Inspection and Structural Testing is a Quality Assurance program intended to ensure that the work is performed in accordance with the Contract Documents.

C. This specification section is intended to inform the Contractor of the Owner's quality assurance program and the extent of the Contractor's responsibilities. This specification section is also intended to notify the Special Inspector, Testing Laboratory and other Agents of the Special Inspector of their requirements and responsibilities.

D. The Contractor shall obtain the services of qualified testing/inspection company to perform the special inspections and structural testing required by Chapter 17 of the International Building Code (IBC), edition currently enforced.

1.02  CONTRACTOR RESPONSIBILITIES

A. The Contractor shall cooperate with the Special Inspector and his agents so that the special inspections and testing may be performed without hindrance.

B. The Contractor shall be responsible for coordinating and scheduling inspections and tests. The Contractor shall notify the Special Inspector or Testing Laboratory at least 24 hours in advance of a required inspection or test. Uninspected work that required inspection may be rejected solely on that basis.

C. The Contractor shall provide incidental labor and facilities to provide access to the work to be inspected or tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

D. The Contractor shall keep at the project site the latest set of construction drawings, field sketches, approved shop drawings, and specifications for use by the inspectors and testing technicians.

E. The Special Inspection program shall in no way relieve the Contractor of his obligation to perform work in accordance with the requirements of the Contract Documents or from implementing an effective Quality Control program. All work that is to be subjected to Special Inspections shall first be reviewed by the Contractor's quality control personnel.

F. The Contractor shall be solely responsible for construction site safety.
1.03 LIMITS OF AUTHORITY

A. The Special Inspector or Testing Laboratory may not release, revoke, alter, or enlarge on the requirements of the Contract Documents.

B. The Special Inspector or Testing Laboratory will not have control nor responsibility over the Contractor's means and methods of construction.

C. The Special Inspector or Testing Laboratory shall not be responsible for construction site safety.

D. The Special Inspector or Testing Laboratory has no authority to stop the work.

END OF SECTION
SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 PROJECT CONDITIONS

A. This Section is not intended to limit types and amounts of temporary construction facilities and controls required. Omission from this Section will not be accepted as an application that such temporary activity is not required for successful completion of the work and compliance with requirements of the Contract Documents.

B. Provide and maintain each temporary construction facility and control when required for proper performance of the work. Terminate and remove when no longer needed or when permanent facilities are authorized and available for use. Provide maintenance personnel to perform this work in accordance with the requirements. Maintenance time will include normal working hours for all trades and start up and shut down overtime as required.

C. Obtain and pay for all required applications, fees, permits and inspections required for temporary construction facilities and controls.

D. Install, operate, maintain and protect temporary construction facilities and controls in a manner and at locations which are safe, non-hazardous, sanitary and adequately protect project work, workmen and the public.

1.02 COST OF CONSUMED UTILITIES

A. Water Service Use Charges: Water consumed during construction is to be metered and paid for by the Owner.

B. Electric Power Service Use Charge: Cost of electric power consumed during construction is to be metered and paid for by the Owner.

C. Sewer Service Use Charges: The cost of providing portable toilets will be paid by the General Contractor. Where existing building toilet facilities are used, there will be no charge for sewer usage by all entities authorized to be at or to perform work at the project site.

D. Propane for Temporary Heat: Prior to, and after, the structure being permanently enclosed: Paid for by the contractor requiring the temporary heat.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. Provide and maintain all temporary facilities in compliance with governing rules, regulations, codes, ordinances and laws of agencies and utility companies having jurisdiction over work involved in project.
B. Be responsible for all temporary work provided, and obtain any necessary permits and inspections for such work.

C. Contractors shall confine equipment, storage of materials, and operation of workmen to the limits indicated or directed and shall abide by law, ordinances, conditions stated in permits and directions of the Architect.

D. Do not interfere with normal use of roads in vicinity of project site except as indicated or as absolutely necessary to execute required work, and then only after proper arrangements have been made with authorities having jurisdiction, including traffic control as applicable.

1.04 SPECIAL PRECAUTIONS AND REQUIREMENTS

A. Do not interfere with normal use of occupied areas in existing buildings, existing driveway access to existing building and existing building utility services, except as absolutely necessary to execute required work involving such facilities, and then only after proper arrangements have been made through the Owner with persons in charge of existing facilities. Do not block required exits from existing buildings.

1.05 TEMPORARY FIELD OFFICES, TRAILERS AND TELEPHONE

A. Provide and maintain clean weather tight offices at the site for own use and the use of the A/E and authorized agents when needed to be present on site while the work is in progress. Provide field office heated, lighted and provide with telephone service. All expenses in connection with the field office, including the installation cost and use cost of heat, air conditioning, light, water and janitor service.

B. Copies of permits, approved shop drawings, plans and specifications marked up-to-date with all revisions and all addenda shall be kept at said offices areas ready for use at all times.

C. All expenses in connection with Contractor's field offices, including the installation cost and use of telephones, shall be borne by the Contractor.

D. Maintain field office areas until final acceptance and then remove, unless the Owner orders or approves earlier removal.

E. Pay all costs, including utility installation costs to the field office.

F. Provide and maintain additional storage trailers on the project as required. Locate where directed by the Owner.

G. Contractor may be required to relocate their offices, as directed by the Owner, during construction as work progresses.

1.06 TEMPORARY SANITARY FACILITIES

A. Provide temporary portable toilets, acceptable to public health authorities, as required to service the project. Maintain in a clean, sanitary condition. Locate as directed by Architect.
1.07 TEMPORARY WATER SERVICE

A. General: Water is available from water main indicated on site drawings.

B. Arrange for, provide and pay for temporary water connections to water main, installation of metered extension and suitable fixtures at termination of lines.

C. Provide sufficient branch lines of adequate size to serve the needs of all trades. Locate water supplies at convenient locations, as directed by Architect.

D. Provide insulated housings for temporary service lines to protect against freezing.

1.08 TEMPORARY HEAT AND VENTILATION

A. Prior to permanent enclosure of the structure, provide temporary heat as necessary to complete the work.
   1. Provide weather protection as required to carry on work during inclement weather and to protect work and materials from damage by weather.
   2. Protection of work includes covering, temporary enclosures, heating materials, work under construction and for suitable working conditions.
   3. Furnish temporary heat by Owner approved types of units or equipment which is safe, will not affect surrounding areas of Contract Work and is properly supervised while in use.

B. "Permanently enclosed" shall mean that permanent walls and roofs are in place and weather tight, windows are in place and glazed and all entrance enclosures are either permanently in place or provided with suitable temporary enclosures.
   1. Polyethylene sheet is not considered a suitable temporary enclosure. One-half inch thick plywood tightly fit, sealed and supported and maintained can be considered a temporary enclosure.

C. After the structure is permanently enclosed, provide, operate and maintain until substantial completion, approved temporary heating and ventilating units to maintain that portion of the structure at suitable temperature and humidity conditions to complete the work.
   1. Arrange temporary units to bring in sufficient outdoor air to ventilate the structure and to prevent build-up of harmful dusts and fumes and to remove excess moisture. During warm weather, provide an adequate supply of fresh air, when necessary, to properly ventilate moisture, dust, fumes from paints, cements or adhesives in tightly-enclosed areas where natural ventilation will not be sufficient.
   2. Provide temporary heating and ventilating as follows:
      a. During normal working hours, minimum 50° F.
      b. During placing, setting and curing of concrete, minimum 50° F.
      c. For 10 days prior to placing interior finish materials and throughout interior finishing, painting, etc., and until final acceptance of work and occupancy by Owner, minimum 70° F.
      d. Supply heat and ventilation in a manner which avoids rapid drying of material but permits material and building to dry so remaining moisture will not affect finish material.
      e. Operate temporary systems each day, including Saturdays,
Sundays and holidays. Include necessary labor and approved operating personnel.

f. Supply all fuel required for temporary heating and ventilating, including all material, labor and supervision to connect same.

D. When permanent systems are used for temporary construction use, Contractor shall assume full responsibility for maintaining such equipment during and after use. Included in maintenance are the following:
1. Proper operation and maintenance of the mechanical equipment until acceptance of the project by Owner.
2. Maintenance of temporary filters in all equipment to prevent accumulation of dust and dirt in coils, housings and ductwork.
3. Prior to final inspection; replacement of temporary filters with new filters, thorough cleaning of coils and other equipment, putting entire system into first class condition, cleaning traps and devices, adjustment and removal of any and all materials and equipment not functioning properly.
4. Owner and Architect must be given access to and opportunity to inspect equipment and maintenance procedures at all times. Owner involvement will not relieve the Contractor from the responsibilities specified herein.

E. Use of permanent heating or cooling and ventilating equipment for temporary construction use shall not affect warranty. Warranty shall take effect at time of project acceptance by Owner.

F. Cost of Temporary Heat: Cost of all fuel consumed in conjunction with temporary heat or permanent system used for temporary heat shall be paid by the Contractor.  
   1. Electric resistance type heating units are not permitted.

G. During periods of extremely low temperatures when water pipes could possibly freeze or when such conditions are forecast, temporary heating must be monitored 24-hours a day, 7 days a week.

1.09 TEMPORARY LIGHT AND POWER

A. Provide necessary temporary electrical service and temporary wiring and outlets as required to meet project needs for temporary lighting and power at the start of the project, as work progresses and until acceptance by the Owner, excluding power to individual contractor’s trailers.

B. Extend temporary service from public utility service. Provide meter and extend service with disconnect to central location on site and to electric panel board location near Contractors’ office trailer area. Provide system sized as required to service project construction needs. Construct temporary pole line as required.

C. Remove temporary service, light and power system when permanent services and systems are available for use. No temporary system component shall form a part of the permanent systems.

D. Electrical work for construction purposes shall conform to Federal, State and local safety requirements, and requirements of the National Electrical Code. Obtain and pay for required applications, permits and inspections pertaining to this work.
E. Provide all lamps required to service the project. Replace lamps and fuses throughout the life of the project.

F. Pay all costs for installation, maintenance, supervision and removal of temporary light and power systems.

G. Make connections for temporary heat. Check temporary heat requirements.

H. Temporary Lighting
   1. Provide as required to service the project.
   2. As interior partitions are erected, revise the temporary lighting arrangements so that not less than one lamp is provided in each space over 70 square feet in area. Lights shall also be installed, as directed by Architect, in smaller areas where required to provide adequate light for work being carried out in the space.

I. Both 240 volt and 120 volt power receptacles are required on the project.

1.10 CONSTRUCTION AIDS

A. Hoists and Cranes: Erect and maintain adequate hoisting facilities as required for the work.

B. Shoring and Bracing: Provide all shoring and bracing required for safety and proper execution of their work. Remove these items when the work is completed.

1.11 WEATHER PROTECTION

A. Protect work and existing or adjacent property against weather, to maintain work, materials, apparatus and fixtures free from injury or damage during the entire construction period. Work likely to be damaged shall be covered or protected at the end of each day's work. Work damaged by not providing protection required, shall be removed and replaced with new work at the Contractor's expense.

B. Remove all snow and ice as may be required for proper protection and execution of the work and protection and safety of the public.

C. Provide winter weather closures and temporary doors at all unclosed openings.

1.12 WATCHMAN SERVICE

A. If Contractor considers watchman services necessary for protection of his/her own interest, such services may be employed at his/her own complete expense.

1.13 SAFETY

A. Safety requirements shall be in accordance with the General Conditions.

B. Provide and maintain guard lights at all barricades, railings, obstructions in the roadways or sidewalks and at all trenches or pits adjacent to walks or roadways.
C. Strict attention and full adherence must be given the Williams-Steiger Occupational Safety and Health Act of 1970, U.S. Department of Labor.

1.14 SECURITY CONDITIONS

A. Security of building must be maintained during "non-standard" working hours (premium time). This includes, but is not necessarily limited to, verifying all entrance doors and windows are secured.

B. Contractor will be responsible for all infractions of rules and regulations by workers.

C. Loitering or wandering through the corridors and into rooms not connected with the project or into other buildings on site will not be permitted.

D. Erect a 6 foot high fence with gates to enclose construction site.
   1. Material: Heavy chain link mesh with steel posts.
   2. Location: As indicated on Drawings.
   3. Provide metal gates, of same fabric as metal fence, where indicated.
   4. Maintain fence and gates in working order at all times.
   5. Except during working hours, keep gates locked at all times.

1.15 DUST CONTROL

A. Control dust originating within project limits using water or a dust palliative acceptable to the Architect. When conditions create blowing dust and dirt that is considered higher than normally encountered, Contractor shall cooperate with A/E in determining methods to help minimize blowing; which at a minimum, may involve more frequent applications of dust palliative. Calcium chloride may not be used.

1.16 TEMPORARY SIGNS

A. Temporary Project Sign.
   1. Provide project sign approximately 4 feet by 8 feet.
   2. Painting by professional sign painter, with text, design, layout and colors as directed by Architect.
   3. Materials: 3/4" APA-AB-EXT. Plywood for sign face with pine or fir trim. Provide 4 x 4 treated wood posts of sufficient length and quantity to securely brace and support sign against wind pressure.
   4. Locate sign as directed by Architect. Maintain until completion of project, then remove. Erect sign a minimum of 8 feet from public right of way.

B. Temporary Directional Signs: Provide as required to adequately direct traffic and personnel on site.

1.17 STREETS AND TRAFFIC

A. Cleaning and Repair
   1. Contractors shall remove mud and spillage from public walks, streets and sewers without delay. Failure to clean areas promptly will result in areas being cleaned by the Owner at the responsible Contractor's expense.
   2. Damage to roads, facilities or site, resulting from hauling, storage of
materials, or other activities in connection with the work shall be repaired or replaced at no expense to the Owner by the Contractor causing the damage. Repairs or replacements will be to the satisfaction of the A/E.

B. Traffic
1. Notify local law enforcement agency at least two weeks in advance of any anticipated work affecting traffic flow.
   a. To assure maintenance of flow and to safeguard all parties involved in planning to maintain flow, a field inspection should be made jointly by the Architect and Contractor personnel before performing any work which would interrupt normal traffic patterns.
   b. Re-routing of traffic shall be planned, as to route and direction, in cooperation with the local law enforcement agency.

1.18 PARKING

A. Employees of Contractors and subcontractors must park vehicles in areas assigned to them. Parking on streets or in restricted areas is prohibited.

1.19 CONSTRUCTION LAYOUT AND FIELD ENGINEERING

A. Employ a registered surveyor, [registered in the State of Tennessee] to lay out the building on the site and to locate and fix all site items such as site improvements and utilities and furnish a certified plat of this work. Be responsible for accuracy of all lines, elevations and measurements of the work. Exercise proper precaution to verify dimensions shown on Drawings before layout of the work.

B. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

C. General: Surveyor, registered in the State of Alabama to lay out the building on the site and to locate and fix all site items such as site improvements and utilities and furnish a certified plat of this work. Work includes:
   1. Establish benchmarks and control points to set lines and levels at each story of construction and as needed to locate each element of Project.
   2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   3. Inform installers of lines and levels to which they must comply.
   4. Check the location, level and plumb, of every major element as the Work progresses.
   5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
   6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

D. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

E. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those
required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

F. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by A/E

G. Field Engineering

1. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
   a. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
   b. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

2. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
   a. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
   b. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
   c. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

4. Final Property Survey: Surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
   a. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
   b. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

END OF SECTION
PART 1 - GENERAL

1.01 JURISDICTION
This project is under the jurisdiction of the Tennessee Department of Environment and Conservation (TDEC) and a Storm Water Pollution Prevention Plan (SWPPP) has been filed. TDEC has provided a Construction General Permit (CGP) Notice of Coverage (CGP-NOC or just NOC). Under a NOC, the Owner is primary permittee, and the Contractor is considered a secondary permittee and may be referred to as a Construction Site Operator, by virtue of having day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions.

1.02 RELATED SECTIONS
A. Copies of the NOC and SWPPP are normally included in the specifications but formatted without a specification section number. They may follow this Section or may be added by addendum or modification, and are to be considered a part of this Section. A copy of each, not bound into larger volumes of the Contract Documents, may be obtained from the Designer for ease of carrying out the requirements below.

B. Other technical aspects of the SWPPP are described in the Contract Documents where appropriate.

1.03 BASIC COORDINATION AND MONITORING
A. NOC: Post a copy of the NOC in a prominent, public location, such as a general notices board where building permit, employment regulations, and prevailing wage rates are posted. Protect the NOC from weather without obstructing its visibility. Repair or replace the NOC if it becomes damaged or missing.

B. SWPPP:
1. Maintain a copy of the SWPPP on site at all times. If a construction office/trailer is on site, keep the SWPPP documents inside it in a designated location. If there is no office/trailer, construct a SWPPP box and store the SWPPP documents therein. If the site is inactive, or does not have an on-site location adequate to store and protect the SWPPP, post a notice alongside the NOC telling where the SWPPP is stored, with a contact name and phone number. If the SWPPP is located off-site, provide reasonable local access to it during normal working hours.

2. Make updated plans and inspection reports available upon request to the operator of the local MS4, inspectors, and local agencies approving EPSC plans, grading plans, or storm water management plans.

C. RAINFALL MONITORING:
1. Maintain a rain gage on site, or determine a reliable local reference resource for rainfall monitoring. Some TBR campuses have such a resource. A resource off of the immediate campus where the project is located is not adequately local for normal daily readings. On days when Contractor’s forces are not on site, if an on-campus local resource is unavailable, a rainfall reading can be obtained from a reliable nearby resource.

2. Take 24-hour rainfall depth measurement readings at a consistent time of day each day. When a rain event occurs, record the approximate beginning and ending time. Record the daily readings on the Weather Delay Report, Section 01 26 25, even if Work is not delayed.

3. Keep a copy of rainfall records with the SWPPP.
D. **EPSC FIELD PLANS:** A set of Erosion Prevention and Sediment Control (EPSC) plans shall be designated “field plans” and used to show modifications and updates and the date of each change, which can be hand-written on the sheets. Maintain these field plans nearby the overall project record documents.

E. **SITE ASSESSMENT:** As soon as SWPPP Site Assessment features are in place, notify the Designer that the Work is ready for the SWPPP Site Assessment.

F. **TWICE-WEEKLY INSPECTIONS:**

1. Conduct inspections of the storm water control measures twice-weekly and at least seventy-two (72) hours apart. Where sites or portion(s) of sites have been temporarily stabilized, or runoff is unlikely due to extreme drought, or winter conditions such as freezing or snow or ice covering, written notification may be submitted to the local environmental field office that inspections are being curtailed; and, if not objected to by that office, then such inspection may be conducted only once per month until construction activity resumes or thaw or precipitation results in runoff. Inspection requirements do not apply after Work has achieved final stabilization.

2. The person making the inspections must have active certification, having completed the TDEC “Fundamentals of Erosion Prevention and Sediment Control Level 1” course.

3. A “Construction Stormwater Inspection Certification (Twice-Weekly Inspections)” form must be filled out by the inspector for each inspection. Keep copies of completed forms with the SWPPP. Blanks of this form can be found in the Tennessee Erosion and Sediment Control Handbook, Fourth Edition, August 2012, appendix C, as issued by the Tennessee Department of Environment and Conservation.

G. **FINAL STABILIZATION:** Submit statement of final stabilization to the Designer when permanent site work is in place and temporary storm water control measures have been removed, typically when requesting substantial completion inspection, at the substantial completion inspection, or when requesting final inspection. Final stabilization is defined as seventy percent (70%) density of a permanent groundcover over all previously disturbed area(s).

H. **RECORD DOCUMENTS:** In addition to keeping the Project Record Documents complete with as-built conditions, at Final Stabilization assemble all twice-weekly inspection reports and site audit reports, and include these in the Project Data Binders.

**PART 2 – PRODUCTS**

**PART 3 – EXECUTION**

**END OF SECTION**
SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1  GENERAL

1.01  SUMMARY

A. Requirements of this Section apply to the Work of all other Sections.

B. Section Includes:
   1. Transportation and Handling.
   2. Storage and Protection.
   3. Standards.
   4. Manufacturers and Types.
   5. Fabrications.
   7. Prohibited Materials and Methods.

1.02  RELATED SECTIONS

A. Quality Control: Section 01 40 00.

B. Cutting and Patching: Section 01 73 29.

C. Shop Drawings, Product Data and Samples: Section 01 33 23.

D. Execution Requirements: Section 01 73 00.

1.03  STANDARDS

A. Standards, codes and regulations published by Manufacturer's Associations, governmental agencies and other regulatory authorities form a part of these Specifications as minimum requirements. Such references include the latest issue and all amendments up to 30 days prior to the Bid Date.

B. "Governing Authority" means all federal, state and local laws and regulations.

C. Where differences occur between the Contract Documents and such standards, the most restrictive requirement shall apply.

D. Supply all materials and perform all work in accordance with the Manufacturer's Specifications and installation procedures, and in conformance with published trade / manufacturer's association standards, unless specifically noted otherwise.

1.04  TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accordance with construction schedules and installation, coordinate to avoid conflict with work and conditions at the site.

   1. Transport products by methods to avoid product damage.
2. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
3. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and accepted submittals, and that products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

1.05 STORAGE AND PROTECTION

A. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

B. Store products in accordance with manufacturer's instructions with seals and labels intact and legible.
1. Store products subject to damage by the elements in weathertight enclosures.
2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
3. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

C. Exterior Storage
1. Store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. Cover products which are subject to deterioration with impervious coverings. Provide adequate ventilation to avoid condensation.
2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign materials.
3. Store foam plastic away from exposure to sunlight, except to extent necessary for period of installation and concealment.

D. Arrange storage in a manner to provide access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage.

E. Protection After Installation: Provide coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

PART 2 PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

A. Products include materials, equipment and systems.

B. Products incorporated into the work:
1. Comply with specifications / reference standards as minimum requirements
2. Undamaged.
3. Manufactured and fabricated products:
   a. Design, fabricate and assemble in accordance with the best engineering and shop practices.
   b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
   c. Two or more items of the same kind shall be identical, by the same manufacturer.
   d. Products shall be suitable for service conditions.
   e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are approved in writing by A/E.

4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

5. New and unused at time of installation, except as otherwise indicated.

6. If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

7. Provide products complete with accessories, trim, finish, fasteners, other items needed for a complete installation and indicated use and effect.

2.02 MANUFACTURER AND PRODUCT SELECTION PROCEDURES

A. Specified Product: Where specifications name a single manufacturer and product or refer to a single manufacturer and product indicated on the drawings, provide the named product. Comparable products or substitutions for Contractor's convenience will not be considered.

B. Specified Manufacturer: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

C. Multiple Specified Products: Where more than one manufacturer and specific product is listed, provide one of the products named. No substitutions will be permitted after signing the contract. Comparable products or substitutions for Contractor's convenience will not be considered.

D. Multiple Manufacturers: Where specifications include a list of manufacturers names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

E. Basis of Design: Where specifications name a Basis of Design or refer to a Basis of Design product indicated on the drawings, the design is based on the product listed. Subject to compliance with requirements, provide the specified product or a product manufactured by one of the other manufacturers listed.
   1. The characteristics of the Basis-of-Design Product establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.
   2. Equipment or materials from these manufacturers will be acceptable.
contingent upon their meeting the design, appearance and functional standards established by the specified items. If equipment or a material of an acceptable manufacturer requires changes; electrically, mechanically, structurally, from what is indicated on the drawings, it shall be the responsibility of the Contractor requiring such change, to pay all costs involved with no additional costs to the Owner.

3. Submit evaluations as follows:
   a. Submit proposed comparable products for evaluation by the Architect at least two weeks prior to awarding contract to the manufacturer of a comparable product.
   b. Obtain samples of Basis-of-Design product.
   c. Select comparable products that comply with the characteristics specified. Submit evidence demonstrating compliance.
   d. Submit samples of comparable products displayed side-by-side with samples of Basis-of-Design products. Architect will determine whether the proposed comparable product is acceptable. Architect is not obligated to prove non-equivalence of proposed comparable products.

F. Where a performance is specified and no manufacturer is listed, submit through the Shop Drawing procedure the name of the manufacturer, the product proposed, and detailed information showing its characteristics. Such proposal shall meet or exceed the specification, line item by line item, or be rejected.

G. Equivalent components (articles, devices, materials, forms of construction, fixtures, etc.) may be submitted to the A/E for approval prior to bidding regardless of listed manufacturers.

H. Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.03 FABRICATION

A. Fabricate all items in the shop insofar as practicable. Where items cannot be completely shop fabricated and assembled for shipment, assemble and fit in shop, disassemble and ship. Identify parts for field assembly.

B. Fabricate items to be straight, square, in proper alignment, and with hairline joints where joints are necessary and permitted. Pre-plan field joints to be as inconspicuous as possible; coordinate locations with Architect.

2.04 SHOP PRIMING

A. Shop prime or seal surfaces of products to receive paint materials in accordance with the requirements of Section 09 91 00. Apply a primer or sealer compatible with the specified paint materials.

B. If a primer is found incompatible with the specified finish paint system, provide a barrier coat or remove the primer and reprime, at no additional cost to the Owner.
2.05 PROHIBITED MATERIALS AND METHODS

A. The following items are expressly prohibited:

1. Attachment Related Items
   a. Powder Fasteners: Powder fasteners are defined as anchors which are driven into place by any device which produces an impact force by use of a powder charge, compressed air, gas or any other propellant. Powder fasteners prohibited for the following conditions:
      1) Attachment of structural members.
      2) Where public may be endangered by misuse.
   b. Plug anchorage by use of wood, lead or plastic.
   c. Perforated steel strap iron for pipe or other support or anchorage.
   d. Suspension systems that are not independently supported.
      1) Ceiling grid systems shall not be supported from ductwork, electrical conduit, heating or plumbing lines, and vice versa.
      2) Each utility system and the ceiling system shall be a separate installation, each independently supported from the building structure.
      3) Where interference occurs, provide trapeze type hangers or other suitable supports for each system.
      4) Locate hangers and supports where they will not interfere with access to mixing boxes, fire dampers, valves, and other appurtenances requiring servicing.

2. Methods Related Items
   a. The penetration of floors and walls by pipes, ducts, or other penetrations unless openings are appropriately fire stopped by fire doors or fire dampers, and voids around pipes, ducts, conduits, etc. are sealed with fireproof materials.
   b. The use of ink marking pens on surfaces of any kind of materials receiving paint or other finish in exposed location.

3. Materials Related Items
   a. Asbestos or asbestos containing materials.
   b. Barbed wire in construction fencing.
   c. Water soluble treatment of insulation jackets or facings, to impede or retard smoke or flames.

4. Masonry Related Items
   a. Chicken wire type masonry reinforcing.
   b. Cinder block.
   c. Muriatic acid.

5. Door Related Items
   a. Knock-down (KD) door frames.
   b. Thresholds raised more than 1/2" at doors indicated as wheel chair accessible.

6. Roofing Related Items
   a. Dead level roofs. All roofs must slope to drain.
   b. Pitch pans or pitch pockets.

PART 3 EXECUTION
Not Applicable

END OF SECTION
PART 1 - GENERAL

1.01 ENVIRONMENTAL HAZARDOUS PRODUCTS, MATERIALS, OR WASTES

A. Do not incorporate in the Work hazardous materials or products as currently defined in the Resource Conservation and Recovery Act of 1976 (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), or Environmental Protection Agency (EPA) regulations, rules, or requirements, as amended, unless the Contract Documents give no other option than to provide a material or product which contains a hazardous material, component, constituent, waste, or leachate. In studying the Contract Documents and carrying out the Work, report at once to the Designer the discovery of a product or material which contains hazardous materials, components, constituents, waste, or leachate.

B. Do not incorporate in the Work a product or material which contains concentrations of a constituent, component, or material above the threshold levels which would require adherence to hazardous waste disposal regulations as currently defined, or could cause a release or threat of release of a hazardous substance at a level that would require a remedial response or removal action as currently defined by RCRA, CERCLA, or the EPA.

C. Select materials and products meeting specified requirements which comply with EPA requirements as regards hazardous materials content. In making requests for substitutions, determine that materials and products proposed for substitution comply with RCRA, CERCLA, and EPA requirements.

END OF SECTION
PART 1 GENERAL

1.01 SUMMARY

A. This section specifies administrative and procedural requirements for field engineering services, including, but not necessarily limited to, the following:
   1. Establishing and maintaining lines and levels;
   2. Structural design of shores, forms and similar items provided by the subcontractor as part of their means and methods of construction.

1.02 SUBMITTALS

A. Project Record Documents: Where applicable, each contractor shall submit a record of work performed as required under the provisions of Section 01 78 39, Record Documents.

1.03 QUALITY ASSURANCE

A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft and who are completely familiar with the specified requirements and the methods needed for proper performance of the work.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.01 GENERAL

A. Each trade contractor is responsible for any and all layout required to complete their scope of work.

B. Verify layout information shown on the drawings, in relation to the property survey and existing benchmarks before proceeding to the layout work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

C. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points, or requirements to relocate reference points, or requirements to relocate reference points because of necessary changes in grades or locations.

D. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.
E. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction.

F. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.

3.02 PERFORMANCE

A. Working from lines and levels established by the property survey, establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale drawings to determine dimensions.

B. Advise entities engaged in construction activities of marked lines and levels provided for their use. Provide a minimum of two column lines as control in two directions which shall be used as reference points.

C. As construction proceeds, check every major element for line, level and plumb.

D. Surveyor’s Log: Maintain a surveyor’s log of control and other survey work. Make this log available for reference.

E. Record deviations from required lines and levels, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.

F. Existing Utilities: Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction.

END OF SECTION
PART 1 GENERAL

1.01 SUMMARY

A. Requirements of this Section apply to the Work of all other Sections.

B. Section Includes:
   1. Examination of Substrate.
   2. Preparation.
   3. Installation.
   4. Workmanship.
   5. Protection.

1.02 RELATED SECTIONS

A. Quality Control: Section 01 40 00.

B. Cutting and Patching: Section 01 73 29.

C. Shop Drawings, Product Data and Samples: Section 01 33 23.

D. Product Requirements: Section 01 60 00.

1.03 STANDARDS

A. Standards, codes and regulations published by Manufacturer's Associations, governmental agencies and other regulatory authorities form a part of these Specifications as minimum requirements. Such references include the latest issue and all amendments up to 30 days prior to the Bid Date.

B. "Governing Authority" means all federal, state and local laws and regulations.

C. Where differences occur between the Contract Documents and such standards, the most restrictive requirement shall apply.

D. Supply all materials and perform all work in accordance with the Manufacturer's Specifications and installation procedures, and in conformance with published trade and manufacturer's association standards, unless specifically noted otherwise herein.

1.04 NON-CONFORMING WORK

A. Faulty work or work not in conformance with the Contract Documents will not be permitted by the Architect.
1. It is the responsibility of the Contractor to propose a remedy by means of detailed drawings and written documentation and submit such documentation to the Architect for comments.

2. All costs for the removal and reconstruction of such work, as well as additional services of the Architect, shall be paid for by the Contractor.

**PART 2  PRODUCTS - NOT APPLICABLE**

**PART 3  EXECUTION**

3.01 EXAMINATION OF SUBSTRATE

A. Examine the substrates or structure to which a product is to be applied or installed. Do not proceed until unsatisfactory conditions have been corrected. Starting the work indicates acceptance of conditions and the installer assumes full responsibility for results.

B. Check the substrate or structure for proper tolerances and clearances. Tolerances are listed under individual specification Sections.

3.02 PREPARATION

A. Substrate: Where the products are applied to a substrate, prepare substrate as recommended by the product manufacturer. That generally includes the following:

1. Bringing substrate to a uniform surface by smoothing uneven surfaces and filling holes, cracks and depressions with recommended filler or compatible type material.

2. Depressed Slabs: Bring to required elevation to receive finished materials where finished materials cannot completely fill depression. Use approved cementitious filler or compatible type material. Coordinate depressed slab locations with finish material locations.

3. Remove substances such as dust, oils and other foreign matter, not compatible with the product.

4. Surfaces shall be dry, unless moisture content or wetting requirement is specified or recommended.

B. Concrete Slabs: Provide steel shot abrasive cleaning of concrete slabs receiving designated finish flooring materials.

1. Designated Finish Flooring Materials
   a. Cementitious or cementitious set materials.
   b. Sheet flooring materials.
   c. Waterproofing materials.
   d. Paint materials.
   e. Polymer or epoxy type seamless flooring.

2. Equipment: Electric powered portable unit with self-contained dust collection system. Size(s) of unit(s) and shot media suitable for conditions and proposed finish materials. WHEELABRATOR CORP. "Blastrac" or similar type system by SASE COMPANY INC., BW MANUFACTURING or INNOVATECH.

3. Cleaning: Remove concrete surfaces to sufficient depth to remove bond...
breakers and contaminants such as curing compounds, oils, and other foreign matter which may be detrimental to the completed flooring installation.

a. Work smoothly and evenly over entire surface; avoid creating dips, ridges, or other imperfections which would show or telegraph in the completed installation.

b. Small transitions for different flooring materials may be obtained by multiple passes if carefully executed to create smooth even slope of not more than 1/8" in 2 feet.

4. Clean floor as near as possible to flooring installation to avoid contamination from work of other trades. Protect clean floor from soiling with suitable sheet materials. Re-clean soiled areas.

C. Inserts and Anchorages

1. Anchorages where not detailed are the responsibility of the installer to design a suitable connection, structurally sound, and aesthetically acceptable to the Architect. Furnish calculations, drawings and product data when requested by the Architect. Such information may or may not be returned as indicated in Section 01 33 23.

2. It is the responsibility of the installer to furnish built-in fastening devices for his/her product to the proper trade for installation as the work proceeds.

3. In the event such devices are not furnished in time to be built-in, it is the installer's responsibility to provide other methods for attaching their product. Submit drawings and other required data to the Architect.

D. Templates: Provide templates, diagrams and other coordinating documents to the proper Contractor, manufacturer or supplier of related items affecting the Work.

E. Dimensions

1. If the exact location of an item is not indicated by dimension on the Drawings or noted in the Specifications, the Architect reserves the right to determine such location in the field prior to roughing-in.

2. If the exact dimensions of a product are not indicated, the Architect reserves the right to determine dimensions prior to the ordering or fabrication of a product.

3. Such dimensional changes shall not be a basis for changes in the Contract Sum.

4. Where miscellaneous devices, such as thermostats, switches, controls, grilles, pipes, or outlets of any nature are not specifically located by the Contract Documents, request such location or obtain approval of the location prior to installation. If approval has not been obtained, the Architect may direct the relocation of such devices at the expense of the installer.

3.03 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
EXECUTION REQUIREMENTS

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
   a. Where pipes occur in partitions, furred-out spaces and chases, determine exact location and size and fit entirely concealed into allotted space. Report conflicts to Architect prior to installation.
   b. Where two or more pipes are to installed in parallel, or parallel to the piping of other trades, the piping shall be installed with sufficient space between the pipes to allow for the proper application of pipe covering, painting, and servicing.
   c. Furnish advance information on locations and sizes of frames, boxes, sleeves and openings needed for the Work to installers.

4. Install work to allow for installation of future work identified on drawings.

5. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.

B. Install products in accordance with manufacturer's recommendations or the requirements of trade associations, listed standards, Shop Drawings and Contract Documents.

C. If a conflict exists between these references, the most strict requirements govern. If printed instructions are not available, consult with the manufacturer or the manufacturer's field representative, where applicable.

D. Provide hangers, auxiliary framing, and other means for installing ceiling suspension systems, lighting fixtures, diffusers, and other equipment in ceilings to avoid ductwork, piping, etc.
   1. Suspend from structural members (i.e. joists, beams, etc.), and not from ductwork or piping.
   2. Provide supplemental framing members (i.e. angles, tubes, light gage steel framing, etc.) to span between structural members where required to support items of this paragraph C.

E. Install work that will not interfere with the proper installation of the Work of other trades.

F. Install work in a manner to facilitate operating, servicing and repairing.

G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

H. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

3.04 SPACE PREFERENCE

A. Carefully check and coordinate the location and level of all Work to avoid conflicts between all contractors. Where conflicts occur, the following preferences shall generally govern:
1. Recessed electrical light fixtures
2. High and medium pressure ductwork
3. Low pressure ductwork
4. Soil, waste, vent and storm piping
5. Sprinkler piping
6. Liquid heat transfer and refrigerant piping
7. Domestic water piping
8. Electrical conduits from branch circuits

B. However, no ductwork or liquid heat transfer main shall have preference over plumbing piping below plumbing fixtures, nor over electrical conduits above or below electrical switchgear and panels. No piping conveying liquids shall be installed directly over electrical or elevator equipment. No piping shall be installed in electrical or elevator equipment rooms.

C. Where headroom or space conditions resulting from application of these preferences appear inadequate, notify the Architect prior to installing the Work.

D. Coordinate the mounting heights of busways, electrical equipment and raceways to clear the opening heights of doors, the height of vehicles and the heights of equipment which needs to be routinely removed, and out of paths required for maintenance.

3.05 WORKMANSHIP

A. Install products straight, plumb, level and in line. Securely attach items to the substrate, using recommended adhesives, mechanical fasteners or other devices. Where holes are provided for attachment, do not field drill or cut new holes without the approval of the Architect.

B. Where applicable, match finished work to the approved samples or mock-ups.

C. Conceal fasteners wherever possible, unless exposed fasteners are permitted or specified.

D. Weld in accordance with AWS standards; comply with AWS for qualifications of operators and for workmanship.

E. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

F. Recheck measurements and dimensions, before starting each installation.

3.06 PROTECTION

A. Protect finished surfaces of product being installed and surrounding products from damage during installation. Provide protective devices as required and as recommended by the manufacturer. Cover work subject to damage at the end of each day’s work.
B. Coat concealed surfaces of metal products with a bituminous or other approved coating to prevent contact between dissimilar metals or other material which can cause deterioration.

C. Correct damage by repairing or replacing as directed by the Architect. Repairing will be permitted only where the repair is undetectable and does not cause structural damage or interfere with proper functioning of the part.

D. Protect finish of installed products until Substantial Completion of the Project by use of wrappings, covers or other approved protective devices. Remove such protection immediately prior to final cleaning.

E. Limiting Exposures: Coordinate and supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Maintain exposures within the manufacturers recommended limits. Where applicable, such exposures include, but are not limited to, the following:
   1. Excessive static or dynamic loading
   2. Excessive internal or external pressure
   3. Excessive high or low temperatures
   4. Thermal shock
   5. Excessively high or low humidity
   6. Air contamination or pollution
   7. Water or ice
   8. Solvents
   9. Chemicals
   10. Light
   11. Radiation
   12. Puncture
   13. Abrasion
   14. Heavy traffic
   15. Soiling, staining and corrosion
   16. Bacteria
   17. Rodent and insect infestation
   18. Combustion
   19. Electrical current
   20. High speed operation
   21. Improper lubrication
   22. Unusual wear or other misuse
   23. Contact between incompatible materials
   24. Destructive testing
   25. Misalignment
   26. Excessive weathering
   27. Unprotected storage
   28. Improper shipping
   29. Theft
   30. Vandalism

F. Take precautions to protect existing concrete and asphalt pavement from damage due to vehicle loads, parking, and storage.
1. Schedule loading to minimize pavement material consolidation during hot weather. Distribute wheel loads to the greatest extent possible.

3.07 OVERHEAD ATTACHMENTS

A. Where overhead hangers are required, and not indicated on the drawings, provide one or more of the following as required:
   1. Concrete inserts prior to placement of concrete or drilled type inserts after concrete is placed.
   2. Trapeze from adjacent structure with suitable steel framing.
   3. Connections to Structure: Suitable anchorage devices with a minimum load carrying capacity of 250 pounds plus safety factor of 4:1 for the applied load.
      a. Concrete: Steel expansion anchors. See Prohibited Material and Methods specified in Section 01 60 00.
      b. Steel: Bolted or welded connections to steel structure.

B. Where metal deck is furnished with hanger tabs or similar devices, applied total load, including work of other trades, not to exceed 75 pounds for each device. Loads in excess of permitted limit to be supported by trapeze framing as specified above.

C. Verify support requirements of heavy or unusual loads not specifically shown on drawings with Architect.

3.08 OPERATION AND MAINTENANCE

A. Contractor shall maintain all systems and equipment operated during construction. The contractor responsible for the installation of the system shall operate and maintain it. Make all repairs and perform all maintenance to assure Work is turned-over to Owner in first class condition.

B. Maintenance work includes:
   1. Lubrication
   2. Adjustments
   3. Filter replacements

END OF SECTION
SECTION 01 73 29
CUTTING AND PATCHING

PART 1 GENERAL

1.01 DESCRIPTION

A. Execute cutting, fitting or patching of Work, required to:
   1. Make several parts fit properly.
   2. Uncover Work to provide for installation of ill-timed Work.
   3. Remove and replace defective Work.
   4. Remove and replace Work not conforming to requirements of Contract Documents.
   5. Remove samples of installed Work as specified for testing.
   6. Install specified Work in existing construction.

B. In addition to contract requirements, upon written instructions of Architect:
   1. Uncover Work to provide for Architect's observation of covered Work.
   2. Remove samples of installed materials for testing.
   3. Remove Work to provide for alteration of existing Work.

C. Do not endanger any Work by cutting or altering Work or any part of it.

1.02 SUBMITTALS

A. Prior to cutting which affects structural safety of Project, submit written notice to Architect, requesting consent to proceed with cutting, including:
   1. Identification of Project.
   2. Description of Affected Work.
   4. Affect on other Work, on structural integrity of Project.
   5. Description of proposed Work. Designate:
      a. Scope of cutting and patching.
      b. Contractor and trades to execute work.
      c. Products proposed to be used.
      d. Extent of refinishing.
   6. Alternative to cutting and patching.
   7. Designation of party responsible for cost of cutting and patching.

B. Should conditions of Work, or schedule indicate change of materials or methods, submit written recommendation to Architect, including:
   1. Conditions indicating change.
   2. Recommendations for alternative materials or methods.

C. Submit written notice to Architect, designating time Work will be uncovered, to provide observation.
**PART 2  PRODUCTS**

2.01 MATERIALS

A. Patching of materials and surfaces shall be in accordance with the requirements of the Contract Documents. Where not otherwise defined, patching shall match adjacent surfaces and proper materials shall be provided accordingly.

**PART 3  EXECUTION**

3.01 INSPECTION

A. Inspect existing conditions of Work, including elements subject to movement or damage during cutting and patching.

B. After uncovering Work, inspect conditions affecting installation of new products.

3.02 PREPARATION PRIOR TO CUTTING

A. Provide shoring, bracing and support as required to maintain structural integrity of Project.

B. Provide protection for other portions of the Project, including all Contractors' personnel.

3.03 PERFORMANCE

A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, finishes.

B. Execute cutting and demolition by method which will prevent damage to other Work, and will provide surface to receive installation of repairs and new Work.
   1. No cutting shall be performed which will, in any way, reduce the structural strength of the building. Should such cutting be necessary, consult A/E and do not proceed with such operation unless written approval is given.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

C. Restore Work which has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.

D. Patching of materials and surfaces shall be in accordance with the requirements of the Contract Documents. Where not otherwise defined, patching shall match existing or adjacent surfaces and proper materials shall be provided accordingly.
   1. Wherever existing walls, floors, ceilings, etc., are cut, the exposed surfaces must be neatly finished by patching, painting, wall covering, etc., as required to blend patched areas into adjacent existing surfaces. Patched areas shall not be visible when viewing entire wall surface.
      a. Provide an even surface of uniform finish, color, texture, and
appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

2. Where painting or finishing of patched surfaces or application of wall or floor covering is required, finish the entire plane of surface in which patched area occurs.

3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

3.04 SLEEVES AND OPENINGS

A. Where pipes, conduits, ductwork or other materials pass through new walls, partitions, floors, roof or ceilings, provide suitable sleeves in these elements or provide openings where sleeves are not practical.

B. Close sleeves and openings to prevent passage of smoke or fire using approved methods and materials to maintain the fire rating of the construction being penetrated. See Section 07 84 00.
   1. Unless otherwise indicated, extend floor sleeves 2” above finished floor.

C. Where pipes, conduit, ductwork etc., pass through, behind, or above existing construction, provide all cutting, patching, and refinishing for doing this work as specified herein.

D. Lintels: Provide steel or precast concrete lintels to span openings in masonry walls sized in accordance with schedule shown or as detailed on structural drawings. In general, lintels are not required for openings less than the width of masonry unit in which wall is being constructed. Penetrations under beams or other concentrated loads require approval of Architect.

3.05 CLEANING

A. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

END OF SECTION
SECTION 01 74 00
CLEANING

PART 1  GENERAL

1.01  GENERAL REQUIREMENTS

A. These requirements supplement paragraph 3.15, General Conditions. Refer to General Conditions for additional requirements.

B. Execute cleaning, during progress of the work and at completion of the work, as required by Contract Documents.

1.02  RELATED SECTIONS

A. Cutting and Patching: Section 01 73 29.

B. Cleaning for Specific Products or Work: Specification section for the work.

1.03  CLEANING AND DISPOSAL REQUIREMENTS

A. Standards: Maintain project in accord with these safety and insurance standards:
   1. Applicable Federal and State Requirements.

B. Hazards Control: All trades shall comply with the following requirements:
   1. Store volatile wastes in covered metal containers; remove from site daily.
   2. Prevent accumulation of wastes which create hazardous conditions.
   3. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
   1. Do not burn or bury rubbish and waste materials on project site.
   2. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary sewers.
   3. Do not dispose of waste into streams or waterways.
   4. Wet down dry materials and rubbish to prevent dust.

D. Clean streets, highways, and private properties of all mud, earth, rubbish, rocks, refuse or other debris of any kind resulting from such work or related transportation to and from the work site.

PART 2  PRODUCTS

2.01  MATERIALS

A. Select and use cleaning materials and equipment with care to avoid scratching, marring, defacing, staining or discoloring surfaces cleaned.

B. Use only cleaning materials recommended by MFR of surfaces to be cleaned.
C. Use cleaning materials only on surfaces recommended by cleaning material MFR.

**PART 3 EXECUTION**

3.01 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

B. Provide, maintain and empty 55 gallon metal and dumpster type containers for collection of waste materials, debris and rubbish. Locate containers as directed by Architect. Provide containers with adequate capacity to accommodate anticipated needs. If containers do not have adequate capacity, increase intervals of waste removal or capacity of containers until adequate capacity is provided.

C. At reasonable intervals during progress of Work, but in no case less than once a week, dispose of waste materials, debris and rubbish.

D. Site: Maintain Project site free of waste materials and debris.

E. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

F. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

G. Direct Special Attention To:
   1. Provide non-staining layout lines / other markings on masonry and concrete
      Use chalk lines wherever possible and remove when no longer needed.
   2. Remove all stains from concrete surfaces, including floors.
   3. Shop marks shall not appear on exposed surfaces of any item.
   4. Remove concrete, mortar and paint spatters.
   5. Clean both brick and concrete unit masonry.
   6. Protect aluminum frames during construction and thoroughly clean upon completion of the installation.

H. Clean interior surfaces before start of finish painting and continue cleaning on an as-needed basis until painting is finished.

I. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

J. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
K. Vacuum interior building areas where work is performed prior to painting and other finish work. Continue vacuum cleaning on an as needed basis until building is ready for occupancy.

L. Protect interior of ductwork during construction from accumulation of dirt, dust or debris.

M. Clean trash from all chases and concealed spaces before final enclosure.

3.02 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations. Leave Project clean and ready for occupancy.

B. Employ experienced workmen, or professional cleaners for final cleaning.

C. At the completion of the work, remove all surplus material, false work, temporary structures, including foundations, plants of any description and debris of every nature resulting from operations and put the site in a neat and orderly condition.

D. Clean exposed interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.

E. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

F. Sweep concrete floors broom clean in unoccupied spaces.

G. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

H. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed interior and exterior surfaces, including light fixtures and lenses; polish surfaces so designated to a shine finish.
   1. Clean finishes free of dust, stains, films and other foreign substances.
   2. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.

I. Remove temporary protection and labels not required to remain

J. Clean surfaces of equipment; remove excess lubrication.

K. Remove debris, rubbish, dirt, etc. from open concealed spaces, chases and above ceilings.

L. Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.
M. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.

N. Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.

O. Clean plumbing fixtures to a sanitary condition.

P. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers and coils when units have been operated without filters during construction.

Q. Clean light fixtures and lamps; polish lenses.

R. Clean dirt and debris from interior of all electrical panels and user accessible electrical enclosure boxes prior to installation of covers or in the case of hinged access doors, before final cleaning of adjacent space. Clean the exterior surfaces of all switchgear located in Mechanical and Electrical Rooms and spaces.

S. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to original condition.

T. Clean dirt and dust from interior of air handling units before installing final filters. Wipe down the exterior surfaces of all HVAC equipment located in Mechanical Rooms and spaces. Exposed painted ductwork to be brushed clean of dust.

U. Site/Exterior Items: Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
   1. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
   2. Rake grounds that are neither planted nor paved to a smooth, even textured surface.
   3. Remove tools, construction equipment, machinery, and surplus material from Project site.
   4. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces.

V. Maintain cleaning until Final Completion.

W. Prior to Final Completion, or Owner occupancy, Contractor shall conduct an inspection of sight exposed interior and exterior surfaces, and all work areas, to verify that the entire work is clean.

END OF SECTION
PART 1  GENERAL

1.01  SUMMARY

A. Section includes administrative and procedural requirements for the following:
   1. Salvaging nonhazardous demolition and construction waste.
   2. Recycling nonhazardous demolition and construction waste.
   3. Disposing of nonhazardous demolition and construction waste.

1.02  RELATED SECTIONS

A. Sustainable Design Requirements: to be included in the project manual in the
   Construction Document issue.

B. Selective Demolition - for disposition of waste resulting from partial demolition of
   buildings, structures, and site improvements: Section 02 41 19.

C. Masonry – for disposal requirements for masonry waste: Section 04 22 00.

1.03  DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid
   waste resulting from construction, remodeling, renovation, or repair operations.
   Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from
   demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent
   sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities
   having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent
   processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or
   reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and
   subsequent incorporation into the Work.

1.04  PERFORMANCE GOALS

A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by
   weight of total nonhazardous solid waste generated by the Work. Practice
   efficient waste management in the use of materials in the course of the Work.
Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

1.05 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00, "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
1. Review and discuss waste management plan including responsibilities of waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.06 SUBMITTALS

A. Waste Management Plan: Submit 2 copies of plan within 14 days after the Notice to Proceed.

B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include separate reports for demolition and construction waste. Include the following information:
1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons.
4. Quantity of waste salvaged, both estimated and actual in tons.
5. Quantity of waste recycled, both estimated and actual in tons.
6. Total quantity of waste recovered (salvaged plus recycled) in tons.
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

C. Waste Reduction Calculations: Before request for Substantial Completion, submit three (3) copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

H. Qualification Data: For waste management coordinator and refrigerant recovery technician.

I. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.07 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 01 31 19 "Project Meetings." Review methods and procedures related to waste management including, but not limited to:
   1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
   2. Review requirements for documenting quantities of each type of waste and its disposition.
   3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
   4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
   5. Review waste management requirements for each trade.

1.08 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E1609 and requirements of this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of site-clearing and construction waste generated by the Work. Use Form CWM-1 for construction waste. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
   1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.

3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.

4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.

5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

**PART 2  PRODUCTS (Not Used)**

**PART 3  EXECUTION**

3.01 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.

B. Training: Train workers, subcontractors and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.02 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area designated by Owner.
   5. Protect items from damage during transport and storage.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

F. Plumbing Fixtures: Separate by type and size.

G. Lighting Fixtures: Separate lamps by type and protect from breakage.

H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.03 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
   1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
      a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner’s property and transport to recycling receiver or processor.

3.04 RECYCLING DEMOLITION WASTE

A. Asphaltic Concrete Paving: Break up and transport paving to recycling facility.

B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
   1. Pulverize concrete to maximum 1-1/2-inch size.
   2. Crush concrete and screen to comply with requirements in Division 31 Section "Earthwork" for use as satisfactory soil for fill or sub base.

C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
   1. Clean and stack undamaged, whole masonry units on wood pallets.

D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

E. Metals: Separate metals by type.
   1. Structural Steel: Stack members according to size, type of member, and length.
   2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

G. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in dry location.

H. Metal Suspension System: Separate metal members, including trim and other metals, from acoustical panels and tile and sort with other metals.

I. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

J. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

K. Plumbing Fixtures: Separate by type and size.

L. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
M. Lighting Fixtures: Separate lamps by type and protect from breakage.

N. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

O. Conduit: Reduce conduit to straight lengths and store by type and size.

3.05 RECYCLING CONSTRUCTION WASTE

A. Packaging
   1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
   3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
   4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Site-Clearing Wastes: Chip brush, branches, and trees at landfill facility.
   1. Comply with requirements in Division 32 Section "Plants" for use of chipped organic waste as organic mulch.

C. Wood Materials:
   1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
   2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
      a. Comply with requirements in Division 32 Section "Plants." for use of clean sawdust as organic mulch.

D. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
   1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.06 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
   1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION
SECTION 01 77 70
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 PRE-CLOSEOUT SUBMITTALS

A. Submit required tabulations when Work reaches seventy-five percent completion; however, regardless of percent completion, submit not later than 30 days prior to the scheduled date on which Substantial Completion is required.

B. Submit tabulations of:
   1. Equipment and systems for which the specifications require demonstrations or training, indicating relevant specification sections, scheduled time and place for demonstration and training sessions, and intended audience. Adjust schedule if instructed by Designer to do so.
   2. Equipment and systems for which operating and maintenance data are required in the Operating and Maintenance Data Binders and related documents are required in the Project Data Binders.
   3. Spare parts and extra materials required, indicating the relevant specification sections, and the appropriate party to whom the items are to be delivered.

1.02 REQUEST FOR CLOSEOUT INSPECTION

A. SUBSTANTIAL COMPLETION:
When Contractor considers Work substantially complete, Contractor shall submit to Designer:
   1. written assertion that Work is Substantially Complete;
   2. a list of items to be completed or corrected and dates scheduled for completion or correction of each item;
   3. certification that orientation and training for facility maintenance personnel is complete or written assertion that such orientation and training will be certified prior to inspection;
   4. written assertion that Operating & Maintenance Data Binders are complete and available or will be prior to inspection;
   5. when a Use and Occupancy Permit applies, a copy of the final approval(s), or written assertion that they will be complete and available prior to inspection;
   6. a draft of the application for payment corresponding to the substantial completion, with written assertion that an application for payment will be ready and submitted at the inspection;
   7. when there is Commissioning, written assertion that Commissioning requirements have been completed or will be prior to inspection.
   8. when there is a storm water permit, written statement of the status of final stabilization required under the Storm Water Pollution Prevention Plan (SWPPP) for the TDEC Construction General Permit (CGP) Notice of Termination (NOT).

B. FINAL INSPECTION:
When Contractor considers Work complete, Contractor shall submit to Designer:
   1. certification that a qualified person authorized by Contractor has reviewed the Contract Documents and inspected the Work;
   2. written assertion that the Work is complete and in accordance with Contract Documents and ready for Final Inspection;
   3. written assertion that additional materials necessary to augment the Operating & Maintenance Data Binders with instructions for adding these to the Binders, or full replacement Binders, are complete and available or will be prior to inspection;
   4. written assertion that Project Data Binders and Construction Record Documents are complete and available or will be prior to inspection; and,
   5. an application for final payment
C. Upon receipt of an appropriate request for inspection, Designer will schedule an inspection meeting with Contractor, and Owner's representatives to determine the status of completion.

1.03 RESULTS OF CLOSEOUT INSPECTIONS

A. Should the Designer determine that Work is not complete to the degree asserted by Contractor, Designer will promptly notify Contractor in writing stating the deficiencies. Contractor shall take immediate steps to remedy deficiencies and make a request for Re-Inspection.

B. SUBSTANTIAL COMPLETION: Designer will prepare a Certificate of Substantial Completion accompanied by a list of items to be completed or corrected, and will submit Certificate to Contractor and to Owner for signature with an accounting of Liquidated Damages due, when Designer verifies that:
   1. Work is Substantially Complete based on an inspection conducted pursuant to an appropriate request for Closeout inspection;
   2. orientation and training for facility maintenance personnel is complete; and,
   3. Operating & Maintenance Data Binders are complete and have been delivered to the Owner.

C. FINAL INSPECTION: Designer will certify that the Work is Complete, and will initiate Final Adjustments, when Designer verifies that:
   1. Work is complete in accordance with Contract Documents based on an inspection conducted pursuant to an appropriate request for Closeout inspection;
   2. orientation and training for facility maintenance personnel is complete; and,
   3. additional materials necessary to augment the Operating & Maintenance Data Binders with instructions for adding these to the Binders, or full replacement Binders, are complete and have been delivered to the Owner.
   4. Project Data Binders and Construction Record Documents are complete and have been delivered to the Designer.

1.04 RE-INSPECTION FEES: If the Work fails a Closeout inspection, and a subsequent inspection is requested and conducted based on Contractor assertion of the same stage of completion, Owner will compensate Designer for performing such Re-Inspection as additional services, and deduct the amount of such compensation from the Contract Sum by appropriate modification.

1.05 FINAL ADJUSTMENTS

A. When Designer has certified that the Work is complete, Designer will determine whether modification is needed to reflect appropriate adjustments to Contract Sum which were not previously effected. If such modification is needed, Designer shall assist the Owner in its preparation and deliver it to Contractor, who in the case of a change order, shall sign and return it to Designer.

B. When Designer has certified that the Work and needed modifications to the Contract are complete, and if necessary, Designer will instruct Contractor to submit a revised final application for payment.

1.06 ONE-YEAR CORRECTIVE INSPECTION

A. An inspection will be scheduled and conducted at project site prior to one year from date Substantial Completion was achieved, but as close to the end of that year as is reasonably possible.

B. The inspection will be attended by at least one representative each of Owner, Designer, and Contractor.

C. The inspection will confirm non-conforming items previously identified for correction by the Owner, and whether corrections have been completed or are still outstanding, and is intended to be an opportunity for Contractor to become aware of any outstanding corrections needed.

END OF SECTION
SECTION 01 78 21
CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 DATA BINDERS

A. Provide two complete sets in durable, commercial quality, plastic covered, three ring binders. Identify project and type of data on face and saddle.

B. Provide information required by Contract Documents, including:
   1. Cover sheet giving complete project title and number, Contractor's name, address, phone number, superintendent's name, and related information.
   2. Table of Contents identifying material in Binder, and identifying missing materials to be added later or certifying completeness of Binder.

C. OPERATING & MAINTENANCE DATA BINDERS
   1. Provide Product Data. Include: manufacturer; model number; names, addresses, & telephone numbers of suppliers, installers, & servicers; related information for repair, renovation, or additions.
   2. Provide Operating and Maintenance Data, including: instructions and schedules for proper operation, maintenance, servicing, and lubrication with manufacturer's parts list, illustrations, assembly drawings, maintenance diagrams, and list of recommended lubricants and cleaning agents; as-installed control diagrams and coordination drawings with color coded piping and wiring diagrams; valve tag charts with numbers, locations, and functions; panel board circuit directories; and, list of materials and parts furnished for Owner. Review brochures and manufacturer's standard printed information for data pertaining to models other than those actually provided, and mark to clearly omit inapplicable information and identify units actually installed.
   3. If Commissioning applies, provide Commissioning functional performance test certifications and data. If separate binders of this information have not been submitted already, provide a third copy in a separate binder.
   4. If a SWPPP applies, provide a section into which the Designer can add the Storm Water Operation & Maintenance Plan.

D. PROJECT DATA BINDERS
   1. On the form exhibited as Section 01 78 88, provide a complete list of subcontractors and material suppliers, including dollar amount, company name, address, phone number, local representative, and information regarding minority-owned business status. List general contractor as first entry.
   2. Provide a copy of the Certificate of Substantial Completion.
   3. Provide a copy of the State Fire Marshal's Certificate of Occupancy, and other Use and Occupancy Permits, Certificate(s) of Inspection, or letter(s) of acceptance from governing authorities as apply.
   4. Provide guarantees, warranties, bonds, certifications, maintenance agreements, service contracts, and related documents, including beginning date, duration, information about instances which might affect validity, and proper procedure in case of failure.
   5. If a SWPPP applies, provide the twice-weekly inspection reports and site audit reports.

1.02 CONSTRUCTION RECORD DOCUMENTS: Keep the record copy of Contract Documents required by paragraph 3.11 of the Conditions in good condition and in the course of the Work, legibly mark these to record actual conditions of Work, including: location, depth, and identification of new and existing underground items, utilities, valves, tap points, equipment, service access, test points, and related features; field changes in dimensions and detail; changes by addenda or Modification; and, description and details of features for maintenance, service, replacement, or expansion of the Work.

END OF SECTION
PART 1 - GENERAL

1.01 RELATED SECTIONS
Section 01 29 76 Payment Procedures
Section 01 77 70 Close-Out Procedures
Section 01 78 21 Close-Out Submittals

1.02 CONTRACTOR PREPARATION AND USE OF THIS FORM

A. Use this form or a reasonable facsimile to verify delivery of Data Binders. Fill in the identifying information following this paragraph, then use the prepared form as a receipt, for signature by the person to whom Data Binders are delivered. Provide a copy of the receipt with the application for payment.

1. For the Application for Payment commensurate with Substantial Completion, provide a copy indicating delivery of Operating and Maintenance Data Binders.
2. For the Application for Payment commensurate with Final Completion, provide a copy indicating delivery of Project Data Binders.

B. Identifying Information:

1. For the Work:

   Project Title:
   (SBC project number, institutional location, and work name)

2. For the Data Binder(s), mark only one of the boxes below:

   [ ] ONLY Operating & Maintenance Data Binder
   (due at substantial completion inspection)

   [ ] ONLY Project Data Binder
   (due at final inspection)

   [ ] BOTH data binders

1.03 RECIPIENT SIGNATURE

A. By signature below, recipient acknowledges receipt of the Data Binder identified above, but does not certify the completeness or correctness of the Data Binder.

   Recipient Signature:
   Legibly indicate recipient's name and title or affiliation with Owner or Designer

END OF SECTION
### Credit Verification Form

**Phase:**

**TN High Performance Building Requirements**

In accordance with the State Architect's office, a copy of this form must be submitted at the end of each project phase and accompany required Project Closeout documents. Acceptance by the State Project Manager is required upon review of completed Credit Verification Form.

#### Designated Project Team Member

<table>
<thead>
<tr>
<th>Team Member</th>
<th>Initials</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner</td>
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<tr>
<td>Contractor</td>
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<td></td>
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<tr>
<td>Mech. Eng.</td>
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<td>Elec. Eng.</td>
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<td>Civil Eng.</td>
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<tr>
<td>Architect</td>
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<tr>
<td>Other</td>
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#### Land Management

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<tr>
<th># Points</th>
<th>Credit ID</th>
<th>Description</th>
<th>Credit Level:</th>
<th>Sign-Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LM1.1</td>
<td>Site Selection - Reuse Existing Buildings</td>
<td>Priority 2</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>LM1.2</td>
<td>Site Selection - Show preference for building on developed sites: Preserve farmland/habitat, wetlands, floodplains, public parkland</td>
<td>Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>LM1.3</td>
<td>Site Selection - Brownfield Redevelopment - Remediate and Restore contaminated sites when possible</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>LM1.4</td>
<td>Site Selection - Urban Development - Locate building within existing infrastructure</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>LM2.1</td>
<td>Site Disturbance - Sediment and Erosion control during construction</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>LM2.2</td>
<td>Site Disturbance - Limit site disturbance during construction to minimum development footprint</td>
<td>Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>LM3.1</td>
<td>Transportation - Plan for access to public transportation</td>
<td>Priority 2</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>LM3.2</td>
<td>Transportation - Provide bicycle storage for 5% of building occupants and shower/changing facilities for 0.5% of FTE occupants</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>LM3.3</td>
<td>Transportation - Plan site to include preferred parking for carpooling for 3% of all spaces provided</td>
<td>Priority 2</td>
<td>N/A</td>
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<tr>
<td>0</td>
<td>LM3.4</td>
<td>Transportation - Plan site to include preferred parking for low-emitting/fuel efficient vehicles for 5% of all spaces provided</td>
<td>Priority 2</td>
<td>N/A</td>
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<tr>
<td>1</td>
<td>LM4.1</td>
<td>Landscape Design - Maximize vegetated open space</td>
<td>Priority 2</td>
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<tr>
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<td>LM4.2</td>
<td>Landscape Design - Native and drought tolerant planting</td>
<td>Required</td>
<td>N/A</td>
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<tr>
<td>1</td>
<td>LM5.1</td>
<td>Heat Island Reduction - Non-roof surface reflectivity and shading</td>
<td>Priority 1</td>
<td>0</td>
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<tr>
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<td>LM5.2</td>
<td>Heat Island Reduction - Reflective roof materials</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>LM6.1</td>
<td>Stormwater Design - Post development discharge rate and volume not to exceed Pre-development rate</td>
<td>Priority 1</td>
<td>0</td>
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<tr>
<td>0</td>
<td>LM6.2</td>
<td>Stormwater Design - Reduce discharge rate and volume 25% on previously developed sites.</td>
<td>Priority 2</td>
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</tr>
<tr>
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<td>LM6.3</td>
<td>Stormwater Design - Design to remove 80% Total Suspended solids from the average annual rainfall event. Verify local requirements.</td>
<td>Priority 1</td>
<td>N/A</td>
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<tr>
<td>1</td>
<td>LM6.4</td>
<td>Stormwater Design - Design per TDEC BMP References</td>
<td>Required</td>
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<tr>
<td>1</td>
<td>LM7.1</td>
<td>Exterior Site Lighting - Design exterior lighting power to be 30% less than is allowed by ASHRAE 90.1-2010, Section 9.4.3</td>
<td>Priority 2</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>LM7.2</td>
<td>Exterior Site Lighting - Locate fixtures to minimize illuminance above the horizontal plane</td>
<td>Priority 1</td>
<td>0</td>
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<tr>
<td>0</td>
<td>LM7.3</td>
<td>Exterior Site Lighting - Locate exterior fixtures to minimize light trespass at property lines. Document foot-candle levels at site boundary</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**HPBr Points Achieved:** 47

HPBr Points Required: 0

In accordance with the State Architect's office, a copy of this form must be submitted at the end of each project phase and accompany required Project Closeout documents. Acceptance by the State Project Manager is required upon review of completed Credit Verification Form.

State of Tennessee HPBr v1 7/1/2015 Page 1 of 4
TN High Performance Building Requirements

Credit Verification Form

<table>
<thead>
<tr>
<th>HPBr Points Required</th>
<th>HPBr Points Achieved</th>
</tr>
</thead>
<tbody>
<tr>
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<td>47</td>
</tr>
</tbody>
</table>

In accordance with the State Architect's office, a copy of this form must be submitted at the end of each project phase and accompany required Project Closeout documents. Acceptance by the State Project Manager is required upon review of completed Credit Verification Form.

### Water Efficiency

<table>
<thead>
<tr>
<th># Points</th>
<th>Credit ID</th>
<th>Description</th>
<th>Credit Level</th>
<th>Sign-Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>W3.1.1</td>
<td>Water Efficient Landscaping, Utilize efficient irrigation technologies and planting measures</td>
<td>Required</td>
<td>0</td>
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<tr>
<td>1</td>
<td>W3.1.2</td>
<td>Water Efficient Landscaping, Non potable sources or no irrigation</td>
<td>Priority 1</td>
<td>0</td>
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<tr>
<td>0</td>
<td>W3.2.1</td>
<td>Wastewater Treatment &amp; Conveyance: On site treatment</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>W3.2.2</td>
<td>Wastewater Treatment &amp; Conveyance: Utilize non potable water</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>W3.3.1</td>
<td>Water Use Reduction - Freeze flow and flush rates</td>
<td>Required</td>
<td>0</td>
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<tr>
<td>1</td>
<td>W3.3.2</td>
<td>Water Use Reduction - Utilize auto-flow / auto-flush valves</td>
<td>Priority 2</td>
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### Energy Efficiency

<table>
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<tr>
<th># Points</th>
<th>Credit ID</th>
<th>Description</th>
<th>Credit Level</th>
<th>Sign-Off</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>EE1.1</td>
<td>Commissioning - Basic commissioning process</td>
<td>Required</td>
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<tr>
<td>0</td>
<td>EE1.2</td>
<td>Commissioning - Advanced commissioning process</td>
<td>Priority 1</td>
<td>N/A</td>
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<tr>
<td>1</td>
<td>EE2.1</td>
<td>Energy Efficient Purchasing Policy - Energy Star qualified appliances &amp; equipment</td>
<td>Required</td>
<td>0</td>
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<tr>
<td>1</td>
<td>EE3.1</td>
<td>Energy Efficiency - Schematic Design energy modeling</td>
<td>Required</td>
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<tr>
<td>0</td>
<td>EE3.2</td>
<td>Energy Efficiency - Life Cycle Cost Analysis</td>
<td>Priority 1</td>
<td>N/A</td>
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<tr>
<td>1</td>
<td>EE3.3</td>
<td>Minimum Energy Performance - all projects to demonstrate compliance with ASHRAE 90.1-2008, according to project scope</td>
<td>Required</td>
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<tr>
<td>0</td>
<td>EE3.4</td>
<td>Improved Energy Performance - energy model is used during design, and final design demonstrates energy cost savings that exceed those required by the Minimum Energy</td>
<td>Priority 1</td>
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<td>5</td>
<td>EE4.1</td>
<td>Energy Efficiency in Existing Buildings - Lighting Power Reduction</td>
<td>Priority 1</td>
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<td>2</td>
<td>EE4.2</td>
<td>Energy Efficiency in Existing Buildings - Daylight Harvesting Controls</td>
<td>Priority 1</td>
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<td>2</td>
<td>EE4.3</td>
<td>Energy Efficiency in Existing Buildings - Vacancy sensor-controlled lighting</td>
<td>Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>EE4.4</td>
<td>Energy Efficiency in Existing Buildings - High efficiency HVAC Equipment</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>EE5.1</td>
<td>Energy Metering, Monitoring and Reporting: Building-Level Metering</td>
<td>Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>EE5.2</td>
<td>Energy Metering, Monitoring and Reporting: System level energy metering with measurement and verification - New Construction</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>EE5.3</td>
<td>Energy Metering, Monitoring and Reporting: System level energy metering with measurement and verification - Existing Buildings</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>EE6.1</td>
<td>Long-Term Energy Reporting - Maintain energy and water consumption data in Energy Star Portfolio Manager</td>
<td>Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>EE7.1</td>
<td>Renewable Energy - Investigate life-cycle cost effectiveness of on-site renewable energy</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>EE7.2</td>
<td>Renewable Energy - Provide Renewable Energy Credits (RECs) equal to 10% of annual site electricity through TVA or RECs equal to 35% from another source</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
</tbody>
</table>
# TN High Performance Building Requirements

In accordance with the State Architect's office, a copy of this form must be submitted at the end of each project phase and accompany required Project Closeout documents. Acceptance by the State Project Manager is required upon review of completed Credit Verification Form.

## Materials and Resources

<table>
<thead>
<tr>
<th># Points</th>
<th>Credit ID</th>
<th>Description</th>
<th>Credit Level</th>
<th>Sign-Off (from HPBr Checklist)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M1.1</td>
<td>Recycling Collection and Storage</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>M2.1</td>
<td>Sustainable Waste Management (50%, 75%, 95%)</td>
<td>Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>M3.1</td>
<td>Sustainable Materials: Recycled content 10%</td>
<td>Required</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>M3.2</td>
<td>Sustainable Materials: Recycled content 20%</td>
<td>Priority 2</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>M3.3</td>
<td>Sustainable Materials: Tennessee Produced Materials (non-wood) - Harvested AND manufactured in state - 10% of total cost. Harvested OR manufactured in TN, 50% of</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>M3.4</td>
<td>Sustainable Materials: Tennessee Produced Wood Products -Wood materials harvested AND manufactured in state - 10% of wood products. When harvested OR manufactured in TN, 50% of</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>M3.5</td>
<td>Sustainable Materials: Regional materials - 20%</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>M3.6</td>
<td>Sustainable Materials: Material re-use</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>M3.7</td>
<td>Sustainable Materials: Rapidly renewables</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
</tbody>
</table>

## Indoor Environmental Quality

<table>
<thead>
<tr>
<th># Points</th>
<th>Credit ID</th>
<th>Description</th>
<th>Credit Level</th>
<th>Sign-Off (from HPBr Checklist)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EQ1.1</td>
<td>Tobacco Smoke Control</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>EQ2.1</td>
<td>Minimum Ventilation: Design to meet ASHRAE 62.1-2007 or 2012 IMC</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>EQ3.1</td>
<td>Outdoor Air Delivery Monitoring: Provide a direct outdoor airflow measurement device</td>
<td>Priority 2</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>EQ4.1</td>
<td>CO2 Monitoring: Provide CO2 monitors in all high occupancy areas</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>EQ5.1</td>
<td>Air Quality Management: During construction</td>
<td>Priority 1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>EQ5.2</td>
<td>Air Quality Management: Before Occupancy</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>EQ6.1</td>
<td>Material VOC Limits: Adhesives and sealants</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>EQ6.2</td>
<td>Material VOC Limits: Paints</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>EQ6.3</td>
<td>Material VOC Limits: Coatings and anti-corrosive paints</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>EQ6.4</td>
<td>Material VOC Limits: Flooring systems</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>EQ6.5</td>
<td>Material VOC Limits: Composite wood and agrifiber</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>EQ7.1</td>
<td>Pollutant Control: Entryway systems</td>
<td>Priority 1</td>
<td>0</td>
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<tr>
<td>1</td>
<td>EQ7.2</td>
<td>Pollutant Control: Hazardous material storage</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>EQ7.3</td>
<td>Pollutant Control: Filtration media</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>EQ8.1</td>
<td>Thermal Comfort: Design to meet ASHRAE Standard 55-2004</td>
<td>Required</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>EQ9.1</td>
<td>Individual Occupant System Controls: Lighting controls</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>EQ9.2</td>
<td>Individual Occupant System Controls: Thermal comfort</td>
<td>Priority 2</td>
<td>N/A</td>
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<tr>
<td>0</td>
<td>EQ10.1</td>
<td>Daylight to Occupied spaces</td>
<td>Priority 1</td>
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<tr>
<td>0</td>
<td>EQ11.1</td>
<td>Views from Occupied spaces</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Credit Verification Form

TN High Performance Building Requirements

0 HPBr Points Required
47 HPBr Points Achieved

In accordance with the State Architect's office, a copy of this form must be submitted at the end of each project phase and accompany required Project Closeout documents. Acceptance by the State Project Manager is required upon review of completed Credit Verification Form.

<table>
<thead>
<tr>
<th># Points</th>
<th>Credit ID</th>
<th>Description</th>
<th>Credit Level</th>
<th>Sign-Off (from HPBr Checklist)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ID1.1</td>
<td>Innovation in Design: Provide Specific Title</td>
<td>Priority 1</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>ID1.2</td>
<td>Innovation in Design: Provide Specific Title</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>0</td>
<td>ID1.3</td>
<td>Innovation in Design: Provide Specific Title</td>
<td>Priority 2</td>
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<tr>
<td>0</td>
<td>ID1.4</td>
<td>Innovation in Design: Provide Specific Title</td>
<td>Priority 2</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>ID2.1</td>
<td>Environmentally Accredited Design Team</td>
<td>Priority 1</td>
<td>0</td>
</tr>
</tbody>
</table>

47 Total HPBr Points Achieved by Project
<table>
<thead>
<tr>
<th>Work performed or Material Supplied, and Dollar Value</th>
<th>Firm name and address</th>
<th>Principal Contact and Phone</th>
<th>If a Minority-Owned Business, classification and certifying agency. If not, “NO”.</th>
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</thead>
<tbody>
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</tr>
</tbody>
</table>
PART 1 - GENERAL: not used

PART 2 - PRODUCTS: not used

PART 3 - EXECUTION

3.01 Equipment Start-up / Commissioning

A. Conduct demonstration and instruction as soon as practicable upon installations, and prior to Substantial Completion inspection. Substantial Completion shall not be certified, nor shall Owner be required to assume responsibility for operating, maintaining, or insuring system, prior to complete demonstration and instruction.

B. Demonstrate operation of newly provided equipment and systems to Designer and to Owner's representative. Instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the operating and maintenance data as the basis of instruction.

C. Make lists of persons witnessing equipment and systems demonstration, and persons receiving operating instruction, using a format similar to the form included in Section 01 79 25 with project, subject, trainer, session information, and attendees identified. Include copy of lists in the Operating and Maintenance Data Binders.

END OF SECTION
PART 1 – GENERAL

1.01 Use a copy of this page as a planning form for demonstrations and training. Fill in the basic identifying information below:

<table>
<thead>
<tr>
<th>SBC Project Number:</th>
<th>Required date of Substantial Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution/Location:</td>
<td></td>
</tr>
<tr>
<td>Project Name:</td>
<td></td>
</tr>
<tr>
<td>Owner’s Facility Coordinator:</td>
<td>Phone:</td>
</tr>
<tr>
<td>Owner’s Maintenance Contact:</td>
<td>Phone:</td>
</tr>
<tr>
<td>Contractor Contact:</td>
<td>Phone:</td>
</tr>
</tbody>
</table>

1.02 If a list of required demonstrations and training has been specified in Division 1, use that list as a starting point, review the project manual for other specifications that require training of the Owner’s operators, and complete the list below. Check the box on left if Demonstration and Training is required on the standard listed subjects; add subjects as identified by review of the specifications and check the box to the left of each; and, schedule and indicate an target date for each. If the number of training subjects exceeds the available space provided here, replace or continue the list on a similarly formatted separate page. Submit the list with the initial Progress Schedule, and update as necessary during the Work to ensure that advance notice of the demonstration and training schedule is acceptable to the Designer.

<table>
<thead>
<tr>
<th>Spec Reference</th>
<th>Subject</th>
<th>Target Date</th>
<th>Actual Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Boiler</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Chiller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Transmission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevator / Conveying</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Alarm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plumbing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telecommunications</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART 2 – PRODUCTS: not used.

PART 3 – EXECUTION

3.01 For each session conducted, use this page as a Training Verification Report.

A. Fill in the information below prior to the session (“End Time” may be filled in after):

<table>
<thead>
<tr>
<th>SBC Project Number:</th>
<th>Institution/Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Project Name:</td>
</tr>
</tbody>
</table>

Subject Equipment / System:

<table>
<thead>
<tr>
<th>Spec Reference</th>
</tr>
</thead>
</table>

Demonstration and Training (by whom, where, when):

<table>
<thead>
<tr>
<th>Trainer Name:</th>
<th>Company:</th>
<th>Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Place:</th>
<th>Date:</th>
<th>Start Time:</th>
<th>End Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

B. Minimum Agenda Requirements:

- [ ] System Walk-through
- [ ] Operation
- [ ] Trouble-shooting
- [ ] Maintenance
- [ ] Safety

C. Attendance: Each person receiving the demonstration and training shall sign in below, or on a similarly formatted continuation page:

<table>
<thead>
<tr>
<th>Initials</th>
<th>Legibly print your name</th>
<th>Unit and title or function</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

END OF SECTION
PART 1 – GENERAL

1.01 Complete the processes of commissioning selected equipment and systems as specified. These should be listed in a companion section following this section. The absence of such a section does not negate the commissioning responsibilities. In the absence of such a section, review the specifications for commissioning requirements and provide a summary list as a submittal to the Designer for approval prior to performing the required commissioning.

1.02 SUBMITTALS

A. Functional Performance Testing:
Prepare and submit to the Designer Functional Performance Testing Procedures for approval of equipment and systems. Contractor will use forms provided in this section of the specifications. Testing procedures will be detailed step-by-step and specific to each system. The approved procedures will be used to conduct the Functional Performance Testing. Functional Performance Testing will be completed prior to Substantial Completion.

B. Commissioning Data:
Upon completion of the Functional Performance Testing, the Contractor will submit to the Designer the Commissioning section of the Operation and Maintenance Binder. The binder will be divided into sections. The binder will contain copies of the manufacturer’s installation and start-up procedures utilized by the installer and/or contractor, completed Functional Performance Testing Procedures and associated forms from Sections 23 08 xx and 26 08 xx, signed Functional Performance Test Certificates, and equipment and maintenance records for equipment and systems operated prior to Owner acceptance.

1.03 ROLES:

A. Designer, using its Consultants will:
1. Review and approve the contractors Functional Performance Testing Procedures.
2. Report on field observations and report deficiencies to the contractor.
3. Observe the contractors Functional Performance Testing.
5. Review final Commissioning Data.

B. Contractor:
1. Prepare and provide Functional Performance Testing Procedures for Designer approval.
2. Provide installation and start-up of all equipment and systems as prescribed by the manufacturer’s procedures.
3. Perform and maintain a maintenance and service log for equipment and systems that are being operated prior to Owner acceptance.
4. Provide manpower, supplies, testing instruments, etc. required to perform Functional Performance Testing.
6. Prepare three (3) sets of Commissioning Data for Designer review and approval.
1.04 SYSTEMS TO BE COMMISSIONED:

**A.** The following Mechanical systems and associated equipment are to be Commissioned as specified in Sections 23 08 xx.

1. Mechanical (HVAC) Air and Water
2. Associated Controls and Building Automation
3. Domestic Hot Water

**B.** The following Electrical systems and associated equipment are to be Commissioned as specified in Sections 26 08 xx.

1. Electrical panel boards.
2. Power Circuits.
3. Lighting levels.
4. Generator and/or Back-up Power sources.

PART 2 – PRODUCTS: NOT USED

PART 3 – EXECUTION

3.01 Commissioning Construction Phase:
Complete the following Commissioning activities during the Construction Phase of the project. Submit for review and provide notification of activities.

**A.** Manufacturer’s system/equipment start-up procedures.

**B.** Specified manufacturer’s and/or independent testing agency reports.

**C.** Project schedule that included dates for start-up of equipment and systems, and Functional Performance Testing.

**D.** Minimum seven (7) day notification of code required testing and specified cleaning of systems.

**E.** Minimum seven (7) day notification of system and equipment start-up.

**F.** Control submittal on systems and equipment including drawings, sequences and programming.

**G.** Prepare detailed Functional Performance Testing Procedures for systems and equipment. Utilize the forms provided in this section of the specifications. Procedures will be detailed, step-by-step, and include description of expected results for verification. Modify test procedures as required by the Designers’ comments. Coordinate and schedule tests so that all parties involved will be present for final testing and acceptance.

**H.** Correct all deficiencies prior to final acceptance.

**I.** Prepare a list of all system and equipment warranties specified in the contract documents. Provide the warranty item and the contract document section number. Provide the Designer with an update list throughout the project.

**J.** Prepare a list of all deliverables specified in the contract documents. Provide the deliverable item and the contract document section number. Provide the Designer with an updated list throughout the project.
K. Prepare a list of all Training and Demonstrations specified in the contract documents. Provide the type of Training and/or Demonstration and the contract document section number. Provide the Designer with an updated list throughout the project.

L. Prepare a list of all tests, reports, services, etc. whether required by codes, independent authorities, or manufacturers as specified in the contract documents. Provide the type of test, report, services, etc. and the contract document section number. In the case that the test is required by state or local codes, update the list as soon as the information is available. Provide the Designer with an updated list throughout the project.

M. Systems and/or equipment will not be used for temporary purposes of any kind until authorized by the Designer in writing to ensure that required maintenance and warranties remain in force. The Contractor will be responsible for maintenance of all systems and equipment until final acceptance and will maintain on site a binder containing schedules of maintenance activities, items checked, repairs or replacements made and documents to verify that the work was performed. The documentation contained in this binder will become part of the Commissioning Binder.

3.02 Commissioning Acceptance Phase:
Complete the following Commissioning activities during the Acceptance Phase of the project. The activities described in this section must be completed prior to substantial completion.

A. Perform Functional Performance Tests of Mechanical and Electrical systems and equipment as specified utilizing the testing procedure prepared by the Contractor and approved by the Designer to verify proper calibration, operation and performance. The Contractor is responsible for providing all manpower, equipment and/or testing instruments required to perform tests. Functional Performance Testing will be performed in the presence of the Designer/Consultant and the Owner. Tests that fail to perform as required, will be retested upon correction. If retesting has to be rescheduled, the Contractor will be responsible for any additional charges.

B. All deliverables prescribed in the contract documents will be delivered to the Owner at the location designated by the Owner.

C. Perform all Training and Demonstrations prescribed in the contract documents.

D. Provide three (3) Final Commissioning Binders to the Designer for review and approval. Ensure that all forms are completely filled out and all testing results documented. If missing or incomplete information and/or data is identified by the Designer, reassemble replacement manuals with complete information prior to project final payment.

END OF SECTION
## Performance Testing Identification Form

### Owner's Project Number: 166/

### Institution or Campus:

### Building:

### Installer:

### System/Unit Identifier:

### Location:

### List Each Piece of Equipment Associated with This System and/or Unit by Tag #

<table>
<thead>
<tr>
<th>Piece of Equipment</th>
<th>Tag Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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<tr>
<td>2</td>
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<td>14</td>
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</tbody>
</table>

**Performance Testing Identification Form**

01 91 23 - 1

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**Posted in XLS format**

June 2011 OFD s019123

Page 1 of 1
<table>
<thead>
<tr>
<th>Step by Step Detailed Procedure</th>
<th>Expected Result</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
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FUNCTIONAL PERFORMANCE TEST CERTIFICATION

Owner's Project #: 166/

PROJECT NAME: ____________________________

Identification of Equipment or System: ____________________________

Location of Equipment or System: ____________________________

Manufacturer / Supplier: ____________________________

This date: ____________________________

Functional Performance Test Procedure No: ____________________________

Components Included: ____________________________

The above systems and components integral to this equipment are complete and have undergone Functional Performance Tests. All Functional Performance Test procedures are complete and have been checked off only by parties having direct knowledge of the event, as indicted below, respective to each responsible contractor. This Functional Performance Test is submitted for approval and is subject to the attached list of outstanding items not completed successfully. Contractor shall submit a Deficiency Form upon completion of any outstanding or deficient items. None of the outstanding items preclude safe and reliable functional tests being performed.

CHECK ONE: Deficiency listing attached; or, No Deficiencies Found.

All Designer and Contractor punch list items for this system and related equipment have been addressed and corrected prior to Functional Performance Testing.

The Functional Performance Test procedures were reviewed and approved by the installer and applicable subcontractors prior to testing.

CONTRACTOR'S CERTIFICATION OF PERFORMANCE:

I hereby certify that the above described equipment or system, has been energized, operated, adjusted, and balanced in accordance with requirements of the Contract Documents and the manufacturer's recommendations for a sufficient period to confirm that operation complies in all respects with the Contract Requirements.

Signature ____________________________ Print Name ____________________________ Date ____________________________

Installer: ____________________________

General Contractor: ____________________________

Designer / Consultant: ____________________________
PART 1 GENERAL

1.01 SUMMARY

A. Commissioning is a quality-focused process for enhancing the delivery of a project. The process focuses on verifying and documenting that the facility and all its systems and assemblies are planned, designed, installed, tested, operated and maintained to meet the Owner’s Operational Performance Requirements as defined in the Contract Documents.

B. The purpose of commissioning is to provide a systematic process of assuring by verification and documentation, from the design phase to a minimum of one year after construction, that all facility systems perform interactively in accordance with the Contract Documents and their intent.

1.02 RELATED DOCUMENTS

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

B. Section 220800 – Commissioning of Plumbing Systems

C. Section 230800 – Commissioning of HVAC

D. Section 260800 – Commissioning of Electrical Systems

E. Commissioning Plan, dated [TBD]

F. CxAlloy Total Quality™ (TQ) Online Software

1. The CxA will provide user accounts to all project team members requested by the Contractor and Subcontractors.

2. All commissioning-related activities (e.g., reviews, issues, checklists, tests, commissioning-related documentation) will be tracked and recorded by using CxAlloy TQ.

3. The Contractor and Subcontractors shall be responsible for providing all hardware (e.g., computers, tablets) necessary to access CxAlloy TQ.

1.03 INCLUDED SYSTEMS

A. The following systems, equipment and their components are included in the scope of the commissioning activities and are considered to be commissioned systems and equipment.

1. Mechanical
2. Plumbing
3. Electrical

1.04 ROLES AND RESPONSIBILITIES

A. Commissioning Authority (CxA): The Commissioning Authority is an individual who leads, reviews and orchestrates the completion of the commissioning process activities. The CxA serves on behalf of and may represent the Owner with respect to the commissioning activities.

B. General Contractor (hereafter referred to as “Contractor”)

1. The Contractor shall be responsible for adhering to applicable code required procedures, standards and industry practices to ensure personal safety, the safety of others, and facility safety. If there are procedures in the checklists or the functional performance tests which conflict with safety, the Contractor shall not proceed and shall notify the CxA immediately.

2. The Contractor shall be responsible for the quality of construction.

3. The Contractor shall be responsible for communicating to the CxA the construction schedule, milestones, completion schedules, planned testing, etc., including updates in the same fashion, timeliness and level of detail as is provided to the Owner.

4. The Contractor shall incorporate commissioning-related activities into the overall project schedule.

5. The Contractor shall make record drawings readily available for review and use by the CxA at any time during normal business hours.

C. Subcontractors {Review the following add/delete/modify as appropriate to the project scope}

1. The HVAC Subcontractor shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the HVAC systems.

2. The Plumbing Subcontractor shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the plumbing systems.

3. The Building Automation Control System (BACS) Subcontractor shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the BACS.

4. The Electrical Subcontractor shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities
as necessary to demonstrate to the Owner successful operation of the electrical systems.

5. The Fire Alarm Subcontractor shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the fire alarm systems.

6. The Fire Protection Subcontractor shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the fire protection systems.

7. The Building Envelope Subcontractor(s) shall be responsible for the scheduling, supervising and performing start-up, testing and commissioning activities as necessary to demonstrate to the Owner successful operation of the building envelope systems.

PART 2 PRODUCTS

2.01 MEANS OF ACCESS

A. The Contractor and/or Subcontractors shall provide means for the CxA to access, observe and visually confirm proper operation of all equipment and systems. These means shall be in compliance with all OSHA and job-site safety regulations.

2.02 TEST EQUIPMENT

A. The Contractor and/or Subcontractors shall provide the necessary equipment to fully test the commissioned systems as defined in the functional performance test procedures to be provided by the CxA.

B. The test equipment shall meet the following minimum requirements.

1. All test equipment shall be in good mechanical and electrical condition.

2. Field test metering used to check power system meter calibration will be more accurate than the instrument being tested.

3. Accuracy of metering in test equipment shall be appropriate for the test being performed.

4. Waveshape and frequency of test equipment output waveforms shall be appropriate for the test and the tested equipment.

C. Calibration

1. Calibration of all test equipment shall be current.

2. Calibration accuracy shall be traceable to National Institute of Standards and Technology (NIST).

3. Test equipment shall be calibrated in accordance with the following
schedule.

a. Field instruments
   1) Analog – At least every 6 months
   2) Digital – At least every 12 months

b. Leased Specialty Equipment – At least every 12 months

4. Dated calibration labels shall be visible on all test equipment.

5. Calibration records shall be provided for all test equipment used in the project.

PART 3 EXECUTION

3.01 COMMISSIONING TEAM

A. The Contractor and each Subcontractor shall designate an individual to be responsible for coordinating commissioning activities with the CxA. This requirement is intended to facilitate effective communication during the commissioning process.

B. The commissioning team consists, at a minimum of the following: {Review the following add/delete/modify as appropriate to the project scope}

1. Owner
2. Commissioning Authority
3. Architect
4. Design Engineers (Mechanical, Plumbing, Electrical, Specialty)
5. General Contractor
6. Mechanical Subcontractor(s) and its Subcontractors
7. Plumbing Subcontractor(s) and its Subcontractors
8. BACS Subcontractor(s) and its Subcontractors
9. Electrical Subcontractor(s) and its Subcontractors
10. Testing, Adjusting & Balancing (TAB) Subcontractor

3.02 COMMUNICATION PROTOCOLS

A. Formal reports including Field Observation Reports will be distributed to the Owner, Architect and General Contractor.

B. Informal comments and observations from the commissioning work will be relayed directly to the responsible party whenever possible, with copies to the Owner, Architect and General Contractor. This includes field observations and functional performance test results. The direct communication approach will
avoid delays from traditional remote paper exchanges, will encourage dialogue and discussion of options and alternatives, and generally maintain an atmosphere of cooperation and quality.

C. Response Times

1. Timeliness in delivering information or providing responses to the CxA is essential to providing the construction product to the Owner on time, as well as facilitating the commissioning process.

2. The Contractor shall adhere to the following to meet this objective:
   a. Delivery of proposed training material to CxA: Thirty (30) days prior to the scheduled training
   b. Response via CxAlloy TQ to a site observation comment to CxA: Five (5) days or less from receipt of comment.
   c. Time to correct discrepancies noted in Record Drawings during construction phase: Two (2) weeks from the date the discrepancy was noted

3. The CxA shall respond, in writing, to questions from the Contractor within five (5) working days.

3.03 COMMISSIONING MEETINGS

A. Commissioning issues will be handled during commissioning meetings which will be scheduled at appropriate times mutually convenient to the CxA and Contractor.

3.04 SUBMITTAL REVIEW PROCEDURES

A. The Contractor shall provide a copy of each submittal defined for the systems to be commissioned to the CxA at the same time as providing the submittal to the Architect.

B. The CxA will review the submittals for information only (approval not required) parallel to the Engineer’s review.

C. The Contractor shall respond via CxAlloy TQ to all submittal comments submitted by the CxA and not rejected by the Design Professional.

3.05 FIELD OBSERVATIONS AND VERIFICATIONS

A. The CxA will make field observations from time-to-time. The CxA field observation reports may include construction issues, access and maintenance issues, safety issues, or other issues.

B. The Contractor shall respond via CxAlloy TQ to each contractor-responsible issue within five (5) business days of receipt of the field observation report. The response shall state at a minimum the following.

1. Concurrence or not on whether this is an issue
2. Planned corrective action
3. Date when correction will be completed

C. The Contractor shall respond via CxAlloy TQ when the corrective action has been completed and in its opinion the issue is resolved.

3.06 EQUIPMENT CHECKLISTS

A. The Commissioning Authority will provide the Contractor the following types of equipment checklists (alternatively, the Contractor may submit its own checklists to the CxA for review and approval in lieu of using those provided by the CxA):

1. Equipment Pre-Functional Checklist

B. Intent

1. The Equipment Receipt Inspection Checklist will be used to verify the correct equipment has been received, record key additional attributes defined in the checklist and confirm that the equipment is in acceptable condition.

2. The Equipment Pre-Functional Checklist will be used to communicate the readiness for a particular equipment or system for functional performance testing.

3. O&M Manual Process Checklist will be used to verify all required components of the O&M Manuals and any quality control documentation for the equipment has been provided.

4. The checklists do not contain all of the requirements of the Contract Documents. The completion of the checklist does not eliminate the Contractor’s responsibility for meeting other requirements in the Contract Documents.

A. Use and Process

1. The Contractor shall refer to CxAlloy TQ to obtain the checklists.

2. The Contractor shall complete each checklist via CxAlloy TQ. The Contractor shall document and explain any negative responses to any line item of the checklist at the end of the checklist.

3. The Contractor shall upload to each checklist any documentation identified and any other documentation that the Contractor deems relevant to the checklists.

4. The Contractor shall provide each completed checklist to the CxA according to the following schedule:

a. Equipment Receipt Inspection Checklist: Prior to any request for payment that includes the equipment

b. Equipment Pre-Functional Checklist: Minimum of five (5) working
days prior to scheduling of any functional performance tests related to that equipment.

c. O&M Manual Process Checklist: By the date requested for Substantial Completion

5. The CxA shall have a minimum of five (5) working days to verify at his discretion whether the checklists have been completed satisfactorily before scheduling of any functional performance tests related to that equipment.

3.07 FUNCTIONAL PERFORMANCE TESTING

A. General

1. The Contractor and appropriate Subcontractors shall demonstrate that the commissioned equipment and systems operate properly in all modes of operation.

2. Testing shall begin at the component level and progress upwards in complexity to the equipment and system level.

3. When all systems have passed their functional performance tests, the Contractor and appropriate Subcontractors shall demonstrate that the systems operate correctly as a whole in a System Integration Test.

B. Functional Performance Test (FPT) Procedures

1. The Contractor shall provide all documentation as requested to the CxA for development of functional performance testing procedures. This documentation shall include, at a minimum, manufacturer installation, start-up, operation and maintenance procedures. The CxA may request further documentation as necessary for the development of functional performance tests.

2. The FPT procedures will be provided to the Contractor by the CxA prior to testing for review.

3. The Contractor shall refer to the Commissioning Plan for draft FPT procedures.

4. The Contractor and Subcontractors shall review the FPT procedures and reply, in writing, whether the tests as written are acceptable, meet the installed conditions, and will not void any warranties. The Contractor shall provide any requested modifications to the test procedures in writing to the CxA for consideration. No reply from the Contractor within four (4) weeks of its receipt of the FPT procedures signifies the Contractor’s and Subcontractors’ concurrence that the procedures are acceptable.

5. The FPT procedures will provide step-by-step instructions in a pass/fail format.

C. When the equipment and systems are ready to test, the FPT will be scheduled.
for a time in accordance with the project completion schedule.

1. Functional performance testing is intended to begin upon completion of a system.

2. Functional testing may proceed prior to the completion of the system at the discretion of the CxA and the Contractor.

D. The Contractor shall place equipment and systems into operation and continue the operation as required during each working day of the testing activities.

E. The Contractor shall accomplish the functional performance testing of equipment based on procedures developed by the CxA and as reviewed by the Contractor.

   1. The Contractor shall provide skilled technicians to operate the systems during functional performance testing. At a minimum, the contractor shall provide one trade technician familiar with the system being tested.

   2. The Contractor shall provide means of access to the CxA to visually verify all aspects of the specified test.

   3. The Contractor shall correct any deficiencies identified during testing and retest equipment as required.

F. If the total time required to correct minor problems during testing is greater that forty-five (45) minutes, the test shall be considered failed and must be repeated in its entirety.

G. If a major problem is discovered during the test, the Contractor shall correct the problem. Prior to retesting, the Contractor shall submit to the CxA the required data indicating that the deficient items have been corrected. After review of this information by the CxA, a retest will be scheduled. During the course of the retest, if at any point a major deficiency is discovered, the test will be stopped. If more than two functional performance tests (one initial test and one retest) for any type of equipment due to Contractor’s failure of problems or issues that the Contractor had direct or indirect control over are required, the costs for the CxA to witness retesting of similar types of equipment until satisfactory results are obtained shall be the responsibility of the Contractor.

   1. A major problem is any problem or group of problems that require more than forty-five minutes to correct.

   2. A type of equipment is equipment that belongs to a common category, for example, air handling unit or panelboard.

H. Re-testing: During the course of the retest, if at any point a major deficiency is discovered, the test will be stopped. Repeat tests until acceptable results are achieved.

I. Deferred Testing: The Contractor shall provide labor, equipment and materials to perform any functional testing that must be deferred past the date of final completion in order to properly perform the test. Acceptable reasons for deferring a test shall include the following:
1. Specific climatic conditions are necessary to properly demonstrate the functionality of the equipment or system.

2. Work to be conducted under a subsequent phase of the Project is not complete per the contractual Detailed CPM Project Schedule.

3.08 TEST AND BALANCE VERIFICATION

A. The Contractor shall provide the labor and test equipment necessary to demonstrate to the CxA that the HVAC air and water systems have been properly balanced.

B. The CxA will randomly select devices, equipment and systems for verification purposes.

1. The Contractor shall be prepared to demonstrate proper balance of at least 10% of non-critical systems. Non-critical systems are those whose sole purpose is to maintain thermal comfort conditions.

2. The Contractor shall be prepared to demonstrate proper balance of 100% of critical systems. Critical systems are those whose primary purpose is to maintain conditions necessary for life-safety or other regulatory conditions, i.e., pressure relationships in laboratories.

C. The Contractor shall regard this verification process as a functional performance test for purposes of time allowed to correct deficiencies and requirements regarding retesting if major problems are discovered.

3.09 TRAINING VERIFICATION

A. The Contractor shall submit proposed training material to the CxA for review and comment.

B. The Contractor for the respective system shall be responsible for the development and implementation of the training material for that system.

C. The Contractor shall upload final Operation and Maintenance (O&M) manuals, approved submittals, warranty document and TAB report to CxAlloy prior to training.

D. At a minimum, the Contractor shall provide the following material at the time of training:

1. Detailed agenda
2. Contractor contact information sheet
3. Detailed training material (divided by sections where appropriate)
4. Log sheets and maintenance checklists
5. Training may be recorded for future reference if requested by the Owner.

E. The Contractor shall develop a proposed training schedule and submit that to the
Owner for review, comment and approval.

F. The Contractor shall schedule and coordinate all training sessions through the Owner.

G. At a minimum, training topics shall include the following:

1. Description of equipment and systems
2. Warranties and guarantees
3. Equipment start-up and shutdown
4. Normal and emergency operation
5. Seasonal changeover
6. Maintenance schedules
7. Health and safety issues
8. Special tools and spare parts
9. Emergency procedures
10. Hands-on operation
11. Troubleshooting
12. O&M manuals
13. Facilities control system and sequences of operation

END OF SECTION
SECTION 02 32 01

GEOTECHNICAL INVESTIGATIONS

PART 1  GENERAL

1.01  SOIL BORINGS

A. Test borings have been made at the site of the improvements. Logs of the test borings are included in a report by GEOServices, LLC, dated July 11, 2017 and titled, “Report Geotechnical Exploration; DP Culp Center Expansion and Renovation; SBC Project No.: 166/005-01-2014A”; Johnson City, Tennessee. GEOServices Project No. 51-17054.

1. A copy of the report is available for examination at the office of the Architect; where copies may be obtained as follows:
   a) A scanned PDF of the report will be emailed upon request.
   b) A paper copy (only if required) will be provided for the cost of reproduction.

B. Logs of the test borings are not warranted by the Owner or the Architect, except that they reflect the best and only information available at the time of design.

END OF SECTION
SECTION 02 41 13

DEMOLITION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: Demolition required for this work includes:
   1. Removal of miscellaneous items.
   2. Dust control.
   3. Demolition and removal of portions of existing construction as indicated on drawings.
   4. Removal of all debris.

B. Definitions: The term “demolition”, as used herein, includes the removal of all existing objects (except for those objects designated to remain), plus such other work as is described in this section of these specifications.

1.02 QUALITY ASSURANCE

In addition to complying with all pertinent codes and regulations, comply with the requirements of all insurance carriers providing coverage for this work.

1.03 JOB CONDITIONS

A. Dust Control: Use all means necessary to prevent spread of dust during performance of the work of this section. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, staff, and concurrent performance of other work on the site.

B. Protection: Use all means necessary to protect existing objects designated to remain and, in the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 REPLACEMENT

Replace all pavements, sidewalks, curbs and gutters, structures, and lawns removed or disturbed to the original condition found with the quality and workmanship as specified in other sections of these Specifications.

2.02 OTHER MATERIALS

All other materials, not specifically described but required for proper completion of the work of this section, shall be as selected by the Contractor subject to the approval of the Architect.

2.03 EXPLOSIVES

A. Explosives are not to be used without permission of the Architect.
B. Conduct pre-blast survey if explosives are required and approved.

C. Contractor will be responsible for all costs connected with or resulting from use of explosives, if required and approved.

PART 3 - EXECUTION

3.01 PREPARATION

A. Notification: Notify the Architect and the Carter County School System at least five full working days prior to commencing the work of this section. Work must be scheduled to begin as soon as possible without interference in the normal operation of all school activities.

B. Site Inspection:
   1. Prior to all work of this section, carefully inspect the entire site and all objects designated to be removed and to be preserved.
   2. Locate all existing utility lines and determine all requirements for disconnecting and capping.
   3. Locate all existing active utility lines traversing the site and determine the requirements for their protection.
   4. The Contractor is to confer with the Local Water and Sewer Department Officials and Owner’s Maintenance for the ascertaining location of any unknown utility line not shown on the drawings before commencing work.

C. Clarification:
   1. The drawings do not purport to show all objects existing on the site.
   2. Before commencing the work of this section, verify with the Architect all objects to be removed and all objects to be preserved.

D. Scheduling:
   1. Schedule all work in a careful manner with all necessary consideration for the public.
   2. Avoid interference with the use of, and passage to and from, adjacent buildings and facilities.

E. Protection of Utilities: Preserve in operating condition all active utilities designated to remain.

3.02 DEMOLITION AND REMOVAL

A. Demolish and remove all walls, concrete slabs, and other structures designated to be removed or necessary to be removed prior to construction of this work.
B. Cutting into existing catch basins, and other existing utility structures shall be performed only to the extent required and patched neatly and left watertight.

3.03 REMOVAL OF DEBRIS

A. Remove all debris from the site and dispose of all removed material legally off site. Leave the site in a neat and orderly condition to the approval of the Architect. Debris disposal receipts will be required to be turned over to the Owner. Comply with all Local, State and Federal disposal requirements. Once demolished items or debris leaves the site they are the responsibility of the Contractor.

3.04 SAFETY

A. The Contractor is to observe all safety laws of Local, State, and Federal government in executing this work. This specifically includes all O.S.H.A. requirements.

B. Provide all warning signs, barricades, lights and other necessary safety devices required by agencies mentioned in paragraph 3.04.A.

C. Provide temporary protection as required. This includes temporary fencing, barricades, warning tape or other materials or means which are needed to protect the public and the Contractors forces.

D. Protect the occupants of the facilities, the general public, and workers at all times.

3.05 CLEAN UP

A. The Contractor is to keep his operations clean at all times during execution of demolition work.

B. Streets, highways, roads, existing paved areas and sidewalks shall be cleaned of all mud, dirt and debris as often as is required and kept clean during construction of this project.

3.06 PROTECTION

A. Protect all existing materials to remain. Where existing materials are damaged they shall be replaced with new materials. Protection of existing construction applies specifically to existing paving, buildings, building roofs, existing surfaces and finishes to remain and all other materials.

END OF SECTION
SECTION 02 41 19

SELECTIVE BUILDING DEMOLITION

PART 1  GENERAL

1.01  SUMMARY OF WORK

A. Work Included: The extent of demolition work is indicated on drawings, and includes, but is not necessarily limited to, the following:

1. Selective breaking up, dismantling and/or removal of existing building items.
2. Salvage of selected existing materials to be turned over to Owner as may be determined by the Owner or to be reused in the project.
3. Cutting and patching.
4. Clean up.

B. Removal of asbestos and other hazardous materials is not a part of this Contract. If asbestos or other hazardous materials are encountered during demolition, Contractor shall halt demolition operations in that area and notify Architect.

1.02  RELATED SECTIONS

A. Cutting and Patching: Section 01 73 29.

B. Construction Waste Management and Recycling: Section 01 74 19.

C. Selective Site Demolition: Section 02 41 13.

1.03  PROJECT CONDITIONS

A. Condition of Structures: The Owner assumes no responsibility for actual condition of structures to be demolished.

1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, variations within the structure may occur by Owner's removal and salvage operations prior to the start of the Demolition work.

2. It is solely the Contractor's responsibility to determine demolition procedure and sequence and to insure the safety of the building and its component parts during demolition. This includes the addition of whatever shoring, sheeting, temporary bracing, guys or tie-downs which might be necessary. Such material shall maintain the Contractor's property after completion of the project.

3. It is solely the Contractor's responsibility to follow all applicable safety codes and regulations during all phases of the work.

4. Existing Building: Provide temporary supports and other measures as required to prevent damage to the existing building during construction. Field verify all existing dimensions which affect the new construction.
B. Coordination
1. Demolition sequence, phasing and methods must be approved by Architect prior to start of demolition work.
2. Coordinate shoring with structural modifications. Shoring to be left in place until completion of structural work permits it's removal.

C. Title to Removed Property
1. All removal items, unless otherwise indicated for salvage or reuse will become the property of the Contractor and shall be removed from the Site. During the demolition operations, Owner reserves the right to add to, or delete from, the list of items designated for reuse or salvage.
2. Items to be salvaged for the Owner or for reinstallation are as indicated on the drawings.
3. Site storage or sale of Contractor owned removed items will not be permitted.

D. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstone and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner. Carefully salvage in a manner to prevent damage and promptly return to Owner.

E. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

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

G. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.
1. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

H. Protections: Ensure safe passage of persons around area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.

I. Damages: Promptly repair damages caused to adjacent facilities by demolition operations at no cost to Owner.
J. Utility Services
1. Locate and identify electrical and mechanical services passing through or located within affected area and serving areas outside the work limits.
2. Maintain existing utilities and protect against damage during demolition operations.
3. Shut-down periods
   a. Arrange timing of shut-down periods of all in-service utilities with the Owner. Do not shut down any utility without prior written approval.
   b. Keep shut-down period to a minimum or use intermittent period as directed.
   c. Some shut-down hours may be required after normal working hours. No extra compensation will be made for Work after normal working hours, weekends or holidays.

K. Scheduling: Conduct work so as to avoid interference with operations and work in areas of building which are to remain in service.

L. Permits, Fees and Inspections: Obtain and pay for all permits, fees and inspections required by governing authorities.

PART 2 PRODUCTS

2.01 MATERIALS

A. The Contractor shall furnish all materials, tools, equipment, supplies and labor required to perform the work in accordance with the Drawings and Specifications and within the time limits as specified. All work done under this contract shall conform to all current standards, building codes and ordinances. American National Standard for Demolition Operations – Safety Requirements, ANSI A10.6 (latest edition), is included by reference.

B. Shoring Materials: As determined by Contractor.

PART 3 EXECUTION

3.01 PROTECTION

A. Use water sprinkling, temporary enclosures and other approved methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.

   1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, pollution and electrical shock.
   2. Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations, as directed by the Architect. Return adjacent areas to conditions existing prior to the start of the work.

B. In removal of existing materials, take care not to damage work remaining in place, salvageable materials or equipment. Repair or replace any existing construction,
materials or equipment damaged during demolition to Owner's satisfaction at no additional cost.

C. Erect dust chutes and use for removal of materials, rubbish and debris.

3.02 DEMOLITION

A. Building Items Demolition
   1. General
      a. Items specified herein or indicated on drawings.
      b. Where indicated to be removed and either turned over to Owner or reinstalled, use methods for removal which will provide the least potential adjacent materials to remain.
      c. Miscellaneous Items: Material or equipment encountered during construction which must be removed to aid in construction operations or that which will not be used in completed facilities.
   2. Concrete and Masonry: Where cut line will be exposed in the finished work and where physically feasible, make edges by saw cutting.
   3. New Door and Window Openings: Cut openings, install lintels and patch jambs and head as required to provide rough openings indicated on drawings.
   4. Masonry: Demolish in small sections. Use bracing and shoring where necessary to avoid collapse of structure.
   5. Removal of Masonry Units.
      a. Limits: As indicated on Drawings or as directed by Architect.
      b. Method.
         1) Remove to first full masonry unit beyond limits.
         2) Remove all old mortar from existing masonry units adjacent to new construction.
         3) Sufficiently brace opening when necessary until construction is completed.
   6. Junction Points: Neatly repair the point of junction after removal of parts or all of masonry walls, slabs and like work which tie into new work or existing work, so as to leave only finished edges and surfaces exposed.
   7. Except where Contract Documents require leaving an existing floor finish in place, completely remove existing flooring from locations where new finishes are scheduled. Leave top surface of substrate completely free from materials that would interfere with bond of new materials.
   8. Completely remove existing carpet from areas to receive new floor finishes. Also remove pad and all traces of adhesive.
   9. Floor Preparation: See Section 01 73 00, Execution Requirements.

B. Mechanical (HVAC & Plumbing)
   1. Disconnect or shut off service to areas where mechanical work is to be removed.
   2. Remove all plumbing, heating, ventilating and air conditioning equipment, fixtures and related piping, ductwork and appurtenances as indicated.

C. Electrical
   1. Disconnect or shut off service to areas where electrical work is to be removed.
2. Remove all electrical fixtures, equipment and related switches, outlets, conduit, wiring and appurtenances as indicated, except conduit in walls and ceilings not being removed may remain. If these conduits are left in place, cut ends are to be permanently sealed.

3.03 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Remove from site, debris, rubbish and other materials resulting from demolition operations.

B. Removal: Transport materials removed and dispose of off site except as follows:
1. Transport material indicated to be "salvaged" to storage areas as directed by Architect. Storage areas are located on-site.
2. Store salvaged materials, protected from dirt and damage.

C. Clean Up
1. Leave interior areas "broom clean".
2. Remove barricades as directed.
3. Remove shoring.

END OF SECTION
PART 1 GENERAL

1.01 WORK INCLUDED
A. Clean concrete surfaces and seal with clear compound specified herein. Coordinate sealer application with concrete curing compound (See Section 03 30 00).

1.02 REFERENCES
A. ACI 515.1R - Guide to the Use of Waterproofing, Dampproofing, Protective, and Decorative Barrier Systems for Concrete.

1.03 SUBMITTALS
A. Product Data: For each type of product. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.

1.04 QUALITY ASSURANCE
A. Manufacturer: Certify in writing that proposed materials meet or exceed specifications and are appropriate for intended use.
B. Test Sample: Identify an area approximately 36" x 36" where a test cleaning can be performed and sealer application can be applied. Obtain Architect's approval of test area prior to start of test. Clean area and apply sealer using materials and methods proposed for the project. Repeat sample applications until approval by Architect. After sample's acceptance by the Architect, sample will be regarded as the minimum standard of workmanship/finish acceptable for the project.

1.05 PROJECT CONDITIONS
A. Do not apply materials when temperature is expected to be below 40° F within 48 hours or when rain is imminent.

1.06 DELIVERY, STORAGE, AND 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. Keep product from freezing.
C. Avoid direct contact with this product as it may cause mild-to-moderate irritation of the eyes and/or skin.
D. Protect materials during handling and application to prevent damage or contamination.

E. Use product full strength from the container.

F. Dispose of material according to all local, state and federal regulations.

**PART 2 PRODUCTS**

2.01 MATERIALS, GENERAL

A. Source Limitations: Obtain each color, grade, finish, type, and variety of product from single source with resources to provide products of consistent quality in appearance and physical properties.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

2.02 CONCRETE CLEANING MATERIAL

A. Description: Pre-mixed, pre-packaged degreaser/stripper.

B. Manufacturer and Product: Citrex by L & M CHEMICAL or Ultrite Degreaser by W. R. MEADOWS. Products by CHEM MASTERS, DAYTON SUPERIOR; MASTER BUILDERS SOLUTIONS; SURE BUILDING CHEMICALS or CONPROCO are acceptable providing they meet the requirements specified.

C. Properties

1. Appearance: Clear.
2. pH: 10.9.
3. Biodegradable: 100% after dilution.

2.03 CONCRETE SEALER

A. Description: Clear, one component, transparent, acrylic copolymer sealer. 2-coat application.

B. Primer: Type as recommended by sealer manufacturer.

C. Properties

1. VOC Content: Less than 170 g/L.
2. Solids: 30%.
3. ASTM C 1315, Type 1, Class A

D. Manufacturer and Product: Dress and Seal WB 30 by L & M CHEMICAL or equal products by CHEMMASTERS, DAYTON SUPERIOR; MASTER BUILDERS SOLUTIONS; SURE BUILDING CHEMICALS; W. R. MEADOWS or CONPROCO.
PART 3  EXECUTION

3.01  EXAMINATION

A. Examine surfaces to receive concrete degreaser. Notify architect if surfaces are not acceptable. Do not begin application until unacceptable conditions have been corrected.

3.02  SURFACE PREPARATION

A. Protect adjacent surfaces not designated to receive concrete degreaser.

B. Follow ACI Guide 515.1R (Section 3.4.2) for severe oil and grease stains.

C. Clean surfaces of residual flooring adhesive and other foreign deposits using warm water, scraping, adhesive removing chemicals or similar methods.

3.03  APPLICATION

A. Cleaner
   1. Conform to manufacturer's requirements and recommendations. Apply in number of applications as required.
   2. Finish cleaned surface to match test sample area.

B. Sealer
   1. Verify that slab surfaces have been cleaned in accordance with sealer manufacturer requirements.
   2. Conform to manufacturer's requirements and recommendations. Provide two coats. Apply first coat at approximately 300 square feet per gallon; second coat at approximately 400 square feet per gallon.
   3. Do not thin material.

3.04  CLEANUP

A. Dispose of material according to local, state, and federal regulations.

B. Clean all tools and equipment with water.

END OF SECTION
SECTION 03 01 31
CONCRETE PATCHING

PART 1 GENERAL

1.01 WORK INCLUDED
A. Pre-packaged grout (concrete patch) material.
B. Hydraulic cement leveling (transition) material.

1.02 UNIT PRICES
A. General: Unit prices include the cost of preparing existing construction to receive the work indicated.
B. Concrete Removal and Replacement or Patching: Work will be paid for by the cubic foot computed on the basis of rectangular solid shapes approximating the actual shape of concrete removed and replaced with average depths, widths, and lengths, measured to the nearest inch.
C. Epoxy Crack Injection: Work will be paid for by the linear foot of crack injected.
D. Polymer Overlays: Work will be paid for by the square foot of exposed overlay surface.

1.03 PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at Project site.

1.04 SUBMITTALS
A. Product Data: For each type of product. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.
B. Samples for Initial Selection: Submit cured samples for each exposed product and for each color and texture specified.
C. Samples for Verification: Submit cured samples for each exposed product and for each color and texture specified.
D. Qualification Data: For installers and manufacturers.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Each manufacturer shall employ factory-trained technical representatives who are available for consultation and Project-site inspection and assistance at no additional cost.
B. Installer Qualifications: Trained and approved by manufacturer.

C. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution for the following:
1. Epoxy Crack Injection: Perform epoxy crack injection in two separate areas, each approximately 48 inches long
2. Polymer Overlay: Apply approximately 20 sq. ft. area of polymer overlay.
3. Polymer Sealer: Apply approximately 20 sq. ft. area of polymer sealer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer’s written instructions for minimum and maximum temperature requirements and other conditions for storage.

B. Store cementitious materials off the ground, under cover, and in a dry location.

C. Store aggregates covered and in a dry location; maintain grading and other required characteristics and prevent contamination.

1.07 FIELD CONDITIONS

A. Environmental Limitations: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

A. Source Limitations: Obtain each color, grade, finish, type, and variety of product from single source with resources to provide products of consistent quality in appearance and physical properties.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

2.02 MATERIALS

A. Grout: One-part, cementitious patching and repair material.
1. Compressive Strength
   a. 28 days: 5500 psi.
   b. 3 days: 3500 psi.
2. Bond Strength (ASTM C1042) - 28 days: 1400 psi.
3. Manufacturer: Eucopatch by EUCLID CHEMICAL CO; SIKA; L&M CHEMICALS.

B. Water: Potable.

C. Hydraulic Cement: Sureflo by GEMITE or equal.

2.02 MIX

A. As recommended by manufacturer.
**PART 3 EXECUTION**

3.01 INSTALLATION

A. Floor Patch Areas
   1. Location: Floor patch areas; wall patch areas; areas where quarry tile removed; where indicated.
   2. Finish top of patch flush with existing floor or adjacent wall surfaces.
   3. Clean grout material from adjacent materials not scheduled or required to receive patch material.

B. Floor Transition/Leveling
   1. Location: At cell block ranges at transition between existing quarry tile and areas of removed vinyl asbestos tile.
   2. Saw-cut existing concrete slab to receive feathered edge of cementitious topping.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide cementitious leveling for the following:
   1. Self-leveling underlayment for application below interior floor coverings.
   2. To reslope shower and toilet room areas.
   3. Filling of floor "channels" where walls have been removed.
   4. At other conditions where existing floor defects require patching and filling.

1.02  RELATED SECTIONS

A. Selective Building Demolition: Section 02 41 19.
B. Concrete: Section 03 30 00.

1.03  SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.
C. Product Certificates: Signed by manufacturers of underlayment and floor-covering systems certifying that products are compatible.
D. Qualification Data: For qualified Installer.

1.04  QUALITY ASSURANCE

A. Installer: Specialist in the installation of materials specified and regularly engaged in the installation of same; qualified in, and familiar with, manufacture's recommendations for the installation of materials.

1.05  PROJECT CONDITIONS

A. Environmental Conditions: Temperature, ventilation, time requirements and other factors affecting installation as recommended by manufacturer.
B. Product Compatibility: Manufacturers of underlayment and floor-covering systems certify in writing that products are compatible.

1.06  DELIVERY, STORAGE AND HANDLING

A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.
PART 2

PRODUCTS

2.01 MANUFACTURERS

A. Specifications are based on products by ARDEX INC. The product catalog numbers listed herein are to establish a level of quality. Products by SIKA CORP., BASF, INC., MAXXON CORPORATION, DEPENDABLE or EUCLID CHEMICAL are acceptable provided they meet the requirements specified herein and design intent and usage indicated on the drawings.

2.02 MATERIALS

A. Self-Leveling Underlayment: ARDEX K-15; High strength, fast setting, non-shrink type. Conform to the following minimum requirements:
   1. Cement Binder: ASTM C150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C219.
   2. Compressive Strength - ASTM C109: Minimum 4000 after 28 days.
   3. Final Set - ASTM C191: Approximately 2 hours at 70°F.

B. Primer: ARDEX P-51 "Ultra Prime"; two-part, non-flammable, non-toxic primer or ARDEX P-51 as recommended for substrates encountered.

C. Aggregate (For thicknesses over 1-1/2" +/-): Washed, well-graded gravel, 1/8"-1/4".

PART 3

EXECUTION

3.01 INSPECTION

A. Inspect surfaces to receive cementitious leveling and verify that conditions are satisfactory for the installation.

B. Substrate must be solid, clean, dry, and free from oil, wax, grease, curing compounds, latex compounds, gypsum, asphalt or other foreign matter.

C. Notify Architect of any conditions deemed unsatisfactory for the installation.

D. Installation of work under this Section is understood as acceptance of the substrates as satisfactory.

3.02 PREPARATION

A. Using materials recommended by underlayment manufacturer, remove all substances adversely affecting bond, and prime existing substrate.
   1. Fill cracks and other subsurface irregularities that may telegraph through fill or otherwise deem a detriment to a satisfactory concrete topping/fill application.

B. Verify that temperature control is provided to meet requirements of underlayment manufacturer.
3.03 INSTALLATION

A. Install all materials in accordance with manufacturer's recommendations and printed instructions.

B. Where thickness is greater than 1-1/2" +/-, provide aggregate as recommended by manufacturer; provide finish layer without aggregate to achieve smooth finish; feather edges.

3.04 PROTECTION

A. Installer to advise Contractor of protection requirements required to prevent damage from work of other trades including limits for foot traffic and equipment.

END OF SECTION
SECTION 03 01 33
CONCRETE REHABILITATION

PART 1  GENERAL

1.01  WORK INCLUDED

A. Patching of existing exposed exterior vertical and horizontal concrete surfaces where visible damage is apparent and where indicated on the drawings to be addressed and restored to original integrity.

B. Topping of horizontal surfaces such as elevated walkways, stairs, landings, curbs.

C. Finish coating of vertical and horizontal exterior wall surfaces, including edge beams of elevated walkways, stair landings and curbs.

1.02  QUALITY ASSURANCE

A. Installer: Licensed or approved by manufacturer of rehabilitation materials.

B. Manufacturer: Certify in writing that proposed materials meet or exceed specifications and are appropriate for intended use.

1.03  PROJECT CONDITIONS

A. Do not apply materials when temperature is expected to be below 40 degrees F within 48 hours or when rain is imminent.

PART 2  PRODUCTS

2.01  CONCRETE PATCH MATERIAL

A. Description: Portland cement based, polymer modified, fibre reinforced specially formulated concrete patching material. One or two component types acceptable.

B. Water: Potable; free of deleterious materials.

C. Properties

1. Compressive Strength - ASTM C109 (Modified): 5,500 to 6,500 psi.
3. Bond Strength: Concrete substrate fails before bond fails.

D. Manufacturer: Fibre-Patch (Complete Mix) by GEMITE. Products by DAYTON SUPERIOR; STONEHARD; SURE BUILDING CHEMICALS or CONPROCO are acceptable providing they meet or exceed the requirements specified.

2.02  CONCRETE TOPPING MATERIAL

A. Description: Two-component hydraulic cement based, fibre-reinforced polymer
modified material, especially formulated for protection and waterproofing of horizontal concrete, traffic bearing surfaces. Manufacturer: Gem-Top by GEMITE. Products by DAYTON SUPERIOR; STONEHARD; SURE BUILDING CHEMICALS or CONPROCO are acceptable providing they meet or exceed requirements specified.

B. Cement: Portland cement, ASTM C150, Type I. Aggregate: Silica sand, mesh 30 to 50, or mortar sand. Water: Potable; free of deleterious materials.

C. Mix: Proportions and sequences as recommended by manufacturer.

D. Properties
   1. Compressive Strength - ASTM C109 (Modified): 5,000 to 5,500 psi.
   2. Modulus of Rupture - ASTM C27: 800 to 1,000 psi.
   3. Direct Tension Bond: 300 to 400 psi.
   4. Freeze Thaw Resistance - ASTM C666: 0% weight loss after 300 cycles.

E. Thickness: 1/4 inch, minimum.

2.03 Finish Coating

A. Description: Portland cement based, micro-fiber reinforced waterproof coating.

B. Color: As selected by Architect. Attain desired color by mixing of gray and white colors. Color to be uniform throughout entire project.

C. Thickness: Apply between 3 and 6 mils.

D. Manufacturer: Cem-Kote by GEMITE. Products by DAYTON SUPERIOR; STONEHARD; SURE BUILDING CHEMICALS or CONPROCO are acceptable providing they meet or exceed the requirements specified.

PART 3 EXECUTION

3.01 Surface Preparation

A. As recommended by MFR and as indicated on drawings. As a minimum, remove loose concrete, clean surfaces of grease, laitance, dust, dirt and efflorescence.

3.02 Application

A. Conform to manufacturer's requirements and recommendations for mixing and application. Apply in number of applications as required and apply surface bonding coat (slurry) as required.

3.03 Clean-Up

A. Clean materials from all surfaces not scheduled to receive patching or topping materials.

END OF SECTION
SECTION 03 01 40.72

STRENGTHENING OF PRECAST CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION

A. This specification section shall define the minimum requirements of the externally bonded composite strengthening system.

1.02 REFERENCES

A. General
1. The latest reference edition available on the day of bid invite shall be used for all standards.

B. American Concrete Institute (ACI)
2. ACI 562, Code Requirements for Evaluation, Repair and Rehabilitation of Concrete Buildings

C. American Society for Testing and Materials (ASTM)
3. ASTM D7522, Standard Test Method for Pull-Off Strength for FRP Bonded to Concrete Substrate

D. International Concrete Repair Institute (ICRI)
1. ICRI Technical Guideline No. 310.2R, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

E. ICC Evaluation Service (ICC-ES)
1. AC125, Acceptance Criteria for Concrete and Reinforced and Unreinforced Masonry Strengthening using Externally Bonded Fiber-Reinforced Polymer (FRP) Composite Systems
2. AC178, Acceptance Criteria for Inspection and Verification of Concrete and Reinforced and Unreinforced Masonry Strengthening using Fiber-Reinforced Polymer (FRP) Composite Systems

1.03 MEASUREMENT AND PAYMENT

A. The composite strengthening system shall be bid as a lump sum and is to include all costs associated with the work defined in this specification section. This includes the furnishing of all submittals, materials, tools, equipment, labor, surface preparation, transportation, storage, and supervision required for the application
of the FRP materials.

1.04 SUBMITTALS

A. Manufacturers’ Product Data
   2. Technical data sheets for materials to be used.
   3. Safety data sheets (SDS) for each material component.
   4. Installation instructions, including temperature restrictions, moisture limitations, surface preparation methods, curing times, and finish requirements.

B. Calculations and Drawings
   1. Design calculations and shop drawings for the composite system shall be compliant with ACI 440.2R and must be stamped and signed by a professional engineer registered in the state of Tennessee.
   2. Design calculations shall also conform to ACI 562 Equation 5.5.1 that stipulates the strength of the unstrengthened structure must be at least equal to: \[1.2D + 0.5L + A_k + 0.2S\].
   3. Shop drawings, at a minimum, must detail the necessary surface preparation, composite system to be used, number of layers, locations, end details, primary fiber direction, and finish requirements.

C. Applicator Qualification
   1. Written documentation from the composite system manufacturer that the contractor has completed the manufacturer’s training program and has been trained to install the proposed system.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. All products shall be delivered, stored, and handled according to the manufacturer’s recommendations.

B. Materials shall be clearly labeled and delivered in factory-sealed containers with manufacturing dates and shelf lives easily identifiable.

C. Materials shall be stored in a protected area free of moisture and UV exposure, with temperatures between 45°F and 95°F.

PART 2 PRODUCTS

2.01 COMPOSITE STRENGTHENING SYSTEM

A. Composite Strengthening System™ supplied by Simpson Strong-Tie®, Inc.

B. Composite Fiberwrap™ supplied by Delta Structural Technology, LLC

C. V-Wrap Systems™ supplied by Structural Technologies

D. CFRP Strengthening Systems by Sika Corporation®
PART 3  EXECUTION OF WORK

3.01  SURFACE PREPARATION

A. Surfaces to be wrapped shall be clean, sound, and free of standing water at time of application. All dust, laitance, grease, curing compounds, and other foreign materials that may hinder the bond must be removed before installation.

B. Existing concave and convex surfaces to be filled/transitioned with epoxy paste or a suitable repair mortar.

C. The concrete shall be abrasively prepared as required to achieve the desired surface texture as recommended by the carbon fiber reinforcing supplier. Possible means may include grinding, sand blasting, shot blasting, or pressure washing unless the FRP is being applied in a contact-critical application (i.e. horizontal wrapping of columns).

D. Any corners to be wrapped around shall be rounded to a ¾ inch minimum radius using a grinder or filler epoxy.

3.02  SURFACE MOUNTED APPLICATION

A. Verify ambient and concrete surface temperatures are between 45°F and 95°F or as recommended by the composite manufacturer.

B. Apply surface primer using a nap roller or as recommended by the composite manufacturer when using fabrics.

C. Apply epoxy paste where minor surface defects are present.

D. Allow the primer and/or paste to become tacky to the touch before applying the saturated fabric or pasted laminate or as recommended by the composite manufacturer.

E. When manually saturating fabric, precut sheets to required length using heavy duty shears before saturating with hand rollers. If mechanically saturating fabric with rollers, cut sheets using heavy duty shears either before or after they go through the epoxy bath. In both cases, ensure full fabric saturation is achieved. When precured laminates are used, cut to required length using a metal cutting wheel, clean with solvent, and apply paste to laminate per manufacturer’s recommendations.

F. Apply the saturated sheet or pasted laminate to the installation surface and remove entrapped air using hand pressure, rollers, or trowels per manufacturer’s recommendations.

G. When using fabrics, apply additional layers as necessary to meet the project requirements, ensuring each layer is firmly adhered to the previous layer. When using laminates, do not apply more than one layer.
H. Feather all fabric seams/edges with epoxy paste per manufacturer’s recommendations.

I. Confirm that intimate contact between composite system and substrate will be maintained throughout the curing process.

J. Apply finish coating after full epoxy cure, lightly sanding epoxy surfaces before installation per manufacturer’s recommendations.

3.03 QUALITY CONTROL

A. Field Monitoring
1. The work performed in Section 3.1 and Section 3.2 of this specification will be field monitored by the Owner’s Special Inspection Agency. The surface preparation shall be checked immediately before application of the composite system materials. Periodic inspection shall be provided during the application process.

2. The special inspector shall create daily reports that document the following:
   a) Date and time of installation.
   b) Ambient temperature, relative humidity, and weather conditions.
   c) Substrate surface temperature and dryness.
   d) Surface preparation method and ICRI concrete surface profile.
   e) Surface cleanliness description.
   f) Fabric/laminate/FRP anchor batch numbers.
   g) Epoxy batch numbers, mix ratios, and mixing times.
   h) Application locations.
   i) Conformance with installation procedures.
   j) Location and size of any delaminations/voids identified or repaired.

3. For fabric systems, the contractor shall create a minimum of two material sample sets daily. Each set will consist of two 12 in. by 12 in. panels made of two layers of saturated fabric and the sets shall be taken at different times during the working shift so that it is representative of maximum variances in material/site conditions. Prepare samples on a flat, level surface covered with heavy-duty vinyl (or similar). Prime vinyl with epoxy saturant, place saturated layers, and apply a top coat of epoxy saturant. Samples shall be cured at the site under the same environmental conditions as the production work they represent and must be marked with sample date, time, epoxy/fabric batch numbers, and installation locations.

B. Field Testing
1. Adhesion Tests
   a. Pull-off tests shall be conducted in accordance with ASTM D7522 and/or ASTM D4541 and performed on flat surfaces. 3 tests shall be executed on each type of substrate or surface preparation method used, with a minimum of 3 tests per 1000 square feet of surface area covered. Testing shall be done on an area adjacent to strengthening locations with substrate, surface preparation, and orientation (i.e. overhead, vertical, etc.) that are representative of that being strengthened. Before pull-off tests are performed, the composite system shall be allowed to reach full cure.
b. Adhesion strengths shall be in excess of 200 psi or as established by the supplier’s design engineer.

C. Lab Testing
1. Tension Tests
   a. General
      1) Lab tension tests are only required when structural performance criteria is specified.
      2) Tension tests shall be performed to verify the tensile strength, strain, and modulus of the composite strengthening system based on the nominal layer thickness reported on the manufacturer’s data sheet and used in the design calculations.
      3) The composite tensile properties used in the design calculations must be lower than the average of the test results unless calculations are performed with the reported average tensile properties show that the strengthening requirements are satisfied.
   
2. Fabric Systems
   a. One panel from a minimum of 15% of all sample sets shall be selected for tension testing performed in accordance with ASTM D7565 and/or ASTM D3039.

3. Laminate Systems
   a. For each laminate batch, tension testing of five coupons shall be performed in accordance with ASTM D7565 and/or ASTM D3039.

D. Defects
1. Small delaminations less than 2 square inches are acceptable so long as the delaminated area is less than 5% of the total laminate area and there are no more than 10 such delaminations per 10 square feet.
2. Large delaminations greater than 25 square inches shall be locally cut away and a new material shall be applied with an equivalent number of layers and sufficient development length overlaps.
3. Delaminations between 2 square inches and 25 square inches shall be injected with epoxy or replaced, depending on the size, number of delaminations, and locations.

E. Remedial Measures
1. If the composite tensile properties used in the design calculations are higher than the average of the laboratory test results, design calculations shall be resubmitted, showing that the target design performance has been achieved. If this is not the case, additional layers shall be applied until the target design performance is reached.

END OF SECTION
SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1  GENERAL

1.01  SECTION INCLUDES

   A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.
   B. Openings for other work.
   C. Form accessories.
   D. Form stripping.

1.02  RELATED REQUIREMENTS

   A. Section 03 20 00 - Concrete Reinforcing.
   B. Section 03 30 00 - Cast-in-Place Concrete.

1.03  REFERENCE STANDARDS

   B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute.
   C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.
   D. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute.

1.04  SUBMITTALS

   A. See Division 01 for submittal procedures.
   B. Product Data: Provide data on void form materials and installation requirements.
   C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

1.05  QUALITY ASSURANCE

   A. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and...
licensed in Tennessee.

B. Maintain one copy of each installation standard on-site throughout the duration of concrete work.

**PART 2 PRODUCTS**

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

D. Comply with relevant portions of ACI 347, ACI 301, and ACI 318.

2.02 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

2.03 FORMWORK ACCESSORIES

A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Colorless mineral oil that will not stain concrete.

C. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

D. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

E. Nails, Spikes, Lag Bolts, Through Bolts, and Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

F. Waterstops: Polyvinyl chloride, minimum 1,750 psi tensile strength, minimum 50 degrees F to plus 175 degrees F working temperature range, 6-inch-wide, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.
PART 3  EXECUTION

3.01  EXAMINATION
A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02  ERECTION - FORMWORK
A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
D. Align joints and make watertight. Keep form joints to a minimum.
E. Obtain approval before framing openings in structural members that are not indicated on drawings.
F. Coordinate this section with other sections of work that require attachment of components to formwork.
G. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.03  APPLICATION - FORM RELEASE AGENT
A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.04  INSERTS, EMBEDDED PARTS, AND OPENINGS
A. Provide formed openings where required for items to be embedded in passing through concrete work.
B. Locate and set in place items that will be cast directly into concrete.
C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.05 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.
   1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
   2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.06 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117.

B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

3.07 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
3.08 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION
SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Reinforcing steel for cast-in-place concrete.
B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS
A. Section 03 10 00 - Concrete Forming and Accessories.
B. Section 03 30 00 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS
A. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
C. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute.

1.04 SUBMITTALS
A. See Division 01 for submittal procedures for submittal procedures.

PART 2 PRODUCTS

2.01 REINFORCEMENT
A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420).
   1. Deformed billet-steel bars.
   2. Unfinished, unless otherwise indicated.

B. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, deformed type.
   1. Coiled Rolls or Flat Sheets.

C. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
   2. Chairs, Bolsters, Bar Supports, and Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel, galvanized, plastic, or plastic-coated steel components for placement within 1-1/2 inches of weathering surfaces.
2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is not permitted.

C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
   1. Review locations of splices with Engineer of Record.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Conform to applicable code for concrete cover over reinforcement.

E. Bond and ground all reinforcement to requirements of Section 260526.

F. Clean reinforcement of loose rust and mill scale.

G. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. At lap splices, lap a minimum of 2 squares. Secure lap splices with metal tie wire.

3.02 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Division 01, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION
SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Concrete footings.
B. Concrete building frame members.
C. Elevated concrete slabs.
D. Floors and slabs on grade.
E. Concrete walls.
F. Joint devices associated with concrete work.
G. Miscellaneous concrete elements, including equipment pads.
H. Concrete curing.

1.02  RELATED SECTIONS

A. Section 03 10 00 - Concrete Forming and Accessories
B. Section 03 20 00 - Concrete Reinforcement
C. Section 07 92 00 - Joint Sealers.

1.03  REFERENCES

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International.
B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International.
C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.
D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.
E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International.
F. ACI 305R - Hot Weather Concreting; American Concrete Institute International.
G. ACI 306R - Cold Weather Concreting; American Concrete Institute International.
H. ACI 308R - Guide to Curing Concrete; American Concrete Institute International.
I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.
J. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute International.
K. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
L. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
S. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
W. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
Z. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-
Cement Grout (Nonshrink).

AA. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).


AC. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers.

AD. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers [Metric].

AE. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

AF. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; Corps of Engineers.

1.04 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements.

C. Mix Designs: Submit mix designs complying with the requirements of ACI 301 Section 4 - Concrete Mixtures, and ACI Chapter 5 - Concrete Quality, Mixing, and Placing.

C. Samples: Submit samples of underslab vapor retarder to be used.

D. Samples: Submit two, 12-inch-long samples of waterstops and construction joint devices.

E. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction for concrete accessories.

F. HPBr Credit: Reference 01 78 56 for HPBr credit verification forms.

G. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.
C. Follow recommendations of ACI 306R when concreting during cold weather.

**PART 2 PRODUCTS**

2.01 FORMWORK

A. Refer to Section 03 10 00

2.02 REINFORCEMENT

A. Refer to Section 03 20 00

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I - Normal Portland type.


C. Fly Ash: ASTM C618, Class C or F.

D. Water: Clean and not detrimental to concrete.

2.04 CHEMICAL ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.


C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

G. Accelerating Admixture: ASTM C494/C494M Type C.

H. Retarding Admixture: ASTM C494/C494M Type B.

I. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
1. Installation: Comply with ASTM E1643.
2. Accessory Products: Vapor retarder manufacturer’s recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.

B. Chemical Hardener: Fluosilicate solution designed for densification of cured concrete slabs.

C. Non-Shrink Grout: ASTM C1107/C1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Minimum Compressive Strength at 48 Hours: 2,400 psi.
2. Minimum Compressive Strength at 28 Days: 7,000 psi.

D. Moisture-Retaining Cover: ASTM C171; regular curing paper, white curing paper, clear polyethylene, white polyethylene, or white burlap-polyethylene sheet.

E. Liquid Curing Compound: ASTM C309, Type 1, clear or translucent.

2.06 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-dispersible acrylic latex, complying with ASTM C1059 Type II.


C. Waterstops: PVC, complying with COE CRD-C 572.
1. Configuration: Ribbed waterstop with center bulb or approved alternate
2. Size: reference COE CRD-C 572 for minimum size guidelines

D. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
1. Size: 1/2-inch throat, 1/2-inch deep.

E. Slab Joint Filler: 1/2” thick, height equal to slab thickness, with removable top section that will form 1/2” deep sealant pocket after removal.

F. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum 1-inch-diameter holes for conduit or rebars to pass through at 6 inches on-center; ribbed steel stakes for setting.

2.07 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations. Lightweight Weight Concrete: Comply with ACI 211.2 recommendations.

B. Concrete Strength: Establish required average strength for each type of
concrete based on field experience or trial mixtures, as specified in ACI 301.
1. For trial mixtures method, employ independent testing agency acceptable
   to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at
   rates recommended by manufacturer.

D. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M
      at 28 days: As indicated on drawings.
   2. Fly Ash Content: Maximum 15 percent of cementitious materials by
      weight.
   3. Water-Cement Ratio: Maximum 50 percent by weight unless lower
      maximum value noted on the drawings.
   4. Total Air Content: As noted on drawing, determined in accordance with
      ASTM C173/C 173M.
   5. Maximum Slump: 3 inches before addition of high range water reducing
      admixture.

E. Lightweight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M
      at 28 days: As indicated on drawings.
   2. Water-Cement Ratio: Maximum 50 percent by weight unless lower
      maximum value noted on the drawings.
   3. Total Air Content: 4 to 7 percent, determined in accordance with ASTM
      C173/C 173M.
   4. Maximum dry unit weight: 115lb per cubic foot

2.08 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Formwork: Refer Section 03 10 00
B. Verify that forms are clean and free of rust before applying release agent.
C. Coordinate placement of embedded items with erection of concrete formwork
   and placement of form accessories.
D. Where new concrete is to be bonded to previously placed concrete, prepare
existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
2. Use latex bonding agent only for non-load-bearing applications.

E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

F. Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches and seal watertight by taping edges and ends. Cover with sand to depth shown on drawings; repair damaged vapor retarder before covering.

3.03 INSTALLING REINFORCEMENT

A. Refer Section 03 20 00

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 24 hours prior to commencement of placement operations.

D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

E. Repair underslab vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.

F. Separate slabs on grade from vertical surfaces with joint filler.

G. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

H. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Division 7 for finish joint sealer requirements.

I. Install joint devices in accordance with manufacturer's instructions.

J. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

K. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
L. Place concrete continuously between predetermined expansion, control, and construction joints.

M. Do not interrupt successive placement; do not permit cold joints to occur.

N. Place floor slabs in checkerboard or saw cut pattern indicated.

O. Saw cut joints within 24 hours after placing. Use 3/16-inch-thick blade, cut into 1/4 depth of slab thickness.

P. Screed floors level, maintaining the following minimum F(F) Floor Flatness and F(L) Floor Levelness values when measured in accordance with ASTM E1155/ASTM E1155M.
   1. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
   2. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for formwork supported suspended slabs measured prior to removal of formwork. Elevated slabs cast on metal deck shall conform to the specified flatness criteria.

3.05 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. All finishing chemical components are to be from the same manufacturer and compatible with the approved floor finish.

D. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.

E. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Wood float surfaces that will receive quarry tile, ceramic tile, and terrazzo with full bed setting system.
   2. Steel trowel surfaces that will receive carpeting, resilient flooring, seamless flooring, thin set quarry tile, and thin set ceramic tile.
   3. Steel trowel surfaces that will be left exposed.
      a. Chemical Hardener: After slab has cured, apply water-diluted hardener in three coats per manufacturer's instructions, allowing 24 hours between coats.

F. In areas with floor drains, maintain floor elevation at walls; pitch surfaces
uniformly to drains at 1:100 nominal.

3.06 CURING AND PROTECTION

A. Comply with requirements of ACI 308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than 7 days.

C. Surfaces Not in Contact with Forms:
   1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   2. Begin final curing after initial curing but before surface is dry.
      a. Moisture-retaining cover: Seal in place with waterproof tape or adhesive.
      b. Curing compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.07 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100-cubic yards or less of each class of concrete placed.

F. Take one additional test cylinder during cold-weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.08 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

END OF SECTION
PART 1  GENERAL

1.01  RELATED SECTIONS

A. Cast-in-Place Concrete: Section 03 30 00.

B. Mortar: Section 04 22 00.

1.02  REFERENCES

A. Specifications Governing Work:
   1. ACI 318, Building Code Requirements for Reinforced Concrete.
   2. ACI 301, Specifications for Structural Concrete for Buildings.
   3. PCI MNL 117, Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
   5. PCI MNL 132, Erection Safety Manual for Prestressed and Precast Concrete.

1.03  SUBMITTALS

A. Shop Drawings: Submit for all items, include the following:
   1. Dimensions.
   2. Finishes.
   4. Layout and identification of each precast unit corresponding to the sequence and procedure of installation. Location of unit by same identification mark placed on unit.
   5. Drawing locating all items to be cast into cast-in-place concrete.

B. Mix Design: Submit mix designs as specified in Section 03 30 00.

C. Samples
   1. Submit samples representative of finished panels showing full range of color and texture.
   2. Submit sample in size of 12 inch x 12 inch x 1-1/2 inch.

1.04  QUALITY ASSURANCE

A. Manufacturer's Qualifications: Minimum ten (10) years production experience in precast concrete work of similar quality and scope required for this project.
   1. Provide documentation that the precast plant is certified to PCI MNL 116 and MNL 117; Canadian equivalent is acceptable.
B. Allowance Tolerances: Testing per PCI MNL 116.
1. Length and width of precast units measured at face adjacent mold: +/-1/8 inch.
2. Thickness of Units +/-1/4 inch.
3. Location of Inserts and Bolts: +/-1/4 inch.
4. Bowing or Warping of Precast after Casting: Not to exceed L/360.

C. Concrete Testing
1. Make one compression test for each day's production of each type concrete.
2. Specimens
   a. Provide 4 test specimens for each compression test.
   b. Obtain concrete for specimens from actual production batch.
   c. 6 inch x 12 inch molded concrete cylinder, ASTM C31.

1.05 JOB MOCK-UP

A. General
1. After standard samples are accepted for color and texture, submit full scale pieces meeting design requirements.
2. A mock-up panel for the exterior masonry, as specified in Section 04 00 00.
3. Full scale sample pieces shall be incorporated into mock-up panel.
4. Mock-up to be standard quality for precast concrete panel work when accepted by the Architect.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery and Handling
1. Transport and handle precast concrete with equipment to protect units from dirt and damage.
2. Do not place units on ground.
3. Place nonstaining resilient spacers of even thickness between each panel.
4. Support during shipment on expanded polystyrene or similar nonstaining shock-absorbing material.

B. Storage
1. Store to protect from contact with soil and from other damage.
2. Store in same position as transported with nonstaining resilient supports located in same position as when transported.
3. Store on firm, level and smooth surfaces.
4. Place stored units so that identification marks are discernable.

PART 2 PRODUCTS

2.01 FORMWORK

A. Provide forms of metal, plastic, wood or other acceptable material that is non-reactive with concrete and will produce required finish surfaces. Accurately construct forms mortar-tight and of sufficient strength to withstand pressures due to concrete placement operations and temperature changes. Maintain formwork to
provide complete precast concrete trim units of shapes, lines and dimensions indicated, within specified fabrication tolerances.

1. Form Release Agent
   a. Polymerized solution of synthetic resins and organic compounds containing no wax, oil, silicates or varnish.
   b. Non-sensitive to lime, alkalies or organic acids.
   c. Compatible with coating, adhesive or sealant applied to surfaces.

2.02 REINFORCING

A. Reinforce all precast concrete units with new billet steel reinforcing bars, as necessary for handling, setting and structural stress. If the surfaces are to be exposed to the weather, the reinforcement shall be galvanized or epoxy coated when covered with less than 2 inches of material for bars larger than 5/8 inch and 1-1/2 inches for bars 5/8 inch or smaller. The material covering in all cases shall be at least twice the diameter of the bars.

1. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
2. Epoxy-Coated Reinforcing Bars: ASTM A775.
3. Galvanized Reinforcing Bars: ASTM A767, Class II (2.0 oz. zinc psf), hot-dip galvanized after fabrication and bending.
7. Supports for Reinforcement: Provide supports for reinforcement including bolsteres, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing.

2.03 CONCRETE MATERIALS

A. General: Conform to the appropriate portions of Section 03 30 00, except provide fabricator's design mix, including admixtures for 5000 psi 28-day compressive strength concrete.

B. Portland Cement: ASTM C150, Type I or Type III, Color to be white. Gray cement or a blend of white and gray cement may be used as long as the proper color mix is achieved as determined by the Architect. Use only one brand, type, and source of supply for each type of cement throughout the entire project.

C. Coarse Aggregate: Color to be white. Darker aggregates may be used as long as the proper color mix is achieved as determined by the Architect. ASTM C33; hard, durable, selected, and graded; free of material that causes staining or reacting with cement.

D. Fine Aggregate: Color to be white. Darker aggregates may be used as long as the proper color mix is achieved as determined by the Architect. ASTM C33; hard, durable, selected, and graded; free of material that causes staining or reacting with cement.

E. Pigments: ASTM C979; Inorganic, non-fading, resistant to lime and other alkalis. Pigments not to exceed 10% of the cement weight.
F. Water: Drinkable, free from foreign materials in amounts harmful to concrete or embedded steel.


H. Water-Reducing, Retarding, or Accelerating Admixtures: ASTM C494, type as selected by Fabricator and containing not more than 0.1 percent chloride ions.

2.04 MIXES

A. Mixing Procedures: Same as for cast-in-place concrete, Section 03 30 00.

B. Concrete Properties
   1. Water Cement Ratio: Maximum 40 lbs of water per 100 lbs. of cement.
   2. Air Entrainment: Minimum 3%, maximum 6%.
   3. Admixtures: Do not use calcium chloride or other salts. Other admixtures must be approved.
   4. 28-day Compressive Strength: Minimum of 5000 psi when tested by 6 x 12 inch cylinders.

C. Color: Match Rockcast Buffstone GP-A as approved by the Architect.

2.05 FABRICATION

A. Design Requirements: Design precast to support the live loads and dead loads indicated on the drawings or as required by the applicable codes and in accordance with ACI 318. Include in the design all reinforcing required for transporting and handling units.
   1. Shapes and sizes as indicated on Drawings.

B. Finishes
   1. Exterior Exposed Surfaces
      a. Light sandblast over entire surface to be exposed. Finish to appear as limestone. Obtain approval of Architect of sandblast finish prior to sandblasting actual job pieces.
      b. Units must be free of rust and other blemishes.
   2. Interior Concealed Surfaces: As cast formed surface; where not cast, provide wood float finish.

C. Curing
   1. Cure precast units until compressive strength is high enough to ensure that stripping does not have an effect on the performance or appearance, including color uniformity, of the final product.
   2. Curing methods and materials shall be fabricator's responsibility.

PART 3 EXECUTION

3.01 CONDITION OF SURFACES

A. Prior to installation, examine surfaces to receive precast concrete and do not
proceed until defects detrimental to the finished work are corrected, including the moisture protection, structural supports, provisions for expansion, or any other conditions which might affect the finished work in appearance, watertightness or integrity of the complete installation.

B. Verify all measurements and dimensions; coordinate the installation of inserts for this work; and coordinate and schedule this work with the work of other trades. Give particular attention to the location and size of cutouts required to accommodate mechanical, electrical and other work or adjoining construction, in accordance with the reviewed shop drawings for such trade.

C. Review shop drawings of items or assemblies related to the support or anchorage of precast, including requirements for clearances for proper installation.

D. Conform with the respective manufacturers of all proprietary products (sealants and anchorage devices) that the materials are proper for the expected use and exposure of the precast. No materials soluble in water after setting shall be used.

3.02 INSTALLATION

A. Conform to requirements of MNL 127 and MNL 132.

B. Do not use precast concrete items with chips, cracks, voids, stains or other defects which would be visible in the finished work. The setting of any damaged or defective stone is at Contractor's risk of removal.

C. Non-cumulative Erection Tolerances
   1. Joint Dimension: Nominal 3/8 inch. To vary no more than +3/16 inch or -1/4 inch.
   2. Joint Taper: Edges at joint not out of parallel over 1/40 inch per 1 foot, but not more than 3/8 inch total.

D. Joints
   1. Butter vertical joints full width before setting and set units in full bed or mortar.
   2. Provide setting shims as required to prevent extrusion of mortar.

E. Do not permit laying of masonry units above precast until mortar is set sufficiently to maintain alignment and prevent extrusion.

F. Field Cutting: No field cut openings will be permitted.

3.03 PATCHING

A. Mix and place patching mixture to match color and texture of surrounding concrete and to minimize shrinkage.

B. Adhere patch to hardened concrete with bonding agent.

C. Replace defective precast units if patching is not acceptable to Architect.
3.04 CLEANING

A. After installation, clean soiled precast concrete surfaces with detergent and water, using fiber brush and sponge, and rinse thoroughly with clean water.

B. Use extreme care to prevent damage to precast concrete surfaces and to adjacent materials.

C. Rinse thoroughly with clean water immediately after using cleaner.

END OF SECTION
SECTION 04 01 21

RESTORATION AND CLEANING

PART 1  GENERAL

1.01  WORK INCLUDED

A. Repoint existing building concrete and precast joints in areas indicated on the drawings and clean building as specified herein.

B. Work included
   1. Removal of existing loose, deteriorating and scaling mortar, surface preparation of joint and repointing.
   2. Cut out mortar joints on exposed side of wall.
   3. Cut out and (re)seal all stress cracks.
   4. Cut out, remove and replace existing joints between dissimilar materials, and reseal with specified material.
   5. Complete cleaning of precast and concrete on all elevations, including sills, parapet caps and backs of parapets.
   6. In place samples for mortar, concrete, precast and sealant color harmony, soundness and workmanship comparisons with existing.
   7. Coordinate and sequence restoration work and cleaning work as required for project conditions.

1.02  RELATED SECTIONS

A. Cast Stone: Section 04 72 00.

B. Synthetic Stone: Section 04 73 13.

1.03  REFERENCE STANDARDS


1.04  SUBMITTALS

A. Product Data: Provide manufacturer's product data sheets on all products to be used for the work.

B. Applicator Qualifications: Submit qualifications of applicator as previously specified.

C. Environmental Regulations: Describe testing, handling, treatment, containment, collection, transport, disposal, and discharge of hazardous wastes and cleaning effluents. Describe any hazardous materials to be cleaned from substrates. Submit applicable local environmental regulations.

D. Protection: Describe methods for protecting surrounding areas, landscaping, building occupants, pedestrians, vehicles, and non-masonry surfaces during the work from contact with chemical restoration cleaners, residues, rinse water, fumes, wastes, and cleaning effluents.
E. Surface Preparation: Describe surface preparation to be completed before application of restoration cleaners.

F. Application: Describe application procedures of restoration cleaners.

G. Provide an analysis of the existing mortar to determine the original mortar mix. Provide testing agencies qualifications.

H. Pressure spray or rinse as referenced refers to the following: 
Provide a combination of rinsing pressure and water volume by masonry washing equipment generating 400-1000 psi with a water flow rate of 6-8 gallons per minute delivered through a 15-45 degree fan spray tip. Equipment should be adjustable to reduce water flow rate and rinsing pressure as required for controlled cleaning of more sensitive surfaces. Refer to the Product Data Sheet for each cleaner for guidelines. Select areas where exterior materials are to be removed/repaired and use these materials for the testing of chemicals and pressures; prior to the cleaning of similar surfaces to remain.

1.05 QUALITY ASSURANCE

A. Certification of Experience
   1. Work to be performed by experienced and skilled mechanics.
   2. Submit evidence or certification that restoration personnel have a minimum of ten (10) consecutive years’ experience in this type of work.
   3. Evidence or certification of experience shall be in letter form, in addition to statement of experience, and shall contain a list of at least five projects of comparable size and complexity which have been satisfactorily completed.
   4. Provide a statement that the work will be under the direct supervision of skilled mechanics.

B. Intent of the work under this section is: repair deteriorated or damaged exterior surfaces and joints, repair cracks, seal around openings to produce as an end result, weather tight walls; clean all existing surfaces; to perform work in such a manner that the building appearance will not be marred by unsightly work; and that all necessary precautions are taken to protect exterior and interior of building and surrounding landscaping and traffic areas.

C. Owner reserves the right to perform quality tests on materials used or scheduled to be used in the project; cost of testing shall be borne by the Owner. If testing proves material in question is faulty, Contractor shall bear testing costs for that material.

D. Pre-Application Meeting: Convene a pre-application meeting 2 weeks before the start of exterior restoration cleaning. Require attendance of parties directly affecting work of this section, including the Contractor, Architect, applicator, and cleaning materials MFR’s representative. Review environmental regulations, test panel procedures, protection of surrounding areas and non-masonry surfaces, surface preparation, application, and coordination with other work.

E. Sample Area - Repointing
   1. Perform repointing operations in an sample area approximately 4’ x 6’ where approved by Architect.
2. Sample area shall include materials, methods and all other details of construction that will be used in the completed work.
3. Sample area will be an actual location of the work requiring repointing work and if acceptable to Architect, will remain in place.
4. Perform additional sample area work as required by Architect until a sample area is found to be acceptable.
5. Do not begin repointing operations until the sample area is approved by the Architect.
6. Acceptable sample area will be used as a reference standard for the remaining work.

F. Sample Area - Cleaning
1. Before full-scale application, review manufacturer’s product data sheets to determine the suitability of each product for the specific surfaces. Apply each restoration cleaner to test panels to determine dilution rates, dwell times, number of applications, compatibility, effectiveness, application procedures, effects of pressure rinsing, and desired results.
2. Apply restoration cleaners to test panels in accordance with manufacturer's instructions. Allow 48 hours or until test panels are thoroughly dry, before evaluating final appearance and results. Do not begin full-scale application until test panels are inspected and approved by the Architect.
   a. Size: Minimum 4 feet by 4 feet each.
   b. Locations: As determined by the Architect. At least one of the cleaning test panel areas shall be the same area as one of the sample repointing areas. This common test area shall expose mortar aggregate to determine final mortar color.
   c. Restoration Cleaners: Number of test panels as required to completely test each restoration cleaner with each type of substrate and with each type of material or stain to be cleaned.
3. Test all cleaning effluents generated by the restoration cleaning of the test panels to determine any hazardous characteristics. Comply with applicable federal, state, and local environmental regulations regarding testing, handling, treatment, containment, collection, transport, disposal, and discharge of hazardous wastes.
4. Retain and protect approved test panels in undisturbed condition during the work of this section, as standards for judging the restoration cleaning work.

G. Material Test Reports: From a qualified testing agency indicating and interpreting test results of existing mortar analysis. Testing agency and qualifications must be approved by Architect. Refer to 2.02.J for additional testing requirements.
E. Store cleaning material containers upright in a cool, dry, well ventilated place, out of the sun. Store away from all other chemicals and potential sources of contamination. Keep lights, fire, sparks, and heat away from containers. Do not drop onto or slide across sharp objects. Keep containers tightly closed when not in use. Store and handle materials in accordance with manufacturer's instructions.

1.07 PROJECT CONDITIONS

A. Do not clean masonry surfaces when temperatures are below freezing or will be overnight, to avoid harm to masonry. Clean masonry surfaces only when air and masonry surface temperatures are 40°F and above. Allow adequate time for masonry to thaw if freezing conditions exist prior to application.

1.08 ENVIRONMENTAL REGULATIONS

A. Comply with applicable federal, state, and local environmental regulations regarding testing, handling, treatment, containment, collection, transport, disposal, and discharge of hazardous wastes and cleaning effluents.

PART 2 PRODUCTS

2.01 MORTAR

A. General: Contractor shall engage a qualified testing agency. Mortar shall closely match existing surrounding mortar in texture, color and strength as determined by analysis of existing mortar and as approved by the Architect. Analysis shall include types and proportions of cements, limes, aggregates and admixtures used in existing samples. Color match may require adding lime proof mineral colors to give an aged appearance to mortar. Texture match may require the addition of an amount of small aggregates to the mortar mix. Provide non-staining type.

B. Materials

3. Hydrated Lime: ASTM C207, Type S.
4. Aggregate
   a. Mason's Sand (For other than pointing mortar): ASTM C144, clean masonry sand, not over 10% to pass No. 100 sieve for general use.
   b. Silica Sand (for pointing mortar): White or light color, fine pure silica.
5. Water: Clean, fresh and free of deleterious amounts of acids, alkalis and foreign organic matter.
6. Water Repellent Admixture: FORRER INDUSTRIES Dry-Block or Mortar Tite by ADDIMENT. Manufacturer must submit certification that water repellent admixture meets or exceeds requirements specified herein.
   b. Type: Integral polymeric water-repellents (IPWR).

C. Mixes - Unit Masonry

1. Type N Mortar
   a. Proportions: ASTM C270 proportions by volume. Minimum average
compressive strength at 28 days of 750 psi. One part Portland cement, one part hydrated lime and six times the sum of the volumes of cement and lime used of damp, loose sand.

b. Aggregate shall be selected for color and size to closely match existing mortar.

2. Color may be added to the mix in quantities not to exceed 6% by weight of the cement in the mix.

3. Provide samples of aggregates to Architect for approval to incorporate into the mortar mix. Prepare sample mortar mixes using varying amounts of the approved aggregate for submission to and approval by the Architect for color and texture match with existing mortar.

D. Stone Mortar: Provide mix comprised of white and gray cement combined with lime and selected aggregates to produce color matching the color of existing stone mortar. Proportion mix based on analysis of existing mortar as required to match existing in color, texture and strength.

E. Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.

1. Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again adding only enough water to produce a damp, unworkable mix which will retain its form when pressed into a ball. Maintain mortar in this dampened (prehydrated) condition for 1 to 2 hours. Add remaining water in small portions until desired mortar consistency is reached. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.

2.02 CLEANING MATERIALS AND EQUIPMENT

A. Manufacturers: Specifications are based on materials manufactured by PROSOCO, INC. (800-255-4255). Equal or products of similar compounds manufactured by DIETRICH and ARCAL are acceptable.

B. Mild Cleaner: Manufacturer’s standard cleaner and degreaser for light-to-heavy soiled concrete/precast surfaces.

Basis of Design: “Enviro Klean 2010 All Surface Cleaner”: PROSOCO, Inc..

C. Two-Part Cleaner: Manufacturer’s standard two-part system consisting of an alkaline cleaner for prewash and an acid neutralizer for afterwash for dissolving heavy carbon soiling from concrete/precast surfaces.

Basis of Design: “Sure Klean 766 Limestone & Masonry Pre-wash and Sure Klean Limestone & Masonry After-wash”: PROSOCO, Inc.

D. Lime Run Remover: Manufacturer’s standard concentrated acidic cleaner to remove atmospheric dirt, mildew, and other stains from unpolished limestone and other high calcium-based surfaces.

Basis of Design: “Sure Klean Limestone Restorer”: PROSOCO, Inc.

E. Mold, Mildew, and Algae Remover: Manufacturer’s standard two-component system and neutralizer to remove biological and atmospheric staining from
F. Rust stains on masonry and lintels: Lintels should be wire brushed and sanded. If rust remains, remove tough atmospheric soiling and subsurface staining, while minimizing potential for damage to delicate masonry and adjacent substrates; in addition to removing difficult calcium (concrete) stains, white scum and other staining from most window glass. Test stability of surfaces before application. Basis of Design: Sure Klean® Light Duty Restoration Cleaner; PROSOCO, Inc.

G. Concentrated acidic cleaner for new masonry surfaces that are subject to vanadium, manganese and other metallic stains, and reduce potential for efflorescence and clean mortar smears Basis of Design: Sure Klean® Vana Trol®: PROSOCO, Inc.,

H. Nonabrasive Brushes: Fiber bristles only.

I. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, if any, at rates indicated for pressure, measured at spray tip, and for volume. Adjust pressure and volume, as required, to ensure that damage to masonry does not result from cleaning methods. For chemical cleaner spray application, provide a low-pressure tank or chemical pump suitable for the chemical cleaner indicated, equipped with a cone-shaped spray tip.

J. Using the same panel selection format as indicated in 1.04.H, test panels to confirm results for all exterior surface types; for locations where sample panels are undamaged, require minor repair and are new replacements. The samples should reflect all of the conditions that could affect types of cleaners required for the condition, the dwell time and the concentration needed.

**PART 3 EXECUTION**

3.01 INSPECTION

A. Examine the substrates, structure, and installation conditions.

3.02 PREPARATION - GENERAL

A. Remove or loosen interferences such as cables, conduits, junction boxes, downspouts and railing on the surface of the building which would prevent the accomplishment, or reduce the effectiveness of the work to be performed. Such items shall be reattached, unless the directed otherwise, as work is completed.

B. Adhere to manufacturer's printed instructions and restrictions for applying cleaners.

C. Cover or protect glass, window frames, landscaping and similar items that may be damaged as a result of the work of this section.

D. Protect passerby and vehicular traffic.
3.03 PREPARATION - JOINTS

A. Test rake all mortar joints. Cut out joints found to be defective to a depth of 1/2 inch or to firm mortar, whichever comes first.

1. Remove dust and loose mortar with compressed air or vacuum. Remove sealant and chemical compounds from joints as required with mechanical and chemical processes that will not abrade or attack the masonry surface.

2. Defective Joints: Consist of mortar joints in which mortar is soft, loose, missing, severely eroded, flaky, or powdered, broken, hollow or cracked.

3. It shall be the Contractor's responsibility to carefully examine all wall areas and to see that all defective joints are cut out. Any question as to whether a joint is defective or not shall be resolved to the satisfaction of the Architect.

B. Cut out forced cracks in masonry to a minimum depth of 1/2 inch. Fill void space in masonry larger than specified depth with a non-absorbent closed cell expandable foam back-up. Select a back-up size that will cause compression when in place.

3.04 REPOINTING EXISTING JOINTS

A. Joint Raking

1. Rake out mortar from joints to firm mortar or to a minimum depth of 1/2 inch, whichever comes first.

2. Remove mortar from masonry surfaces to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum and/or flush joints to remove dirt and loose debris.

3. Do not spall edges of masonry units or widen joints. Replace masonry units which become damaged.
   a. Cut out mortar with chisel and mallet, unless otherwise indicated.
   b. Power operated hand saws and grinders will be permitted only with specific written approval of the Architect based on submission of the Contractor of a satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker fatigue.

B. Joint Pointing

1. Clean joint surfaces to remove dust and mortar particles. Schedule water rinsing operations so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.

2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8" until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.

3. After joints have been filled to a uniform depth, place remaining mortar in 3 layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Slightly recess the final layer in from face of masonry. Take care not to spread mortar over edges onto exposed masonry surfaces; or to featheredge mortar.
4. When final layer of mortar is thumbprint-hard, tool joints to match original appearance of joint or appearance of adjacent existing joint. Remove excess mortar from edge of joint by brushing.

3.05 REMOVAL AND REPLACEMENT

A. Replace missing, eroded, spalled or cracked exterior units. Cut out deteriorated or damaged units, including entire mortar joint around the masonry unit. Install replacement joints solidly packed with mortar.
   1. Remove units by hand using care so as not to damage adjacent materials.
   2. Repoint new joints to comply with requirements for repointing existing.
   3. Place units in a full bed of mortar, bottom and sides, laid with a shove joint.

B. Clean excess mortar, splatter and drippings from exterior and interior as work progresses.

3.06 CLEANING

A. Protection
   1. Protect surrounding areas, landscaping, building occupants, pedestrians, vehicles, and non-masonry surfaces during the work from contact with chemical restoration cleaners, residues, rinse water, fumes, wastes, and cleaning effluents in accordance with manufacturer's instructions.
   2. Clean exterior materials before installation of replacement windows.
   3. Test window glass not specified to be replaced for compatibility with chemical cleaning products to determine required protection.
   4. Divert and protect pedestrian and auto traffic.
   5. Avoid wind drifting of spray of chemical cleaning products, residues, and rinse water.

B. Surface Preparation: Apply all specified caulking and sealants and allow to cure before chemical cleaning begins.

C. Chemical Cleaners: When permitted for use, apply restoration cleaners to substrates in accordance with manufacturer's instructions, environmental regulations, and application procedures determined from test panel results approved by the Architect. Consult manufacturer's instructions for information on equipment to be used and precautions to be taken with the specified products.

END OF SECTION
PART 1   GENERAL

1.01  WORK INCLUDED

A. Provide the following:
   1. Concrete masonry units.
      a. Standard
      b. Fire-rated
   2. Masonry lintels, setting of steel angles, setting bearing plates supported and embedded with masonry furnished under Section 05 50 00.
   3. Provide masonry fill concrete and reinforcing steel where indicated on drawings. See Section 03 30 00.
   4. Wall reinforcing and accessories.
   5. Built-in collars, sleeves, inserts, anchors, ties, sockets, bolts, blocking, miscellaneous metal work, etc., in contact with, supported on or enclosed by masonry. When these items are furnished by others, they shall include information for setting.
   6. Includes grouting solid all hollow metal door frames in masonry.
   7. Mortar and grout.

1.02  DEFINITIONS

A. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.03  SUBMITTALS

A. Product Data: For each different masonry unit, accessory and other manufactured products specified.

B. Submit certification that fire resistant concrete units conform to the requirements specified herein for Fire Resistant Concrete Block.

C. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
   1. Each type of masonry unit required.
      a. Include test data, measurements, and calculations establishing net-area compressive strength of masonry units.
   2. Each combination of masonry unit type and mortar type. Include statement of net-area compressive strength of masonry units, mortar type, and net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
   3. Each material and grade indicated for reinforcing bars.
   4. Each type and size of joint reinforcement.

D. Cold-Weather Procedures: Detailed description of methods, materials and equipment to be used to comply with cold-weather requirements.
1.04 QUALITY ASSURANCE

A. Supervisor: A supervisory journeyman mason shall be appointed for the project and shall be present at all times masonry work is being performed and:
   1. have minimum of 5 years experience on masonry projects of this type/size
   2. be thoroughly familiar with the design requirements, types of materials being installed, referenced standards and other requirements.

B. Use only skilled journeyman masons for cutting and placing of masonry; no allowance shall be made for lack of skill on the part of the workmen.

C. Consult other trades and make provisions that shall permit the installation of their work in a manner to avoid cutting and patching. Build-in work under other sections, as necessary, and as the work progresses.

D. Unit Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602, “Specifications for Masonry Structures”. Maintain one copy of the standard in project field office at all times during construction. Contractor’s supervisory personnel shall be thoroughly familiar with the material as it applies to this Project.

E. Concrete Unit Masonry Construction: Comply with the National Concrete Masonry Association (NCMA) “TEK Bulletins”, and other requirements specified.
   1. NCMA TEK Bulletin 3-2 “Grouting for Concrete Masonry Walls”.
   2. NCMA TEK Bulletin 3-3A “Reinforced Concrete Masonry”.
   3. NCMA TEK Bulletin 8-2 “Removal of Stains from Concrete Masonry Walls”.
   4. NCMA TEK Bulletin 10-1A “Crack Control in Concrete Masonry Walls”.
   5. NCMA TEK Bulletin 10-2B “Control Joints for Concrete Masonry Walls”.
   6. NCMA TEK Bulletin 14-2 “Reinforced Concrete Masonry”.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store cement and lime materials and masonry units off the ground, under cover and protected from weather damage. If units become wet, do not install until they are dry. Do not use cementitious materials that have become damp.

B. Stockpile and store aggregates to prevent contamination from foreign materials, in locations where grading and other required characteristics can be maintained.

C. Use care in handling units to avoid chipping and breakage.

D. Locate storage areas where they will not be disturbed or damaged by construction operations.

E. Protect finished floor areas from damage.

1.06 COLD WEATHER CONSTRUCTION

A. Comply with recommended practices for cold weather construction of the International Masonry Industry All-Weather Council and requirements contained in ACI 530.1/ASCE 6/TMS 602.
B. Do not build on frozen or snow covered work. Remove and replace masonry work damaged by frost or freezing.

C. Requirements During Construction: Provide the following minimum requirements for the air temperatures listed:

1. Above 40° F: Normal masonry procedures.
2. 40° F to 32° F: Heat mixing water to produce mortar temperatures between 40° F and 120° F. Produce consecutive batches of mortar with the same temperatures within this range. Do not heat mortar to greater than 120° F.
3. Below 32° F to 25° F: Heat sufficient mortar ingredients to produce mortar temperatures between 40° F and 120° F. Produce consecutive batches of mortar with the same temperatures falling within this range. Maintain mortar temperatures after mixing above 40° F. Do not heat mortar to greater than 120° F.
4. Below 25° F to 20° F: Heat sufficient mortar ingredients to produce mortar temperatures between 40° F and 120° F. Produce consecutive batches of mortar with the same temperatures falling within this range. Maintain mortar temperatures after mixing above 40° F. Do not heat mortar to greater than 120° F. Maintain masonry above freezing using auxiliary heat. Provide enclosure when wind is in excess of 15 mph.
5. Below 20° F: Heat sufficient mortar ingredients to produce mortar temperatures between 40° F and 120° F. Produce consecutive batches of mortar with the same temperatures falling within this range. Maintain mortar temperatures after mixing above 40° F. Do not heat mortar to greater than 120° F. Keep masonry above freezing using enclosure and auxiliary heat.

D. Protection Requirements for Completed Masonry (and masonry not being worked on): Provide the following minimum requirements for the mean daily air temperatures listed:

1. Above 40° F: Normal masonry procedures.
2. 40° F to 32° F: Protect from rain or snow for 24 hours with weather-resistive membrane.
3. Below 32° F to 20° F: Completely cover with weather-resistive membrane and maintain above freezing for 24 hours.
4. Below 20° F: Provide weather-resistant enclosure and auxiliary heat to maintain above freezing for 24 hours.

1.07 HOT WEATHER CONSTRUCTION

A. Protect masonry construction from direct exposure to wind and sun when erected in an ambient air temperature of 90° F., or greater in shade with relative humidity less than 50%. Provide artificial shade and wind breaks and use cooled materials as required. Provide artificial shade, wind breaks, use cooled materials and other procedures outlined in BIA Tech Notes #1.

1.08 PROJECT CONDITIONS

A. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

1. Brace unsupported and newly laid masonry walls. Maintain bracing in place until building structure provides permanent bracing.
B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar and soil that become in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
   2. Protect sills, ledges and projections from mortar droppings.
   3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
   4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. General
   1. Curing: Cure for at least 7 days and units must be at least 28 days old when used in the work.
   2. Color: Natural color.

B. Hollow Load Bearing, Solid Load Bearing (75%) and Fire Resistant Concrete Masonry Units
   1. Type: Hollow, load bearing, standard modular size and shapes, thoroughly cured and dried.
   2. References: ASTM C90.
   3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
   4. Weight Classification: Normal weight, unless otherwise indicated.
   5. Linear Shrinkage: Not to exceed 0.065 percent, ASTM C426.
   7. Fire Resistant
      a. Rating: Design for fire ratings indicated on drawings.
      b. Manufacturer
         1) Listed in the Building Materials List published by the Underwriters' Laboratories, Inc.
         2) In lieu of above, provide a report from a nationally recognized testing agency stating that the units are equivalent in fire rating to those furnished by the producers as listed above.
      c. Location: Where indicated.

2.02 MORTAR

A. Materials
   1. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated or selected.
   3. Hydrated Lime: ASTM C207, Type S.
4. Aggregate: ASTM C144, clean masonry sand, not over 10% to pass No. 100 sieve for general use.
5. Water: Clean, fresh and free of deleterious amounts of acids, alkalis and foreign organic matter.

B. Proprietary Mortar Cement: Conform to ASTM C91, containing hydrated lime.
1. Certification: Submit certified laboratory data substantiating conformance with structural requirements for mortars as specified; and that no adverse chemical reaction will occur with the specified masonry accessories and reinforcing. Certification must be received and approved by Architect prior to mortar use.
2. Suitable products are acceptable from the following manufacturers:
   a. CEMEX (Richcolor)
   b. LEHIGH PORTLAND CEMENT COMPANY
   c. ESSROC MATERIALS, INC. (Brixment)
   d. QUIKRETE

C. Mixes - Unit Masonry
1. Provide water repellent admixture in all mortar used for exterior masonry work. Add to mix in accordance with manufacturer's recommendations.
2. Type S Mortar
   a. Proportions: ASTM C270 proportions by volume. Minimum average compressive strength at 28 days of 1,800 psi.
   b. Color: Natural color.

2.03 GROUT

A. Masonry Grout - Mix
1. Fine Grout for Reinforced Masonry: Mix with mechanical mixer with sufficient water to the desired consistency in accordance with ASTM C476 Proportion Specifications.
   a. Portland Cement: 1 part
   b. Hydrated Lime: 0 to 1/10 part
   c. Fine Aggregate: 2-1/4 to 3 times the sum of the volumes of the cementitious materials
2. Coarse Grout for Reinforced Masonry: Mix with mechanical mixer with sufficient water to the desired consistency in accordance with ASTM C476 Proportion Specifications.
   a. Portland Cement: 1 part
   b. Hydrated Lime: 0 to 1/10 part
   c. Fine Aggregate: 2-1/4 to 3 times the sum of the volumes of the cementitious materials.
   d. Coarse Aggregate: 1 to 2 times the sum of the volumes of the cementitious materials.
3. Hand Mixing: Not acceptable.

2.04 REINFORCING

A. Manufacturers: DUR-O-WALL; HECKMANN BUILDING PRODUCTS; HOHMANN & BARNARD; MASONRY REINFORCING CORPORATION OF AMERICA (WIREBOND). Where products are specified referencing a particular manufacturer,
equal products from the manufacturers listed are acceptable providing the product meets the requirements indicated.

1. Where a manufacturer is listed below for a specific product, it is to establish a level of quality. Similar products of equal quality from the above listed manufacturers are acceptable.

B. Horizontal Joint Reinforcement
1. General
   a. Type: Ladder type, standard weight, galvanized.
   b. Width: Approximately 2 in. less than nominal wall thickness.
   c. Spacing: Continuous along horizontal joint, spaced 16 inches on center vertically, unless otherwise indicated.

2. Longitudinal Wire

C. Wire Mesh: Wire Mesh: 1/4" mesh of galvanized steel wire (min. 16 gage) or galvanized metal lath, cut into strips 1-1/2" narrower than wall width where used. For use at intersection of masonry walls and as a grout stop.

D. Reinforcing Steel - Bond Beam and Wall Reinforcement: Uncoated steel reinforcing bars; ASTM A615/A; ASTM A616, including Supplement 1; or ASTM A617/A, Grade 60.

PART 3  EXECUTION

3.01 INSPECTION

A. Examine the substrates, structure, and installation conditions. Do not proceed with unit masonry work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Concrete Masonry Units: Lay masonry units dry. Do not wet masonry units.

B. Establish lines, levels, and coursing.

C. Coordination: Identify items that are to be built-in to masonry wall as specified in other section of these specifications. Verify that these items are available prior to commencing masonry work in these areas. Coordinate sizes of required openings.

3.03 INSTALLATION - GENERAL

A. Build walls to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown or specified.

B. Cut masonry units using motor-driven masonry saws to provide clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full-size units without cutting wherever possible. Provide 100% solid units where webs would be exposed.
C. Construction Tolerance: Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:
   1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than ¼" in 20 feet, nor ½" maximum.
   2. For vertical alignment of exposed head joints, do not vary from plumb by more than ¼" in 10 feet, nor ½" maximum.
   3. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than ¼" in 20 feet, nor ½" maximum.
   4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to ½". Do not vary from bed-joint thickness of adjacent courses by more than 1/8".
   5. For exposed head joints, do not vary from thickness by more than plus or minus 1/8". Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8".

D. Openings: Form all chases and openings required for piping and other trades. After work is completed, close openings with masonry and seal around penetration.

3.04 ERECTION - CONCRETE MASONRY

A. Masonry
   1. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths, and to properly locate returns and offsets. Avoid the use of less than half-size units at corners, jambs and other locations.
   2. Lay up walls plumb and true to comply with specified tolerance. Provide courses level, accurately spaced and coordinated with other work.
   3. Pattern Bond: Lay exposed masonry in running bond with vertical joint in each course centered on units in courses above and below. Bond and interlock each course of each wythe at corners. Do not use units with less than 4" of horizontal face dimensions at corners.
   4. 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 slabs. Maintain 3/8" joint widths, except for minor variations required to maintain bond alignment.
   5. Joints
      a. Exposed: Cut flush and finish (tool) with hardened metal tool to form a concave compressed joint. Same methods and types of tools to be used by all masons working on project.
      b. Concealed: Cut flush and trowel point.

B. Horizontal Wall Reinforcement: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
   1. Space reinforcement not more than 16 inches o.c.
   2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
      a. Reinforcement above is in addition to continuous reinforcement.
   3. Cut or interrupt joint reinforcement at control and expansion joints, unless
4. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

5. Provide additional reinforcement continuous in first joint above openings and in first joint below openings not extending to floor. Extend additional reinforcement a minimum of 4'-0" beyond opening.

C. Bond Beams and Block Cores: Reinforce as indicated and fill with grout.
   1. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes.
   2. Position reinforcement accurately at the spacing indicated. Place horizontal reinforcement as the masonry work progresses.
      a. Use "Fine Grout" per ASTM C 476 for filling spaces less than 4" in one or both horizontal directions.
      b. Use "Coarse Grout" per ASTM C 476 for filling spaces 4" to 10" in both horizontal directions.
      c. Use 3000 psi concrete for filling spaces 10" or larger in both horizontal directions.

D. Door Frames: Fill all frames installed in masonry with mortar.

E. Bearing Points: Where a lintel, beam or similar member bears directly on concrete masonry, fill the cores of the two blocks courses directly under the member with grout to a limit of 16 inches beyond the end of the member.

F. 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.

G. Control and Expansion Joints: Provide control joints for exterior and interior masonry construction in accordance with NCMA-TEK Bulletins 10-1A and 10-2B.
   1. Unless otherwise indicated, provide control joints in masonry walls at maximum 30 foot intervals for interior walls, and at intersections of walls, except corners.
      a. Exact locations as determined by the Architect if not specifically dimensioned.
      b. If drawings do not indicate all control joints based on these maximums, allow for additional joints to be determined by the Architect prior to commencement of masonry work.
      c. Locate control at steel columns.
   2. Provide 3/8" wide control joints, unless otherwise indicated. For interior control joints, no filler is required; rake joint approximately 3/4" deep and install sealant and backup. See Section 07 92 00, Sealants.
   3. Do not carry horizontal joint reinforcement through control joint.
   4. Maintain lateral support of continuous wall at control joint by using control joint filler, tongue and groove type control joint block, or similar type approved method.
5. Maintain lateral support of intersecting interior masonry walls with wire mesh ties placed across joint between walls, spaced 16" on-center vertically.

H. Masonry, non-bearing walls carried to structure above: Terminate at normal joint width below surface and leave joint open for sealants.
   1. At fire-rated partitions, install firestopping in joint between top of partition and underside of structure above to comply with Section 07 84 00, Firestopping.

I. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, remove loose masonry units and mortar before laying fresh masonry.

J. Built-in Work: As construction progresses, build in items specified under this and other specification sections. Fill in solidly with masonry around built-in items.

K. Steel Lintels: Install steel lintels at all masonry opening, whether indicated on the drawings or not. Provide minimum bearing of 8" an each jamb, unless otherwise indicated.

3.05 MORTAR

A. General
   1. Batch Size: Controlled so that all material used within two (2) hours.
   2. Mortar on Board
      a. Keep well tempered with water so long as its cementing material has not started to set.
      b. Do not retemper if initial set of cementing material has been reached, or if mortar has stiffened greatly.

B. Mixing
   1. Machine mix dry in a batch mixer with care taken in adding water to mix to avoid overwetting.
   2. Do not retamper in mixer at any time.
   3. Continue mixing for a minimum of five (5) minutes after all materials are in mixer.

C. Recharging: Completely empty and clean mixer before recharging.

3.06 PROTECTION

A. Brace all walls while in green condition.

B. Protection of Masonry: During construction, cover tops of walls with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

3.07 FIELD QUALITY CONTROL

A. Owner will engage a qualified independent testing agency to perform source quality-control testing indicated below:

1. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof.

C. Mortar properties will be tested per ASTM C780.

D. Grout will be sampled and tested for compressive strength per ASTM C1019.

3.08 REPAIR, POINTING AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged. Provide new units to match adjoining units and install in fresh mortar pointed to eliminate evidence of replacement.

B. During the tooling of joints, enlarge all voids or holes, and completely fill with mortar. Point up all joints at corners to provide a neat, uniform appearance.

C. Cleaning – Concrete Masonry: During construction of exposed CMU, minimize mortar and grout smears on exposed surfaces. Dry brush CMU surfaces at the end of each days work and after final pointing. Remove mortar stains and dirt from exposed surfaces.

1. Cleaning Solutions: Where cleaning solutions are required, they shall be provided at no additional cost to the Owner. Cleaning solutions must be approved by Architect and spot tested prior to use.

D. Area Cleaning: Clean floors of all mortar droppings, including floor surfaces of accessible chases.

3.09 MASONRY WASTE DISPOSAL

A. Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Disposal as Fill Material: When approved by Geotechnical Engineer, dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches in each dimension.

2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 31 22 00,
Earthwork. All fill material must be approved by Geotechnical Engineer.

3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Excess Masonry Waste: Remove excess, clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION
SECTION 04 73 13
CALCIUM SILICATE MANUFACTURED STONE

PART 1  GENERAL

1.01  WORK INCLUDED
A. Work includes building blocks indicated in patterns on the elevations and all indicated trim shapes.

1.02  RELATED SECTIONS
A. Cast-in-Place Concrete: Section 03 30 00.
B. Mortar: Section 04 22 00.
C. Limestone: Section 04 43 10
D. Sealant: Section 07 92 00.

1.03  SUBMITTALS
A. Shop Drawings: Submit for all items; include the following:
1. Details and sizes of stones.
2. Arrangement of joints.
3. Connection details.
5. Inserts.
7. Reinforcing.
8. Method of installation and anchoring.

B. Provide for the following:
1. Suitable washes on all exterior copings, projecting courses and pieces with exposed top surfaces.
2. Drips under the outer edge of projecting pieces.
3. Setting mark on each stone and its location on the structure. Stone when delivered shall bear the same corresponding setting mark on an unexposed surface.

C. Samples: When requested by Architect, submit samples representative of finished stone pieces showing full range of color and texture.

1.04  QUALITY ASSURANCE
A. Acceptable Manufacturers: The following manufacturers are acceptable:
1. ARRISCRAFT CORPORATION
2. READING ROCK
3. CENTURION STONE
B. Installer Qualifications: Experienced mason regularly engaged for at least five (5) years in installation of manufactured stone elements similar to those required on this project.

1.05 JOB MOCK-UP

A. General
1. After standard samples are accepted for color and texture, submit full scale pieces meeting design requirements.
2. A mock-up panel for the exterior masonry is to be built on the site.
3. Full scale sample pieces of each type of stone shall be incorporated into mock-up panel.
4. Mock-up to be standard quality for manufactured stone work when accepted by the Architect.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery and Handling
1. Transport and handle stone with equipment to protect units from dirt and damage.
2. Do not place on ground.
3. Place nonstaining resilient spacers of even thickness between each element.
4. Support stone during shipment on expanded polystyrene or similar nonstaining shock-absorbing material.

B. Storage
1. Store to protect from contact with soil and from other damage.
2. Store in same position as transported with nonstaining resilient supports located in same position as when transported.
3. Store on firm, level and smooth surfaces.
4. Place stored stone so that identification marks are discernible.

PART 2 PRODUCTS

2.01 MATERIALS

A. Calcium Silicate Manufactured Stone
1. Manufacturer: Arristile Renaissance units by ARRISCRAFT CORP.; or, equivalent by READING ROCK, or CENTURION STONE.
2. Sizes and Pattern: As indicated on drawings.

2.02 MIXES AND PERFORMANCES

A. Cast Building Units (CBU)
1. Manufacturer: Responsible for mix design as required to achieve strength and surface finish desired.
2. Compressive Strength: ASTM C170; minimum 7750 psi or ASTM C140 5000 psi.
4. Density: ASTM C97; minimum 139 pcf or ASTM C140 120 pcf.
5. Water Absorption - Average: ASTM C97; maximum 10% dry weight or ASTM C1195 maximum 5%.

2.03 COLOR AND FINISH

A. Color and Texture: Submit samples for final selection and/or approval of color and texture.
   1. Colors: As selected and approved by Architect.
   2. Finish: Texture as selected by Architect.

PART 3 EXECUTION

3.01 CONDITION OF SURFACES

A. Prior to installation, examine surfaces to receive manufactured stone and do not proceed until defects detrimental to the finished work are corrected, including the moisture protection, structural supports, provisions for expansion, or any other conditions which might affect the finished work in appearance, watertightness or integrity of the complete installation.

B. Verify all measurements and dimensions; coordinate the installation of inserts for this work; and coordinate and schedule this work with the work of other trades.

C. Review shop drawings of items or assemblies related to the support or anchorage of cast stone work, including requirements for clearances for proper installation.

3.02 INSTALLATION

A. Do not use stone with chips, cracks, voids, stains or other defects which would be visible in the finished work. The setting of any damaged or defective stone is at Contractor's risk of removal.

B. Set stone work accurately, straight, level, plumb and square in accordance with Shop Drawings.

C. Unless otherwise indicated, set stone in full mortar bed with vertical joints flushed full. Where applicable, anchors and dowels shall be firmly placed and all anchor holes and dowel holes and similar holes filled completely with mortar.

   1. Copings, projecting belt courses, and in general, all stone areas either partially or totally horizontal: Set with unfilled vertical joints. After setting, insert back-up material or backer rod, prime stone ends and seal. All in accordance with Section 07 92 00.

D. Thoroughly wet stones prior to setting.

E. Rake joints indicated to receive sealant to a depth of 3/4". Sponge off face of stones to remove excess mortar.
3.03 TOLERANCES

A. Stone Dimensions: The numerically greater of plus or minus 1/8 inch or length/360.
B. Setting Tolerances: Plus or minus 1/8" allowable out of plane from adjacent unit.

3.04 PATCHING AND CLEANING

A. Repair of chipped or damaged stone shall be done only by mechanics skilled in this type of repair work, with materials furnished by manufacturer and under manufacturer's direction.
B. Before pointing, clean face of stone with a fiber brush, soap powder and water, and thoroughly rinse with clean running water.
   1. Remove excess mortar from face of stone.
   2. No acids or prepared cleaners are permitted without the approval of stone manufacturer and Architect.

3.05 POINTING AND SEALING

A. Dampen joints prior to pointing.
B. Point stone joints to a concave surface with pointing mortar. See Section 04 22 00 for mortar.
   1. Pointing in freezing weather or in locations exposed to hot sun, unless properly protected, is not permitted.
C. Seal head joints, where left open for sealing, with sealant in accordance with Section 07 92 00.

3.05 INSPECTION AND ACCEPTANCE

A. Manufactured stone shall show no obvious repairs or imperfections other than normal color variations when viewed with the unaided eye at a 20 foot distance in good typical daylight illumination.
B. Applicable Standards for Inspection and Quality Control: ACI Committee 311 Manual of Concrete Inspection and PCI MNL-117 Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.

END OF SECTION


SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Structural steel framing members, as shown on drawings.

B. Grouting under base plates.

1.02  RELATED REQUIREMENTS

A. Section 05 21 00 - Steel Joist Framing.

B. Section 05 31 00 - Steel Decking.

1.03  REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction, Inc.

B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.

C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts.


G. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.


J. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

K. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless
Carbon Steel Structural Tubing.


N. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.


Q. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.


V. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.

W. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

1.04 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Connections not detailed.
   3. Indicate cambers and loads.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

E. HPBr Credit: Reference 01 78 56 for HPBr credit verification forms.
1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."

B. QUALIFICATIONS

1. Qualifications of Fabricator: Approved by the American Institute of Steel Construction Quality Certification Program, Category STD.

2. A Fabricator not complying with Category STD shall have fabrication procedures and fabricated steel tested and inspected by an independent testing agency as directed by the Structural Engineer. Tests and inspections are to be performed by AWS Certified Welding Inspectors. Submit copies of the inspection reports to the Structural Engineer. Payment of these tests and inspections will be by the fabricator. Tests and inspection shall include the following:
   a. Examine mill test reports and verify that material being used is the same as the mill test reports.
   b. Review the fabricator's written welding procedures. Verify that the fabricator's welding procedures are being adhered to.
   c. Verify that welders are certified with current papers and that they demonstrate proper techniques.
   d. Examine joint preparation for complete penetration joints. Ultrasonically test complete penetration joints.
   e. Examine fillet welds for proper size, profile, throat, porosity, and end returns.
   f. Examine steel members for laminations. Spot check dimensions and hole sizes.
   g. The purpose of this inspection is to enable the testing agency to verify that, in general, the steel is being fabricated in accordance with the project specifications. A minimum of one trip per week is recommended. The first trip should be scheduled in the early stages of fabrication.

C. Fabricator: Company specializing in performing the work of this section with minimum five years of documented experience.

D. Erector: Company specializing in performing the work of this section with minimum five years of documented experience.

E. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Tennessee.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Angles and Plates: ASTM A36/A36M.

B. Rolled Steel Structural Shapes: ASTM A992/A992M.
C. Cold-Formed Structural Tubing: ASTM A500, Grade B.

D. Hot-Formed Structural Tubing: ASTM A501, seamless or welded.


F. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A galvanized to ASTM A153/A153M, Class C.

G. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, medium carbon, galvanized.

H. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 or A563M nuts and ASTM F436 Type 1 washers.


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

K. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C1107/C1107M and capable of developing a minimum compressive strength of 7,000 psi at 28 days.

L. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors.

D. Develop required camber for members.

2.03 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP 1.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

2.04 SOURCE QUALITY CONTROL

A. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", testing at least 10 percent of bolts at each connection.

B. Welded Connections: Visually inspect all shop-welded connections and test at
least 10 percent of welds using one of the following:
1. Radiographic testing performed in accordance with ASTM E94.
2. Ultrasonic testing performed in accordance with ASTM E164.
3. Liquid penetrant inspection performed in accordance with ASTM E165.
4. Magnetic particle inspection performed in accordance with ASTM E709.

C. 100% of Complete and Partial Penetration Groove Welds shall be ultrasonically tested.

**PART 3 EXECUTION**

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".

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

C. Field weld components indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".

E. Do not field cut or alter structural members without approval of Architect.

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

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset from True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.
B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", testing at least 10 percent of bolts at each connection.

C. Welded Connections: Visually inspect all field-welded connections and test at least 10 percent of welds using one of the following:
   1. Radiographic testing performed in accordance with ASTM E94.
   2. Ultrasonic testing performed in accordance with ASTM E164.
   3. Liquid penetrant inspection performed in accordance with ASTM E165.
   4. Magnetic particle inspection performed in accordance with ASTM E709.

D. 100% of Complete and Partial Penetration Groove Welds shall be ultrasonically tested.

END OF SECTION
SECTION 05 12 13

ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Requirements regarding the appearance and surface preparation of Architecturally Exposed Structural Steel (AESS).

B. This section applies to any members or areas noted on the Architectural and/or Structural drawings as “AESS”.

1.02  RELATED REQUIREMENTS

A. Section 01 40 00 - Quality Requirements.

B. Section 05 12 00 – Structural Steel Framing.

C. Section 05 31 00 – Steel Decking.

D. Section 05 50 00 – Metal Fabrications.

E. Division 9 Section - “Painting” for finish coat requirements and coordination with primer and surface preparation specified in this section.

F. Division 9 Section - “Painting” for finish coat requirements and coordination with primer and surface preparation specified in this section.

1.03.  REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction, Inc.

B. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts.


G. ASTM A 134 - Standard Specification for Pipe, Steel, Electric-Fusion (Arc)-Welded (Sizes NPS 16 and Over)


K. ASTM A434 - Standard Specification for Steel Bars, Alloy, Hot-Wrought or Cold-Finished, Quenched and Tempered


M. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.


Q. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.


U. AWS D1.1 - Structural Welding Code - Steel; American Welding Society.

1.04 SUBMITTALS

A. General: Submit each item below according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

C. Shop Drawings detailing fabrication of AESS components.
   1. Provide erection drawings clearly indicating which members are considered as AESS members.
2. Include details that clearly identify all of the requirements listed in sections 2.3 "Fabrication" and 3.3 "Erection" of this specification. Provide connections for exposed AESS consistent with concepts shown on the architectural or structural drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length and type of each weld. Identify grinding, finish and profile of welds as defined herein.

4. Indicate type, size, finish and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tensioned shear/bearing connections. Indicate to which direction bolt heads should be oriented.

5. Clearly indicate which surfaces or edges are exposed and what class of surface preparation is being used.

6. Indicate special tolerances and erection requirements as noted on the drawings or defined herein.

D. Qualification data for firms performing work covered in this specification in order to demonstrate their capabilities and experience. Include a list of completed projects names and address, name and address of architect and submit photographs showing detail of installed AESS.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: In addition to those qualifications listed in Division 5 Section ‘Structural Steel Framing,’ engage a firm experienced in fabricating AESS similar to that indicated for this Project with a record of successful in-service performance, as well as sufficient production capacity to fabricate AESS without delaying the Work.

B. Erector Qualifications: In addition to those qualifications listed in Division 5 Section ‘Structural Steel Framing,’ engage an experienced Erector who has completed AESS work similar in material, design, and extent to that indicted for this Project and with a record of successful in-service performance.

C. Comply with applicable provisions of the following specifications and documents:


D. Mockups: At least four weeks prior to fabricating AESS, the contractor shall construct mockups to demonstrate aesthetic effects as well as qualities of materials and execution. A mockup for each of the elements shall be constructed:

Build mock-ups to comply with the following requirements, using materials indicated for final unit of Work.
1. Locate mockups on-site or in the fabricator’s shop as directed by Architect. Mockups shall be full-size pieces unless the Architect approves smaller models.
2. Notify the Architect one week in advance of the dates and times when mockups will be available for review.
3. Demonstrate the proposed range of aesthetic effects regarding each element listed under the fabrication heading below.
4. Mockup will have finished surface (including surface preparation and paint system).
5. Obtain Architect’s approval of mockups before starting fabrication of final units.
6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.
   a. Approved mockups in an undisturbed condition at the time of Substantial completion may become part of the completed work.

E. Pre-installation Conference: The General Contractor shall schedule and conduct conference at the project site to comply with requirements of Section 01 31 00 “Project Management and Coordination.” As a minimum, the meeting shall include the General Contractor, Fabricator, Erector, the finish-painting subcontractor, and the Architect. Coordinate requirements for shipping, special handling, attachment of safety cables and temporary erection bracing, touch up painting and other requirements for AESS.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver AESS to Project site in such quantities and at such times to ensure continuity of installation.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. Use special care in handling to prevent twisting or warping of AESS members.

C. Erect pre-painted finish pieces using padded slings or other methods, such that they are not damaged. Provide padding as required to protect while rigging and aligning member’s frames. Weld tabs for temporary bracing and safety cabling only at points concealed from view in the completed structure or where approved by the Architect during the pre-installation meeting. Methods of removing temporary erection devices and finishing the AESS members shall be approved by the Architect prior to erection.

1.07 PROJECT CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.
1.08 COORDINATION

A. Coordinate installation of anchors for AESS members that connect to the work of other trades. Furnish setting drawings, templates, and directions for installing anchors, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to the project site in time for installation. Anchorage concepts shall be as indicated on drawings and approved on final shop drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. General: Meet requirements Section 051200 ‘Structural Steel Framing’ as amended below.

B. High-Strength Bolts, Nuts, and Washers: Per Section 051200 heavy hex heads and nuts. Provide rounded bolt heads with twist-off bolts. Provide standard carbon steel mechanically galvanized finish.

2.02 PRIMERS

A. Compatibility: The General Contractor shall submit all components / procedures of the paint system for AESS as a single coordinated submittal. As a minimum, identify required surface preparation, primer, intermediate coat, and finish coat. All of the items shall be coordinated with the finish coat specified in Division 9.

B. Primer: For interior bare steel, provide modified alkyd-oil primer, equal in quality to 10-99 Tnemec Primer, 10-99W Tnemec Primer, or 4-55 Versare Primer by Tnemec Company, Inc. Meet class B surface requirements for slip-critical connections.

2.03 FABRICATION

A. Fabricate and assemble AESS in the shop to the greatest extent possible. Locate field joints in AESS assemblies at concealed locations or as approved by the Architect. Detail AESS assemblies to minimize field handling and expedite erection.

B. Fabricate AESS with exposed surfaces smooth, square and of surface quality consistent with the approved mock up. Use special care in handling and shipping of AESS both before and after shop painting.

C. In addition to special care used to handle and fabricate AESS, employ the following fabrication techniques.
   1. Fabrication Tolerance: Fabricate steel to one-half the normal tolerance as specified in the Code of Standard Practice Section 10.
   2. Welds ground smooth: Fabricator shall grind welds of AESS smooth. For groove welds, the weld shall be made flush to the surfaces each side and be within +1/16", -0" of plate thickness.
3. Contouring and blending of welds: Where fillet welds are indicated to be ground, contoured, or blended, oversize welds as required and grind to provide a smooth transition and to match profile on approved mock-up.

4. Continuous Welds: Where welding is noted on the drawings, provide continuous welds of a uniform size and profile.

5. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.

6. Piece Marks Hidden: Fabricate such that piece marks are fully hidden in the final structure or made with such media to permit full removal after erection.

7. Mill Mark Removal: Fabricator shall deliver steel with no mill marks (stenciled, stamped, raised, etc., in exposed locations. Mill marks shall be omitted by cutting of mill material to appropriate lengths where possible. Where not possible, the fabricator can fill and/or grind to a surface finish consistent with the approved mock-up.

8. Seal weld open ends of round and rectangular hollow structural section with 3/8" closure plates. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.

2.04 SHOP CONNECTIONS

A. Bolted Connections: Make in accordance with Section 051200. Provide bolt type and finish as noted herein and align bolt heads as indicated on the approved shop erection drawings.

B. Weld Connections: Comply with AWS D1.1 and Section 051200. Appearance and quality of welds shall be consistent with the mock up. Assemble and weld built-up sections by methods that will maintain alignment of members without warp exceeding the tolerance of this section.

2.05 SHOP PRIMING

A. Shop-prime steel surfaces, except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2".
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections, if primer does not meet the specified AISC slip coefficient.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Prepare surfaces according to SSPC Specifications as follows:
1. SSPC-SP 3 “Power Tool Cleaning.” For all interior applications.
2. Coordinate the required blast profile with the approved paint submittal prior to beginning surface preparation.

C. Priming: Immediately after surface preparation, apply primer according to manufacturer’s instructions to provide a dry film thickness of not less than 1.5 mil (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop primer to surfaces that are inaccessible after assembly or erection.

2.06 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to AESS indicated for galvanizing according to ASTM A123. Fabricate such that all connections of assemblies are made in the field with bolted connections. Provide galvanized finish or members and assemblies within the range of color and surface textures presented in the mockups.

PART 3 EXECUTION

3.01 EXAMINATION

A. The erector shall check all AESS members upon delivery for twist, kinks, gouges or other imperfections that might result in rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel.

3.02 PREPARATION

A. Provide connections for temporary shoring, bracing and supports only where noted on the approved shop drawings. Temporary connections not shown shall be made at locations not exposed to view in the final structure or as approved by the Architect. Handle, lift, and align pieces using padded slings and/or other protection required to maintain the appearance of the AESS through the process of erection.

3.03 ERECTION

A. Set AESS accurately in locations and to elevations indicated, and according to AISC specifications referenced in this Section.

B. In addition to the special care used to handle and erect AESS, employ the following erection techniques:
   1. AESS Erection tolerances: Erection tolerances shall meet the requirements of standard frame tolerances for structural steel per Chapter 7 of the AISC Code of Standard Practice.
   2. Welds ground smooth: Erector shall grind welds smooth in the connections of AESS members. For groove welds, the weld shall be made flush to the surfaces of each side and be within +1/16", -0" of plate thickness.
   3. AESS Erection tolerances: Erection tolerances shall meet the requirements of standard frame tolerances for structural steel per Chapter 7 of the AISC Code of Standard Practice.
   4. Contouring and blending of welds: Where fillet welds are indicated to be ground contoured, or blended, oversize welds as required; grind to provide a smooth transition and to match profile on approved mockup.
   5. Continuous Welds: Where noted on the drawings, provide continuous welds of a uniform size and profile.
6. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material. Bolt Head Orientation: All bolt heads shall be oriented as indicated on the contract documents. Where bolt-head alignment is specified, the orientation shall be noted for each connection on the erection drawings. Where not noted, the bolt heads in a given connection shall be oriented to one side.

7. Removal of field connection aids: Run-out tabs, erection bolts and other steel members added to connections to allow for alignment, fit-up, and welding in the field shall be removed from the structure. Field groove welds shall be selected to eliminate the need for backing bars or to permit their removal after welding. Welds at run-out tabs shall be removed to match adjacent surfaces and ground smooth. Holes for erection bolts shall be plug welded and ground smooth.

8. Filling of weld access holes: Where holes must be cut in the web at the intersection with flanges on W-shapes and structural tees to permit field welding of the flanges, they shall be filled. Filling shall be executed with proper procedures to minimize restraint and address thermal stresses in group 4 and 5 shapes.

C. Field Welding: Weld profile, quality, and finish shall be consistent with mock-ups approved prior to fabrication.

D. Splice members only where indicated.

E. Obtain permission for any torch cutting or field fabrication from the Architect. Finish sections thermally cut during erection to a surface appearance consistent with the mock up.

F. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts. Replace connection plates that are misaligned where holes cannot be aligned with acceptable final appearance.

3.04 FIELD CONNECTIONS

A. Bolted Connections: Install bolts of the specified type and finish in accordance with Division 5 Section "Structural Steel."

B. Welded Connections: Comply with AWS D1.1 for procedures, and appearance. Refer to Division 5 section "Structural Steel" for other requirements.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp. Verify that weld sizes, fabrication sequence, and equipment used for AESS will limit distortions to allowable tolerances.

2. Obtain Architects approval for appearance of welds in repaired or field modified work.

3.05 FIELD QUALITY CONTROL

A. An independent testing agency will perform the functions of the Special Inspector and will perform field quality control tests, as specified in Section 014000.
B. AESS acceptance: The Architect shall observe the AESS steel in place and determine acceptability based on the mockup.

3.06 ADJUSTING AND CLEANING

A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint shall be completed to blend with the adjacent surfaces of AESS. Such touch up work shall be done in accordance with manufacturer’s instructions as specified in the corresponding Division 9 “Painting” sections.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION
SECTION 05 21 00
STEEL JOIST FRAMING

PART 1  GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY
A. Section Includes:
   A. K-series steel joists.
   B. LH- and DLH-series long-span steel joists.
   C. Joist girders.
   D. Joist accessories.
B. Related Requirements:
   1. Section 03 30 00 "Cast-in-Place Concrete" for installing bearing plates in concrete.
   2. Section 04 22 00 "Unit Masonry" for installing bearing plates in unit masonry.
   3. Section 05 12 00 "Structural Steel Framing" for field-welded shear connectors.

1.03 DEFINITIONS
A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support non-uniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.04 ACTION SUBMITTALS
A. Product Data: For each type of joist, accessory, and product.
B. LEED Submittals:
   1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
   2. Laboratory Test Reports for Credit EQ 4: For primers, documentation indicating that products comply 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."
C. Shop Drawings:
1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details, bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
3. Indicate locations and details of bearing plates to be embedded in other construction.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.
B. Welding certificates.
C. Manufacturer certificates: Signed by manufacturers certifying that joists comply with requirements.
D. Mill Certificates: For each type of bolt. Signed by bolt manufacturers certifying that bolts comply with requirements.
E. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's Specifications.
   1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's Specifications.
B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.08 SEQUENCING

A. Deliver steel bearing plates to be built into cast-in-place concrete and masonry construction.
PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and connections capable of
withstanding design loads indicated.
   1. Use ASD; data are given at service-load level.
   2. Design special joists to withstand design loads with live-load deflections
      no greater than the following:
      a. Floor Joists: Vertical deflection of 1/360 of the span.

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half
   of preconsumer recycled content not less than 30 percent.

2.02 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specifications for
   Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top-
   and bottom-chord members, underslung ends, and parallel top chord.

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for
   Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or-
   channel members.

C. Provide holes in chord members for connecting and securing other construction to
   joists.

D. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top chord
   extensions where indicated, complying with SJI's "Specifications."

E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends
   where indicated, complying with SJI's "Specifications."

F. Do not camber joists.

G. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped
   shoes if joist slope exceeds 1/4 inch per 12 inches.

2.03 PRIMERS

A. Low-Emitting Materials: Paints and coatings shall comply 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."

B. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with
   performance requirements in SSPC-Paint 15.

2.04 JOIST ACCESSORIES
A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Fabricate steel bearing plates from ASTM A36/A 36M steel with integral anchorages of sizes and thicknesses indicated.

C. Steel bearing plates with integral anchorages are specified in Section 055000 "Metal Fabrications."

D. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated.

E. High-Strength Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.
   1. Finish: Plain.

F. Welding Electrodes: Comply with AWS standards.

G. Galvanizing Repair Paint: ASTM A780.

H. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.05 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.

B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.

C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION
A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJL's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.

C. Before installation, splice joists delivered to Project site in more than one piece.

D. Space, adjust, and align joists accurately in location before permanently fastening.

E. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

F. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.

G. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.


I. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.03 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.

B. Visually inspect field welds according to AWS D1.1/D1.1M.
   1. In addition to visual inspection, test field welds according to AWS D1.1/D1.1M and the following procedures, as applicable:
      a. Liquid Penetrant Inspection: ASTM E 165.
      b. Magnetic Particle Inspection: ASTM E 709.

C. Visually inspect bolted connections.

D. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.

E. Perform additional testing to determine compliance of corrected Work with specified requirements.
3.04 PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.
   1. Clean and prepare surfaces by hand-tool cleaning according to SSPC-SP 2, or power-tool cleaning according to SSPC-SP 3.
   2. Apply a compatible primer of same type as primer used on adjacent surfaces.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, which ensure that joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION
SECTION 05 31 00
STEEL DECKING

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Roof deck.
B. Composite floor deck.
C. Metal form deck.
D. Supplementary framing for openings up to and including 18 inches.
E. Bearing plates and angles.
F. Stud shear connectors.

1.02  RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Reinforcing and concrete topping over metal deck.
B. Section 05 12 00 - Structural Steel Framing: Support framing for openings larger than 18 inches and shear stud connectors.
C. Section 05 21 00 - Steel Joist Framing: Support framing for openings larger than 18 inches.
D. Section 05 50 00 - Metal Fabrications: Steel angle concrete stops at deck edges.

1.03  REFERENCE STANDARDS

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
D. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.
E. AWS D1.3 - Structural Welding Code - Sheet Steel; American Welding Society.
F. SDI (DM) - Publication No.31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute.
G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic");
The Society for Protective Coatings.

H. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings.

1.04 SUBMITTALS

A. See Division 01 for submittals procedures.

B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

D. Certificates: Certify that products furnished meet or exceed specified requirements.

E. Submit manufacturer's installation instructions.

F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Tennessee.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.01 STEEL DECK

A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
   1. Calculate to structural limit stress design and structural properties specified.
   5. Maximum Lateral Deflection of Diaphragms: 1/500 of the height of the wall.
B. Roof Deck: Non-composite type, fluted steel sheet:
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS), with G90/Z275 galvanized coating.
      a. Grade as required to meet performance criteria.
   2. Structural Properties as shown on Structural Drawings.
      a. Span Design: Multiple.
   3. Profile: Fluted; SDI NR.
   4. Formed Sheet Width: 24 inch.
   5. Side Joints: Lock seam.

C. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
   2. Structural Properties as shown on Structural Drawings.
   4. Profile: Fluted; SDI NR.
   5. Formed Sheet Width: 24 inch.
   7. End Joints: Lapped, welded.

D. Metal Form Deck: Corrugated sheet steel, with provision for ventilation of concrete:
   3. Nominal Height: 2 inch.
   4. Formed Sheet Width: 24 inch.
   5. Side Joints: Lapped, welded.

2.02 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A36/A36M steel, unfinished.

B. Stud Shear Connectors: Made from ASTM A108 Grade 1015 bars.


D. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.

E. Shop and Touch-Up Primer: SSPC-Paint 25, zinc oxide, complying with VOC limitations of authorities having jurisdiction.

F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

G. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.
2.03 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage thick sheet steel; of profile and size as indicated; finished same as deck.

B. Cant Strips: Formed sheet steel, 22 gage thick, 45 degree slope, 3 1/2 inch nominal width and height, flange for attachment.

C. Roof Sump Pans: 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

D. Floor Drain Pans: 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below floor deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.

B. On concrete and masonry surfaces provide minimum 4 inch bearing.

C. On steel supports provide minimum 1-1/2 inch bearing.

D. Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
   1. Welding: Use fusion welds through weld washers.
   2. Place and secure special deep fluted sections for integral concrete bridging.

E. Clinch lock seam side laps.

F. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.

G. At welded male/female side laps weld at 18 inches on center maximum.

H. Weld deck in accordance with AWS D1.3 or mechanically fasten with either power actuated or pneumatically driven fasteners. Install fasteners in accordance with the deck manufacturer's instructions.

I. At deck openings from 6 inches to 18 inches in size, provide 2 x 2 x 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
J. At deck openings greater than 18 inches in size, provide 3 x 3 x 3/8 inch steel angle reinforcement. Place angles perpendicular to flutes attached to the floor/roof beams/joists and fusion weld to deck at each flute.

K. Where deck changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.

L. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.

M. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

N. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.

O. Place metal cant strips in position and fusion weld.

P. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

Q. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

R. Weld stud shear connectors through steel deck to structural members below.

S. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide miscellaneous metals as indicated on the drawings and specified herein. Work includes, but is not limited to:
1. Ladders.
2. Stairs; work includes design.
3. Loose steel lintels.
4. Steel railings and handrails; work includes design.
5. Loose leveling and bearing plates.
7. Miscellaneous steel framing and supports which are not indicated as part of structural steel work.
8. Miscellaneous steel members to be embedded in concrete.
9. Concrete filled steel pipe protection posts (pipe bollards).
10. Structural channel frames.
11. Curb and floor opening angles.
12. Elevator sill angles and elevator intermediate structural supports.
13. Lavatory counter supports.
14. Supports above ceilings for ceiling hung items (folding partition, toilet partition, etc).
15. Floor grating

1.02  RELATED SECTIONS

A. Structural Steel: Section 05 12 00.

B. Painting: Section 09 91 00.

C. Decorative Metals: Section 05 73 00.

1.03  REFERENCES


B. American Welding Society (AWS).
1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.3 – Structural Welding Code – Sheet Steel.
3. AWS D1.2 – Structural Welding Code – Aluminum.
4. AWS D1.6 – Structural Welding Code – Stainless Steel

C. American Society for Testing and Materials (ASTM).
1. ASTM A36 - Structural Steel.
2. ASTM A53 - Pipe, Steel, Black, Hot-Dipped, Zinc-coated Welded and Seamless.
3. ASTM A123 – Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
4. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A283 – Low and Intermediate Tensile Strength Carbon Steel Plates.
6. ASTM A307 - Carbon Steel Bolts and Studs Externally and Internally Threaded Fasteners, 60,000 PSI Tensile Strength.
8. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
9. ASTM A501–Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
11. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
12. ASTM A569 - Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality.
13. ASTM A570 - Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
14. ASTM A611 - Steel Sheet, Carbon, Cold-Rolled, Structural Quality.
15. ASTM A780 - Practice for Repair of Damaged Hot-Dip Galvanized Coatings.
17. ASTM A276 - Stainless and Heat-Resisting Steel Bars and Shapes.
18. ASTM B209 – Aluminum and Aluminum-Alloy Sheet and Plate.

D. American National Standards Institute (ANSI)
1. ANSI A14.3 - Safety Requirements for Fixed Ladders
2. ANSI Z49.1 – Safety in Welding, Cutting and Allied Processes

E. National Association of Architectural Metal Manufacturers, (NAAMM).

F. Society for Protective Coatings (SSPC)
1. SSPC-SP1 - Solvent Cleaning
2. SSPC-SP2 - Hand Tool Cleaning
3. SSPC-SP3 - Power Tool Cleaning
4. SSPC-SP6 - Commercial Blast Cleaning
5. SSPC-SP11 - Power Tool Cleaning to Bare Metal

1.04 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design metal stairs and railings and ladders, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
1.05 SUBMITTALS

A. Shop Drawings - General: Submit for all items.

B. Shop Drawings – Stairs and Handrails: Indicate in detail construction, gages of metals, jointing, methods of installation, fastening and supports, location and sizes of welds, anchors, hangers and other pertinent information and data.
   1. In addition, submit plans and details of stairs and handrails, drawn to scale not less than 1/4 inch per foot.
   2. Shop drawings shall contain design, type of steel and load assumption, bearing the seal of a licensed professional engineer registered in the State of Tennessee.

C. Samples: Submit samples of materials or workmanship, if requested by the A/E.

D. Stair manufacturer’s certificate of compliance with the Architectural Products Division of the National Association of Architectural Metal Manufacturer’s AMP 510 Metal Stairs Manual materials, construction and installation specification.


1.06 QUALITY ASSURANCE

A. Fabricate and install metal items in accordance with applicable standards of AISC and NAAMM. Welding and related procedures in accordance with AWS.

B. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1 - Structural Welding Code - Steel.
   2. AWS D1.2 - Structural Welding Code - Aluminum.

C. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

D. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

1.07 PROJECT CONDITIONS

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
1.08 COORDINATION

A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

1.09 STORAGE AND HANDLING

A. Protect from corrosion.

B. Store materials in a weathertight and dry place until ready for use in the work.

C. Store packaged materials in their original unbroken package or container.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ferrous Metals
   1. Steel Shapes, Bars and Plates: ASTM A36.
   2. Steel Plates to be Bent or Cold Formed: ASTM A283, Grade C.
      a. Pipe Bollards: Heavy weight, schedule 80.
   4. Steel for Gratings: ASTM A569 or A36.
   5. Steel Tubing: ASTM A500, Grade A, cold-formed; or ASTM A501, hot-formed.
   6. Steel Sheets: Hot-rolled ASTM A570, Class 1, Grade 36; or cold-rolled ASTM A611, Grade C, Type 1.
   7. Galvanized Steel Sheets: ASTM A653 Grade 33, G90 coating.

B. Aluminum
   4. Aluminum Extrusions: ASTM B221, Alloy 6063-T6

C. Stainless Steel
   1. Bar Stock: ASTM A276, Type 302 or 304.
   2. Plate: ASTM A167, Type 302B.

D. End Welded Studs
   1. Material: Compatible with material to which it is attached.
   2. Type: Automatically end welded in the shop or field, head or bent top.
   3. Welding Procedures: In strict conformance with MFR’s recommendations.
   4. Size: Diameter and length as indicated.

E. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded
2.02 FASTENERS

A. General
   1. Provide fasteners of types as required for assembly and installation of fabricated items.
   2. Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941; Class Fe/Zn 5; at exterior walls.

B. Bolts, Nuts and Washers: Regular hexagon head type, externally and internally threaded fasteners; include necessary nuts and plain hardened washers. Provide the following materials/finishes:
   1. Steel: ASTM A307 Grade A bolts; A563 nuts. For members for support of structural members or connection thereto, provide ASTM A325 bolts.
   2. Stainless Steel: ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1

C. Expansion Anchors: Stainless steel "DH Bolts" or "Ankr Tite" devices by WEJ-IT or similar by REDHEAD, HILTI or SIMPSON. Length as required to provide minimum 2-1/2" embedment into sound masonry.

D. Adhesive Type Anchor Bolts – In Hollow CMU: Chemically grouted adhesive anchor systems with nylon or stainless steel screen inserts. Use 1/2 inch diameter anchors, unless otherwise noted.
   1. HIT HY-70 Adhesive Anchors, HILTI, INC.
   2. EPCON System, ITW/RAMSET/RED HEAD
   3. Chem-Stud Adhesive Anchors, RAWLPLUG COMPANY, INC.
   4. Simpson Set Epoxy-Tie Adhesive Anchors, SIMPSON STRONG-TIE COMPANY, INC.

E. Adhesive Type Anchor Bolts - In solid grouted CMU and Concrete: Chemically grouted adhesive anchor systems. Use ¾ inch diameter anchors, unless otherwise noted.
   1. HIT HY 200 or RE-500 V “Safe Set System” Adhesive Anchors, HILTI, INC.
   2. EPCON System, ITW/RAMSET/REDHEAD
   3. Chem-Stud Adhesive Anchors, POWERS FASTENERS, INC.
   4. Simpson Set Epoxy-Tie Adhesive Anchors, SIMPSON STRONG-TIE COMPANY, INC.

F. Miscellaneous Fasteners
   1. Lag Bolts: ANSI B18.2.1.
   4. Plain Washers: Round, carbon steel, ANSI B18.22.1
   5. Toggle Bolts: Tumble-wing or spring wing type, FS FF-B-588, type, class, and style as required.
2.03 MANUFACTURED ITEMS

A. Concrete Stair Nosings
   1. Use: Concrete panfilled treads and cast-in-place concrete stairs.
   2. Type: Extruded aluminum with aluminum oxide/silicone carbide abrasion anti-slip filler strips and integral anchor.
   3. Size: 3" wide by 1/4" thick by full length of tread for panfilled and 6" less than width of tread for cast-in-place (3" each end).
   5. Manufacturer: WOOSTER PRODUCTS, Type 231BF for panfilled, Type 231 for cast-in-place; AMERICAN ABRASIVE METALS COMPANY; BALCO.

B. Gratings and Stair Treads
   1. Steel
      a. Type: McNICHOLS CO. GCM-2-125A or equal by IKG INDUSTRIES, OHIO GRATING, BLAW-KNOX EQUIPMENT, or DRAVO CORP.
      b. Finish: Hot-dipped galvanized, ASTM A123 with aluminum oxide granules set in epoxy adhesive to provide non-slip surface. Similar to Mebac by McNICHOLS COMPANY.
   2. Adjacent Sections: Align bars so they appear continuous.
   3. Joints: Do not locate joints at top of steps.
   4. Tread Nosing: Solid with same finish as grating surface.

2.04 FABRICATION

A. General
   1. Workmanship
      a. Construct all items to ensure ease of installation and minimal field adjustment.
      b. Use materials of size and thickness shown, or, if not shown, of required size and thickness to produce strength and durability in finished product. Ease exposed edges to a radius of approximately 1/32 inch. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
      c. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces. Grind crotches to 1/8" radius.
      d. Form exposed connections with hairline joints, flush and smooth.
   2. Field Measuring: Field measure all items required to obtain proper fit.
   3. Exposed mill names and logos not permitted in finished work.

B. Steel Stairs
   1. General: Construct stairs to conform to sizes and arrangements shown: Join pieces together by welding unless otherwise indicated. Provide complete stair assemblies, including metal framing, hangers, railings, struts, clip brackets, bearing plates and other components for the support of stairs and platforms and as required to anchor and contain the stairs on supporting structure.
   2. Design: Comply with all applicable building laws and ordinances. Stairs to be designed to sustain a live load of 100 psf and a concentrated load of 300
lbs. Sizes of members shown on drawings are minimums. Furnish heavier members if necessary to meet design requirements.

3. Stair Framing: Fabricate stringers of structural steel channels. Provide closures for exposed ends of stringers. Construct platforms (landings) of structural steel channel headers and miscellaneous framing members as shown. Bolt or weld headers to stringers and framing members to stringers and headers; fabricate and join so bolts do not appear on finish surfaces.

4. Pan-Filled Stairs
   a. Metal Pan Risers, Subtreads, and Subplatforms (Landings): Shape metal pans for risers and subtreads to conform to configuration shown. Provide thicknesses of structural steel sheet for metal pans indicated but not less than that required to support total design loading. Form metal pans of hot-rolled or cold-rolled carbon steel sheet, unless otherwise indicated.
   b. Attach risers and subtreads to stringers by means of steel angle brackets; weld brackets to strings and weld metal pans to brackets.
   c. Provide subplatforms of configuration and constructions indicated, or if not indicated, of same metal as risers and subtreads and in thicknesses required to support design loading. Attach subplatform to platform framing members with welds.

5. Grating Stairs
   a. General: Install galvanized steel grating treads/landings as indicated.
   b. Treads: Prefabricated.

C. Ladders
   1. Fabricate ladders for the locations shown with dimensions, spacings, details and anchorages as indicated. Comply with the requirements of ANSI A14.3 and OSHA, except as otherwise indicated.
      a. Unless otherwise shown on the drawings, provide 1/2 inch x 2-1/2 inch continuous structural steel flat bar stringers with eased edges, spaced 18 inches apart.
      b. Provide 1 inch diameter solid structural steel bar rungs, spaced maximum 12 inches on center.
   2. Center rungs on stringers, plug weld and grind smooth on outer rail faces.
   3. Coat top of each rung with aluminum oxide granules set in epoxy adhesive to provide non-slip surface.
   5. Provide semi-circular safety cages with flared bottom where ladders height exceeds 20'-0". The back of the cage must extend between 27 and 30 inches from each ladder rung, measured from the center of the rung. Cage shall be connected to the ladder, or to the structure to which the ladder is fixed, by horizontal bands, and there shall be a horizontal band at least every 4 feet. Provide vertical bars, no more than 9.5 inches from each other, connecting the horizontal bands. The vertical bars must also be connected to the inside of the horizontal bands. Locate bottom of cage between 7'-0" and 8'-0".
   6. At public access locations and where indicated, provide expanded metal hinged security gate at gage bottom with lockable hasp.
D. Handrail/Guardrail: Fabricate as indicated on the drawings.

1. Material: Steel pipe or shapes as detailed; meeting the requirements specified herein for the specific material.

2. Loadings: Steel guardrails and handrails shall meet the following load requirements:
   a. Welded construction, fabricated, complete with connectors to structure designed for a concentrated load of 200 pounds applied at any point and in any direction on the handrail and at the top of the guardrail and in compliance with OBC.
   b. Guardrails: Designed and constructed for a load of 50 pounds per lineal foot applied horizontally at the required guardrail height and a simultaneous load of 100 pounds per lineal foot applied vertically downward at the top of the guardrail.
   c. Guardrails: Designed and constructed to resist a 200 pound concentrated horizontal load applied on a one foot square area at any point in the system including intermediate rails or other elements serving this purpose.
   d. Handrails: Designed and constructed for a load of 50 pounds per lineal foot applied in any direction and in compliance with the OBC.
   e. Loading conditions in paragraphs a, b, c and d shall not be applied simultaneously, but each shall be applied to produce maximum stress in each of the respective components or any of the supporting components.

3. Verify dimensions on site prior to shop fabrication.

4. Railing system shall be assembled in a shop in largest sizes for delivery to site and for installation; to minimize field-splicing and assembly.
   a. Rails shall be disassembled only as necessary for shipping and handling.
   b. Rails shall be marked for re-assembly and coordinated installations.

5. Close open ends of railings, not scheduled to be closed with finials, with close fitting steel plates welded in place and ground smooth.

6. Welded Connection: Cope intersections of rails and posts, weld joints and grind smooth. Butt weld end-to-end joints of railings, or use welding connections at fabricator's option.

7. Form simple and compound curves by bending pipes in jigs to produce uniform curves.
   a. Maintain profile of pipes throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces.

8. Space posts and wall brackets as indicated. If not indicated, 7'-0" maximum center to center.

9. Brackets, Flanges and Anchors: Provide for railing posts and handrail supports. Provide inserts and sleeves as required for anchorage to concrete or masonry.

10. Provide wall returns at ends of wall mounted rails.

11. For Exterior Installations: Provide weepholes or other means for evacuation of water trapped in pipe rails.

12. Expansion Joints: Provide expansion joints at locations indicated. If not indicated, locate at intervals not to exceed 40 feet.
   a. Provide slip-joint interval sleeve extending beyond joint on each side; secure sleeve to one side.
   b. Do not locate expansion joints closer than 6" from post.
13. Toe Boards: Where indicated, provide toe boards around openings and at edge of open-sided floors and platforms.
   a. Fabricate to dimensions and details shown.

E. Miscellaneous Steel Lintels: Provide sizes and shapes as indicated with 8" minimum bearing each jamb, unless otherwise noted. When lintel is fabricated of two or more members to accommodate thickness of wall, weld adjacent members to form a single unit. Unless otherwise indicated, provide one 3-1/2" wide angle leg for each nominal 4" wythe of masonry.

F. Miscellaneous Embedded Items: Provide steel members of shapes and size required per drawings. Equip members to be anchored into concrete or masonry with welded on anchor straps or weld studs as shown or required. Spacing and location of anchors per drawings, but if not otherwise detailed, provide at ends and at maximum intervals of 12" with minimum two per member.

G. Miscellaneous Framing and Supports
   1. Provide as indicated on drawings.
   2. Fabricate members and assemblies to size, shape and dimensions detailed with provisions to receive adjacent construction supported by such items.

H. Miscellaneous Loose Steel Items: Provide steel shapes such as channels, angles, plates, protection posts, etc., as indicated on drawings.

I. Accessories: Provide all clips, bolts, anchors, fasteners, etc., as required for completion of miscellaneous metal work. Type, size and strength as noted or as suitable for conditions and construction involved.

K. Stair Nosings: Provide single length sections; no joints permitted within the width of a stair tread.

L. Counter Supports:
   1. Surface Mounted: 1/8" steel with 45 degree notch that allows for wall cleat and wire run clearance.
      a. Load to Deformation: 1500 lbf/pair minimum.
      c. Manufacturer: A&M HARDWARE or approved equal
   2. In-Wall Mounted (Concealed): Fabricate from steel angles and welded in sizes indicated or as required.
      a. Load to Deformation: 650 lbf/pair minimum.
   3. Accessories: Provide all required fasteners to structure type provided.

2.05 FINISHES

A. Preparation: Grind all exposed cut surfaces as required to remove burrs and sharp edges.

B. Galvanizing
   1. Galvanize all ferrous metal items exposed to weather, embedded in masonry or concrete, and where indicated.
2. Hot-dip galvanize after fabrication in accordance with ASTM A123; provide minimum of 2 oz. of galvanizing (Grade 85) per sq. ft. of subsurface. Prepare and pretreat surfaces as recommended by galvanizer. Do not weld after galvanizing.

3. Galvanizing Repair Paint: Minimum 79% zinc dust by weight in dried film. TNEMEC COMPANY, INC., No. 92 Tneme-Zinc; ZRC Cold Galvanizing Compound by ZRC, Zinc-rich Galvax by ALVIN PRODUCTS.

4. Do not use stainless steel or other non-galvanized fasteners in the assembly of galvanized components.

C. Shop Painting (Non-galvanized Ferrous Metal)
1. Cleaning: After fabrication, clean all items of loose scale, rust, oil, dirt or other foreign matter.
4. Paint: One shop coat of paint compatible with the finish paint system. Section 09 91 00.

PART 3  EXECUTION

3.01  PREPARATION

A. Coordinate and furnish anchorages, settings drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.02  INSTALLATION

A. General
1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and level. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
4. **Field Welding:** Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work. Comply with the following requirements:
   a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   b. Obtain fusion without undercut or overlap.
   c. Remove welding flux immediately.
   d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

5. **Protection from Dissimilar Materials:** Coat all aluminum surfaces in contact with steel, concrete or masonry with one coat of heavy bodied bituminous paint. Where aluminum contacts steel surfaces, and only where specifically approved, the painting required on the steel surface may be substituted for the bituminous paint.

**B. Handrail**

1. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or specified herein. Plumb posts in each direction. Secure posts in each direction. Secure posts and railing ends to building construction as follows.

2. Anchor posts to concrete as indicated on the drawings.

3. Weld posts to channels as indicated.

4. Secure handrails to wall with wall brackets. Provide brackets with not less than 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to concrete or masonry with expansion bolts.

**C. StairNosings:** Use on all concrete and concrete pan filled treads.

**D. Gratings and Frames**

1. **Field Cutting:** Only with permission of Architect.

2. **Bearing Bars at Supports:** Notching to maintain elevations not permitted.

3. **Rejection:** Bent or warped grating in excess of those specified in the Metal Bar Grating Manual will be rejected.

4. **Clearance Between Panels**
   a. General: Allow approximately 1/8" clearance between adjacent panels (or panel and frame) at 70 degrees F., except that the total accumulated clearance between any number of panels in a single frame shall fall within the following ranges:

<table>
<thead>
<tr>
<th>FRAME DIMENSION (feet)</th>
<th>ACCUMULATED CLEARANCE (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>00 - 10</td>
<td>1/8</td>
</tr>
<tr>
<td>10 - 30</td>
<td>3/16</td>
</tr>
<tr>
<td>30 - 50</td>
<td>3/8</td>
</tr>
<tr>
<td>50 - 80</td>
<td>1/2</td>
</tr>
</tbody>
</table>

   b. Spacers: Spacers welded to the edge of the intermediate panels
may be used to reduce excessive clearance.

5. Clips: Provide two at each end support and one at each intermediate support.

3.03 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION
SECTION 05 51 00

METAL STAIRS

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Stairs with concrete treads.
B. Stairs with metal treads.
C. Stairs with grating treads.
D. Structural steel stair framing and supports.
E. Handrails and guards.

1.02  RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete fill in stair pans and landings; mesh reinforcement for landings.
B. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal anchors in concrete.
C. Section 05 50 00 - Metal Fabrications.

1.03  REFERENCE STANDARDS

H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
J. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-
Strength Low-Alloy, and Alloy Steel Floor Plates.

K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.

L. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

M. NAAMM AMP 510 - Metal Stairs Manual; The National Association of Architectural Metal Manufacturers.

N. NAAMM MBG 531 - Metal Bar Grating Manual; The National Association of Architectural Metal Manufacturers.


P. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings.


R. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings.

1.04 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.

1. Indicate welded connections using standard AWS A2.4 welding symbols.

2. Include the design engineer's stamp or seal on each sheet of shop drawings.

C. Delegated Design Data: As required by authorities having jurisdiction.

D. Welders' Certificates.

1.05 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Engineer experienced in design of this work and licensed in Tennessee.

B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.

1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.

2. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.
B. Metal Jointing and Finish Quality Levels:
1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
   a. Welded Joints: Continuously welded and ground smooth and flush.
   b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
   c. Exposed Edges and Corners: Eased to small uniform radius.
   d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.
2. Commercial: Exposed joints as inconspicuous as possible, whether welded or mechanical; underside of stair not covered by soffit is considered exposed to view.
   a. Welded Joints: Intermittently welded on back side, filled with body putty, and sanded smooth and flush.
   b. Welds Exposed to View: Ground smooth and flush.
   c. Mechanical Joints: Butted tight, flush, and hairline.
   d. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts.
   e. Exposed Edges and Corners: Eased to small uniform radius.
   f. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for satin or matte finish.
3. Service: Exposed joints tight with face surfaces aligned; underside of stair not covered by soffit is not considered exposed to view.
   a. Welded Joints: Welded on back side wherever possible.
   b. Welds Exposed to View: Ground smooth; not required to be flush.
   c. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts or screw threads.
   d. Metal Surfaces to be Painted: Sanded smooth, suitable for satin or matte finish.
4. Industrial: All joints made neatly.
   a. Welded Joints: Welded on back side wherever possible.
   b. Welds Exposed to Touch: Ground smooth.
   c. Bolts Exposed to Touch in Travel Area: No nuts or screw threads exposed to touch.

2.02 METAL STAIRS WITH CONCRETE TREADS

A. Jointing and Finish Quality Level: Architectural, as defined above.

B. Risers: Closed.

C. Treads: Metal pan with field-installed concrete fill.
   1. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.
   2. Pan Anchorage to Stringers: Continuously welded, from top or bottom.
   3. Concrete Finish: For resilient floor covering.

D. Risers: Same material and thickness as tread pans.
   1. Riser/Nosing Profile: Vertical riser with underside of nosing sloped up from bottom of tread pan at not less than 60 degrees from horizontal, with rounded top of nosing of minimum radius.
   2. Nosing Depth: Not more than 1-1/2 inch overhang.
   3. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.

E. Stringers: Rolled steel channels.
   1. Stringer Depth: 12 inch minimum.
   2. End Closure: Sheet steel of same thickness as risers welded across ends.
F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

G. Railings: Reference Architectural Details.

H. Finish: Shop- or factory-prime painted.

I. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.03 METAL STAIRS WITH METAL TREADS

A. Jointing and Finish Quality Level: Service, as defined above.

B. Risers: Closed.

C. Treads: Checkered steel plate.
   1. Tread Thickness: 1/4 inch, minimum.
   2. Anchorage to Stringers: Welded or bolted to carrier angles welded or bolted to stringers.

D. Treads: Checkered steel plate.
   1. Tread Thickness: 1/4 inch, minimum.
   2. Anchorage to Stringers: Welded or bolted to carrier angles welded or bolted to stringers.

E. Risers: Steel sheet.
   1. Riser Thickness: As required by design; 14 gage, 0.075 inch minimum.
   2. Riser/Nosing Profile: Sloped riser with rounded nosing of minimum radius.

F. Stringers: Rolled steel channels.
   1. Stringer Depth: 12 inches.
   2. End Closure: Sheet steel of same thickness as risers welded across ends.

G. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

H. Railings: Steel pipe railings.

I. Finish: Shop- or factory-prime painted.

2.04 METAL STAIRS WITH GRATING TREADS

A. Jointing and Finish Quality Level: Industrial, as defined above.

B. Risers: Open.

C. Treads: Steel bar grating.
   1. Grating Type: Welded.
   2. Bearing Bar Depth: 3/4 inch, minimum.
   3. Top Surface: Standard.
   6. Anchorage to Stringers: End plates welded to grating, bolted to stringers.

D. Stringers: Rolled steel channels.
1. Stringer Depth: 12 inches, minimum
2. End Closure: Sheet steel of same thickness as risers welded across ends.

E. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

F. Railings: Steel pipe railings.

G. Finish: Shop- or factory-prime painted.

2.05 HANDRAILS AND GUARDS

A. Wall-Mounted Rails: Round pipe or tube rails unless otherwise indicated.
   1. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.

B. Guards:
   1. Top Rails: Round pipe or tube rails unless otherwise indicated.
      a. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.
   2. Infill at Picket Railings: Vertical pickets.
      a. Horizontal Spacing: Maximum 4 inches on center.
      b. Material: Solid steel bar.
      c. Shape: Square.
      d. Size: 1/4 inch square.
      e. Top Mounting: Welded to underside of top rail.
      f. Bottom Mounting: Welded to top surface of stringer.
   3. Infill at Pipe Railings: Pipe or tube rails sloped parallel to stair.
      a. Outside Diameter: 1 inch.
      b. Material: Steel pipe or tube, round.
      c. Vertical Spacing: Maximum 4 inches on center.
      d. Jointing: Welded and ground smooth and flush.
   4. End and Intermediate Posts: Same material and size as top rails.
      a. Horizontal Spacing: As indicated on drawings.
      b. Mounting: Welded to top surface of stringer.

2.06 MATERIALS

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A500 or ASTM A501 structural tubing, round and shapes as indicated.

C. Steel Plates: ASTM A6/A6M or ASTM A283/A283M.


E. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
   1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).
   2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).

F. Checkered Plate: ASTM A786/A786M, rolled steel floor plate.

G. Gratings: Bar gratings complying with NAAMM MBG 531 or NAAMM MBG 532, whichever applies based on bar sizes.
H. Concrete Fill: Portland cement Type I, 3,000 psi, 28-day strength, 2- to 3-inch slump.
I. Concrete Reinforcement: Mesh type as detailed, galvanized.
J. Steel Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.
K. Welding Materials: AWS D1.1; type required for materials being welded.
L. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
M. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.07 SHOP FINISHING
A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
B. Do not prime surfaces in direct contact with concrete or where field welding is required.
C. Prime Painting: Use specified shop- and touch-up primer.
   1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
   2. Number of Coats: One.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION
A. When field welding is required, clean and strip primed steel items to bare metal.
B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.03 INSTALLATION
A. Install components plumb and level, accurately fitted, free from distortion or defects.
B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1.
E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
F. Obtain approval prior to site cutting or creating adjustments not scheduled.
G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
3.04 TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset from True Alignment: 1/4 inch.

END OF SECTION
SECTION 05 58 13
COLUMN COVERS

PART 1  GENERAL

1.01  WORK INCLUDED
   A. Provide column cover assembly complete with framing studs, brackets and fasteners.

1.02  RELATED SECTIONS
   A. Gypsum Board Joint Tape and Compound: Section 09 21 16.

1.03  QUALITY ASSURANCE
   A. Manufacturer to have a minimum of ten years experience in the manufacturing of column covers.

1.04  SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. Shop Drawings: Show fabrication and installation details.
      1. Include plans, elevations, component details, and attachments to other work.
      2. Indicate materials and profiles of each member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.

1.05  DELIVERY, STORAGE AND HANDLING
   A. Protect all material during fabrication, shipment, site storage and erection to prevent damage to the finished work from other trades.
   B. Store column covers inside a well ventilated area, away from uncured concrete and masonry, and protected from weather, moisture, soiling and abrasion,

PART 2  PRODUCTS

2.01  COLUMN COVERS
   A. Cover: Minimum .090” thick rolled aluminum sheet, alloy 5052-T5 or 3003-H14 alloy. Provide with tapered or recessed joint flanges to permit flush finishing of joints using conventional gypsum board type tape and compound and techniques.
   B. Framing (Posts) and Brackets: Manufacturer's standard metal type. Locate as back-up to joints.
C. Aluminum Finish: Architectural Class 1, anodized coating; AA-M10C21A41, minimum 0.7 mil thickness (AAMA 611).

D. Manufacturer: Series 100 by PITTCON INDUSTRIES, INC.; Series FF by FRY REGLET; HJ Series by MM SYSTEMS.

2.03 FABRICATION

A. Provide column covers to specific dimensions and tolerances, and accurately formed to radii indicated.

B. Fabricate in two vertically divided sections attached with a field taping joint.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect column covers upon receipt to ensure that no damage has occurred during shipment.

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Correctly orient and install in accordance with manufacturer's shop drawings and installation instructions to ensure proper installation.

C. Erect plumb and level.

D. Finish column joints to a smooth, sanded monolithic surface. Leave columns ready to receive field applied finishes specified.

END OF SECTION
SECTION 05 73 00
DECORATIVE METAL RAILINGS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Section includes stainless steel decorative railings for exterior and interior installations.

1.02 RELATED SECTIONS

A. Metal Fabrications: Section 05 50 00.

1.03 DEFINITIONS

A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas, pedestrian guidance and support, visual separation, or wall protection.

1.04 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Handrails and Top Rails of Guards:
      a. Uniform load of 50 lbf/ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   2. Infill of Guards:
      a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft
      b. Infill and other loads need not be assumed to act concurrently.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.05 REFERENCE STANDARDS

A. The following publications of the issues listed below, but referred to hereinafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.
   a. A167 Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
   b. A312 Seamless and Welded Austenitic Stainless Steel Pipe.
2. American Welding Society (AWS)
   a. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.06 SUBMITTALS

A. Product Data: Manufacturer's literature may be submitted for standard proprietary products in lieu of shop drawings. Data to fully explain product indicating materials, sizes and finishes, and installation procedures.

B. Samples: Samples to be reviewed for color, texture and reflectivity and general appearance. Compliance with all other requirements is the responsibility of the Contractor.
   1. Finish: Submit for approval minimum 6" x 6" or 12" length of each required metal finish.
   2. Weld: Submit samples of welded joint showing quality of work. Samples to be of same form, alloy, temper and hardness to be used in the work.
   3. Sample: Submit a 2'-0" long sample of completed rail system.

C. Shop Drawings: Show details of fabrication and installation. Indicate materials, alloys and tempers, thicknesses of materials, gages, sizes, dimensions, methods of joining and fastening, welds, finishes, details of reinforcement and embedment, attachments, anchorages, miscellaneous metal items incidental to basic fabrication shown, provisions for work of other trades and other pertinent information as requested by the Architect.

D. Maintenance Instructions: Submit manufacturers'/fabricators' recommendations for maintenance of exposed finishes.

E. Certifications: Submit certifications that products comply with applicable design loadings. Include structural analysis data sealed and signed professional engineer responsible for their preparation.

F. Welder Certifications: Qualify welding process and welders in accordance AWS Codes referenced herein. Certify that each welder has successfully passed AWS qualification tests for the welding processing involved and, if pertinent, has undergone recertification.

1.07 QUALITY ASSURANCE

A. Fabricator Qualifications: Fabricator must have a minimum of 5 years experience and be regularly engaged in type of work specified. Must employ only skilled personnel using proper equipment to produce the work in high quality. Must be approved by Architect.

B. Installer Qualifications: Fabricator of products.
C. Single Source Responsibility: Railing systems shall be designed, fabricated and installed by the same source.

D. Engineering Responsibility: Engineering to be performed by a qualified professional engineer legally authorized to practice in the State of Tennessee experienced in this type of work.

1.08 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not suit structural performance requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design:
   **Exterior / Interior Applications**: Circum Railing System by HDI RAILINGS.
   Top rail and handrail to be stainless steel grade UNS 1.4305, type 316 exterior / 304 interior; surface to be 240 grain/grit finish; tubes 1-1/2” (38mm) outside diameter by 5/64” (2 mm) wall thickness. Posts to be stainless steel grade UNS 1.4305, type 316 exterior / 304 interior, surface to be 240 grain/grit finish; tubes 1.9” diameter by 0.14” wall thickness. Infill rails to be stainless steel infill rods, max. 9 ea.with guardrail height 42”. Infill rails to be 3/8” O.D. solid stainless steel. Brushed finish #6 polished radially. Clamping knobs and fixtures to be stainless steel finished to match. Horizontal infill rails on approx. 4” centers, gaps between rods and adjacent posts to be equalized depending on required rail length and site conditions (not to exceed 4”) .
   **Monumental Stair Application**: Optik Boss Railing System by HDI RAILINGS.
   Tempered, frosted ½” glass infill panels, Fascia mounted, Rails and hardware SS grade AISI type 304 or 316, Glass to be 42” in height

B. Equivalent Manufacturers: Subject to compliance with requirements, provide products by one of the following: VIVA RAILINGS or LIVERS BRONZE CO.

C. All stair and ramp rails shall have handrails as well as top rails.

2.02 MATERIALS

A. Provide materials which have been selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Exposed-to-view surfaces which exhibit pitting, seam marks, roller marks, "oil-canning", stains, discolorations or other imperfections on finished units will not be acceptable.
B. Stainless Steel
   1. Tubing: ASTM A554, Grade MT316 exterior / MT304 interior
   2. Pipe: ASTM A312/A312M, Grade TP316 exterior / TP304 interior
   4. Sheet, Strip, Plate, and Flat Bar: ASTM A666, Type 316 / 304
   5. Bars and Shapes: ASTM A276, Type 316 exterior / 304 interior

C. Welding: Electrodes and filler metal to be of type and alloy as recommended by producer of metal to be welded, and as required for color match, strength and compatibility in the fabricated items.

D. Fasteners: Provide fasteners of types as required for assembly and installation of fabricated items. In general, fasteners to be concealed from view. Exposed fasteners, where permitted or required, to conform to the following:
   1. Stainless-Steel Components: Type 304 stainless-steel fasteners.
   2. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated.

2.02 FABRICATION

A. Preliminary: Verify dimensions prior to fabrication.

B. Forming: Form metal items to accurate sizes and configurations as indicated on drawings and otherwise required for proper installation. Make with all lines straight and angles sharp, clean and true. Drill, countersink, tap and otherwise prepare items for connections with work of other trades as required.

C. Fasteners: Make permanent connections with work of other trades, as required. Avoid using exposed bolts or screws unless specifically indicated or approved.

D. Joints: Construct items with joints milled to a tight, hairline fit. Cope or miter corner joints. Where exposed to weather, form to exclude water.

E. Welding: Comply with AWS for recommended practices in shop welding.
   1. Provide welds behind finished surfaces without distortion or discoloration of exposed side.
   2. Clean exposed welded joints of all welding flux and dress on all exposed and contact surfaces to match adjacent surfaces.
   3. Where welding cannot be concealed behind finished surfaces, finish joints to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 Welds: no evidence of a welded joint.

F. Cut, reinforce, drill and tap miscellaneous metal as indicated to receive hardware, screws, and similar items. Countersunk screw holes to set screw heads flush, unless indicated otherwise.

2.03 SHOP FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces from damage by application of strippable, temporary protective covering prior to shipment.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are not acceptable if they are noticeable variations in the same piece. Variations in appearance of other components are acceptable, subject to Architect's approval.

D. Stainless Steel Surfaces
   1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
   2. Exposed Surfaces: #4 satin finish.
   3. Concealed Surfaces: No requirements.

PART 3 EXECUTION

3.01 INSTALLATION

A. Set railing work accurately as measured from established building lines and levels, plumb and in true alignment with previously completed work. Brace temporarily or anchor securely in formwork where work is to be built into concrete, masonry or similar construction.

B. Anchor securely in place in the manner shown, using concealed anchorage wherever possible.

C. Fit mechanical joints together accurately to form tight joints and uniform reveals and spaces for joint fillers and sealants. Restore any finishes that have been damaged by shipment and installation.

D. Do not cut or abrade finishes which cannot be completely restored in the field, including special finishes. Return units with special finishes that cannot be field restored to the shop for required alterations, followed by complete refinishing.

F. Remove protective coverings when there is no longer any danger of damage to the railing work from other work yet to be performed in the same location. Restore protective coverings which have been removed or damaged during shipment or installation of the work, if such other work is yet to be performed.

END OF SECTION
SECTION 06 10 00
ROUGH CARPENTRY

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide rough carpentry work as shown and specified. Work includes:

1. Wood framing, nailers, blocking, grounds and furring.
2. Roof blocking, cants and nailers.
3. Concealed blocking for support of accessories, equipment, specialty items, cabinets, fixtures, trim and facing materials.
5. Rough hardware and accessory materials.
6. Plywood roof and wall sheathing.

1.02  RELATED SECTIONS

A. Finish Carpentry: Section 06 20 00.
B. Architectural Woodwork: Section 06 40 00
C. Exterior Sheathing Board: Section 09 21 16.

1.03  REFERENCES

A. Standards

1. American Plywood Association (APA): Grades and Standards
   a. APA Plywood Design Specification, Form No. Y510T.
   b. APA Engineered Wood Construction Guide, Form No. E30R.
   a. AWPA U1 - Use Category System: User Specification for Treated Wood
3. PS - U.S. Product Standard: Softwood Lumber and Plywood Standards
   a. PS-1 - Construction and Industrial Plywood.
   a. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   b. D3498 - Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems
   c. D2898 - Standard Practice for Accelerated Weathering of Fire- Retardant-Treated Wood for Fire Testing

1.04  SUBMITTALS

A. Shop Drawings: Submit shop drawings indicating framing connection details, fastener connections and dimensions.
B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

C. Preservative Treated Wood: Submit certification by treating plant stating chemical and process used and conformance with applicable standards.

D. Fire-Retardant Treatment: Submit certification by treating plant that fire retardant treatment materials comply with governing ordinances and that treatment will not bleed through finished surfaces.

1.05 QUALITY ASSURANCE

A. Softwood Lumber: Grading rules and wood species shall conform with the voluntary Product Standards PS 20 including grading rules of the following associations, as applicable:
   2. Douglas Fir, Western Larch and Hemlock: Western Lumber Grading Rules, published by Western Wood Products Association (WWPA), Standard Grading and Dressing Rules for West Coast Lumber Inspection Bureau (WCLIB) or National Lumber Grades Authority (NLGA).
   3. Western Spruce, Pine and Fir: Western Spruce-Pine-Fir Association (WSPFA) and current Canadian Grading Rules by National Grades Association, Canada.

B. Softwood Plywood: Grading rules and wood species shall conform with Product Standard PS 1.

C. Grade Marks
   1. General: Identify all lumber and plywood by official grade mark.
   2. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping, or combination designation, rules under which graded, where applicable and condition of seasoning at time of manufacture.
      a. Type, grade, class and identification index.
      b. Inspection and testing agency mark.

1.06 STORAGE AND HANDLING

A. Store off the ground.

B. Protect from direct contact with the weather.

C. Provide proper ventilation.

D. Do not store adhesives in occupied spaces; or with materials that have a high capacity to absorb VOC emissions (i.e., materials which are woven, fibrous or porous in nature, such as acoustical ceilings, carpets, textiles, etc.).
1.07 JOB CONDITIONS

A. Time delivery and installation of carpentry work to avoid delaying trades whose work is dependent on, or affected by, the carpentry work and to comply with protection and storage requirements.

B. Installer must examine the surfaces and supporting structure and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

C. Correlate location of furring, nailers, blocking, grounds and similar supports so that attached work will comply with design requirements.

PART 2 PRODUCTS

2.01 MATERIALS

A. Dimension Lumber - General
   1. Nominal sizes are indicated, except as shown by detailed dimensions. Provide lumber complying with lumber producer's inspection agency grading rules certified as conforming to the "National Grading Rule for Dimension Lumber," by Board of Review of the American Lumber Standards Committee (ALCS), established under Section 10 of PS 20.
   2. Dress dimension lumber S4S unless otherwise shown or scheduled.
   3. Provide seasoned dimension lumber with 19% maximum moisture content at time of dressing and complying with the dry size requirements of PS 20. Mark lumber "S-DRY".
      a. 15% maximum moisture content for fire-retardant wood.
   4. Provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship".

B. Light Framing Lumber: Where framing lumber from 2" through 4" thick, and 4" or less wide is indicated, provide lumber complying with the specified requirements for dimension lumber and with the following grading, unless otherwise indicated:
   1. Provide "Construction" grade light framing and mark "CONST".
   2. Where stud framing is shown, provide "Stud" grade lumber and mark "STUD".

C. Miscellaneous Lumber
   1. Provide wood for support or attachment of other work such as cant strips, nailers, blocking, furring, grounds, bucks, stripping and similar members. Provide lumber of the sizes shown or specified, worked to shapes shown and as follows:
      a. Specie: Any commercial softwood, construction grade.
D. Plywood: Provide exterior grade plywood for exterior use and interior type with exterior glue for interior use. Formaldehyde free.
   1. Concealed Use
      a. Exterior: APA-CD-EXT.
   2. Exposed Interior Use-Painted Finish: APA MEDIUM DENSITY OVERLAY (MDO)
   3. Roof Sheathing: APA RATED SHEATHING EXT, square edge.

2.02 FIRE-RETARDANT WOOD TREATMENT

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
   1. Use treatment that does not promote corrosion of metal fasteners.
   2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
   3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. After treatment, kiln-dry lumber to maximum 19% moisture content and plywood to maximum 15% moisture content. Inspect each piece of lumber and plywood after drying and discard damaged or defective pieces.

D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

2.03 PRESERVATIVE WOOD TREATMENT

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
   2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
C. Mark each piece of treated lumber with AWPB Quality Mark designation denoting conformance to the appropriate specification.
   1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, [furring,] [stripping,] and similar concealed members in contact with masonry or concrete.
   3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
   4. Wood framing members that are less than 18 inches above the ground in crawl spaces or unexcavated areas.
   5. Wood floor plates that are installed over concrete slabs-on-grade.

2.04 ROUGH HARDWARE

A. General: Provide all necessary spikes, screws, nails, bolts and other hardware for satisfactory erection of work. Except where noted to be stainless steel, provide hot-dipped galvanized finish for hardware exposed to exterior, located in toilet rooms, in contact with treated wood or in contact with roofing or flashing.

1. Nails: ASTM F1667. Common wire nails, except where noted otherwise on drawings; sizes as noted or specified herein.
   a. Subflooring: Deformed shank nails.

2. Attachment to Concrete or Masonry: Metal expansion type shields or inserts; sizes as required to accommodate applied fastener; spacing as indicated on drawings.
   a. "DH" or "Ankr-Tight" by WEJ-IT or equal by RED HEAD or HILTI.
   b. Sleeve type for masonry.
   c. Wedge type for concrete.

3. Adhesive Type Anchor Bolts – In Hollow CMU: Chemically grouted adhesive anchor systems with nylon or stainless steel screen inserts. Use 1/2 inch diameter anchors, unless otherwise noted.
   a. HIT HY20 Adhesive Anchors, HILTI, INC.
   b. EPCON System, ITW/RAMSET/RED HEAD
   c. Chem-Stud Adhesive Anchors, RAWLPLUG COMPANY, INC.
   d. Simpson Set Epoxy-Tie Adhesive Anchors, SIMPSON STRONG-TIE COMPANY, INC.

4. Adhesive Type Anchor Bolts - In solid grouted CMU and Concrete: Chemically grouted adhesive anchor systems. Use ¾ inch diameter anchors, unless otherwise noted.
   a. HIT HY150 Adhesive Anchors, HILTI, INC.
   b. EPCON System, ITW/RAMSET/REDHEAD
   c. Chem-Stud Adhesive Anchors, POWERS FASTENERS, INC.
   d. Simpson Set Epoxy-Tie Adhesive Anchors, SIMPSON STRONG-TIE COMPANY, INC.

5. Attachment to Steel Studs: Self tapping screws of sufficient length and strength to perform the functions for which they are used.
6. Roof Construction
   a. Wood-to-Wood Attachment: 300 Series stainless steel, flat head.
      1) Plywood to Nailers: Minimum #8 x 1-3/4”.
   b. Wood-to-Metal Deck Attachment: Hot dip galvanized in accordance
      with ASTM A153; machine bolts, locknuts and washers; minimum
      3/8” diameter.
   c. Wood-to-Concrete Attachment: 300 Series stainless steel
      expansion anchors as specified above. Minimum 3/8” diameter,
      length as required for minimum 2” concrete embedment.

B. Provide plates, anchors, hangers and other miscellaneous steel and iron shapes
   as required for framing and supporting woodwork and for anchoring or securing
   woodwork to concrete or wood structures.

1. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with
   ASTM A 653/A 653M, G60 coating designation.
   a. Use for interior locations unless otherwise indicated.
2. Hot-Dip Heavy-Galvanized Steel Sheet: ASTM A653; Structural Steel
   (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-
   strength low-alloy steel Type B (HSLAS Type B); G185 coating
   designation; and not less than 0.036 inch thick.
   a. Use for wood-preservative-treated lumber and where indicated.
3. Manufacturers: Provide products by one of the following:
   a. SIMPSON STRONG-TIE COMPANY
   b. CLEVELAND STEEL SPECIALTY COMPANY
   c. USP STRUCTURAL CONNECTORS
   d. PHOENIX METAL PRODUCTS

2.05 MISCELLANEOUS ITEMS

A. Adhesives: Water- and mold-resistant formulation complying with ASTM D3498
   that is approved for use indicated by adhesive manufacturer.

   [1. Adhesives shall have a VOC content of 70 g/L or less when calculated
      according to 40 CFR 59, Subpart D (EPA Method 24).]

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a
   pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density
   polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall
   thickness of not less than 0.025 inch.

C. Sill Sealer: 3/8” thick by width required, self adhered close cell polyethylene foam
   sill sealer.

PART 3 EXECUTION

3.01 INSTALLATION

A. General
1. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate the work with a minimum of joints or the optimum jointing arrangement.
2. Fit carpentry work to other work. Scribe and cope as required for accurate fit.
3. Set wood framing accurately to required lines and levels.
4. Provide framing members of sizes and at spacing shown, and frame openings as shown, or if not shown, comply with the recommendations of the "National Design Specifications for Wood Construction and Supplements" as published by the American Wood Council.
5. Cut, join and tightly fit framing around other work.
6. Do not splice structural members between supports unless otherwise detailed.
7. Anchor and nail as indicated, or if not indicated to comply with the "Fastening Schedule" of the IBC, 2304.9.
8. Fasteners
   a. Use common wire nails, except as otherwise shown or specified herein.
   b. Use finishing nails for exposed work.
   c. Do not wax or lubricate fasteners that depend on friction for holding power.
   d. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials.
   e. Make tight connections between members.
   f. Install fasteners without splitting of wood; predrill as required. Do not drive threaded friction type fasteners; turn into place.
   g. Tighten bolts and lag screws at installation and retighten as required for tight connections prior to closing in or at completion of work.
   h. Countersink nail heads on exposed carpentry work and fill holes.
   i. Provide washers under bolt heads and nuts in contact with wood.
9. Nail plywood to comply with the recommendations of the American Plywood Association and OBC 2304.9.
10. Provide sill plates where wood framing is supported by concrete or masonry walls or piers. Anchor to embedded bolts as shown.
11. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

B. Stud Framing: Provide stud framing where shown. Erect on lines shown, to true planes, plumb, level and rigidly secured. Use 2" by 4" studs spaced at 16" on center, except as otherwise indicated. Cut wood framing square at bearing.
1. Provide single bottom plate and double top plates, 2" thick and of same width as studs. Overlap top plates at corners and intersections. Single top plate may be used for non-bearing partitions.
2. Construct corners and intersections of partitions and walls with not less than three studs 2" thick, to provide bearing surface for wall finishes.
3. Provide blocking and framing, same width as studs, required for support of facing materials, fixtures, specialty items, trim, cabinets, drapery hardware and accessories. Blocking and framing for subsequently applied work shall be reviewed and be acceptable to the Architect before installation of finish materials.
4. Framing openings with double studs (triple studs for openings wider than 6'-0") and headers of double members of thickness equal to width of studs. Set headers on edge and support on jamb studs. Provide headers of depth shown.

5. Notch framing for wiring and piping as required. No cut or hole may exceed 40% of the stud cross sectional area. Install steel plates at stud face notches to prevent drywall fastener damage.

6. Provide plywood sheathing or OSB at building corners; extend 4' on each side of corner.

C. Provide all special framing as indicated or required for eaves, overhangs and similar conditions to maintain the profiles indicated on the building plans, sections and elevations. If specific large scale details are not indicated on the drawings, the profiles indicated on smaller scale elevations and plans will govern.

D. Provide fire stops and fire separations in roof areas as required by applicable code requirements.

E. Wood Grounds, Nailers and Blocking
   1. Provide wherever shown and where required for scrading or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached or scraded.
   2. Coordinate location with other work; refer to shop drawings of such work, if any.
   3. Attach to surfaces securely with anchor bolts or other attachment devices as shown, and as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry as work progresses, cutting to fit masonry unit size involved. Anchor to formwork before concrete placement.
   4. Provide grounds of dressed, key-bevelled lumber not less than 1-1/2" wide and of the thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required. Where indicated as permanent grounds, provide treated lumber.
   5. Anchor plates, blocking, nailers, etc. to masonry and concrete masonry units (units with cores grouted solid) with minimum 1/2" diameter fasteners spaced at 4' o.c., unless otherwise indicated. Situations requiring special bolting shall be with size and spacing of bolts as required.

3.02 SHEATHING

A. Wall Sheathing, Roof Sheathing and Subflooring: Provide where indicated. Comply with applicable recommendations contained in Form No. E30R "APA Engineered Wood Construction Guide", for types of plywood products and applications indicated.
   1. General
      a. Install panels across supports, using panels continuous over two or more spans, with end joints staggered and located over center of supports. Provide 1/8" space at edges for expansion/contraction.
      b. Nail at 6" on center along panel ends and 12" on center at intermediate supports.
3.03 MISCELLANEOUS INSTALLATIONS

A. Backing Panels: Provide plywood backing panels for electrical and telephone equipment where indicated.
   1. Provide fire-retardant material at interior locations.
   2. Provide preservative treated material at exterior locations.

3.04 WOOD TREATMENT

A. Preservative Treated Wood Products: Provide pressure treatment for all lumber and plywood as specified hereinbefore.
   1. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
      a. Use inorganic boron for items that are continuously protected from liquid water.
      b. Use copper naphthenate for items not continuously protected from liquid water.

B. Fire Retardant Treated Wood Products: Provide fire retardant treatment on all lumber and plywood as specified hereinbefore.

3.05 CLEANING

A. Clean up debris and cuttings daily. Remove and dispose of excess materials and debris created by carpentry.

B. Maintain the building and site free of accumulations of cutting and waste materials in a neat orderly condition acceptable to the Architect.

3.06 WASTE MANAGEMENT

A. Do not burn scraps of treated wood. Do not mix treated wood scraps with untreated wood. Hazardous wastes shall be separated, stored, and disposed of according to local regulations.

END OF SECTION
SECTION 06 20 00
FINISH CARPENTRY

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide finish carpentry as indicated and specified. Work includes:
   1. Softwood trim.
   2. Shelving and accessories.
      a. Utility shelving (janitor closets), painted finish.
      b. Adjustable shelving, painted finish.
   3. Prefinished wood paneling.
   4. Wall/door mounted coat hooks.
   5. Installation of shop fabricated millwork.
   6. Installation of door hardware, door frames and doors.
   7. Miscellaneous fasteners and hardware.

1.02  RELATED SECTIONS

A. Rough Carpentry: Section 06 10 00.
B. Architectural Woodwork: Section 06 40 00.
C. Hollow Metal Doors and Frames: Section 08 11 13.
D. Wood Doors: Section 08 14 00.
E. Door Hardware: Section 08 71 10.
F. Painting and Finishing: Section 09 91 00.

1.03  REFERENCES

A. Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard:
   2. AWI: Architectural Woodwork Institute.

1.04  SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

B. Submit samples of all finish materials, include the following:
   1. Lumber with transparent finish for each species and cut. (three pieces, 12")
   2. Lumber with opaque finish. (12")
3. Prefinished wood paneling (12" x 12").
4. Hardwood plywood with transparent finish for each species (3 pieces, 12"x12")

C Manufacturer's product data describing type and quality of items specified herein.

D Certification that fire-retardant treatment materials comply with governing ordinances and meet or exceed ASTM E84 tests. Include certification by treating plant that treatment will not bleed through finish surfaces. Materials shall bear UL label showing Flame Spread 25 or less and smoke developed 40 or less. Mill certification is not acceptable.

1.05 QUALITY ASSURANCE

A. Installation: Performed only by experienced skilled finish carpenters.

B. Provide lumber factory marked with type, grade, mill and grading agency identification on concealed surfaces. Omit marking and submit mill certificates for materials receiving transparent finishes (cannot be marked on concealed surface)

C. Fire-retardant treated wood shall conform to applicable requirements of AWPA and NFPA.

D. Quality Grade: Materials and fabrication shall be "custom grade" in accordance with "Quality Standard Illustrated," of the AWI conforming to the following sections:
   1. Section 100: Solid wood members.
   2. Section 500: Paneling.
   3. Section 600: Closet and storage shelving.
   4. Section 1700: Installation of architectural woodwork.

E. Bench Mark: Before beginning both prefinished and custom paneling work, construct full scale corner condition extending 2'-0" each direction for custom type and full column width each direction for prefinished type; demonstrating joint construction, materials and general workmanship, including trim work.
   1. Approved bench mark will establish minimum standards of quality and workmanship for Architectural Woodwork.
   2. Construction Manager will coordinate location of bench mark for each type of paneling. When Construction Manager approves bench mark, construction on the paneling can continue and bench mark can be incorporated into the final work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Do not deliver materials until concrete, masonry and other similar wet work has been completed and is thoroughly dry, outside door openings are permanently watertight, exterior windows are glazed and, in case of temperature dropping below 60 degrees F., until temporary heating and ventilating systems are in operation.
   1. Do not store adhesives with materials that have a high capacity to absorb VOC emissions (i.e., materials which are woven, fibrous or porous in nature, such as acoustical ceilings, carpets, textiles, etc.).
   2. Do not store adhesives in occupied spaces.
B. Protect finish carpentry during delivery, storage and handling to prevent damage, soiling and deterioration.

C. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

1.07 PROJECT CONDITIONS

A. Provide and maintain a constant temperature and humidity before, during and after installation as required to maintain optimum moisture content of installed materials.

B. Obtain measurements and verify dimensions and details before proceeding with finish carpentry.

C. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
   1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 PRODUCTS

2.01 MATERIALS

A. Lumber
   1. Provide lumber surfaced four sides (S4S) and worked to profiles and patterns shown. Nominal sizes are as shown, except where detailed dimensions are indicated.
   2. Moisture Content: Provide materials kiln-dried to moisture content complying with AWI Standards, Section 100-G-3.
      a. Western Red Cedar, Ponderosa Pine, White Pine: Western Lumber Grading Rules, published by Western Wood Products Association (WWPA), or Standard Grading Rules for West Coast Lumber, No. 16, published by West Coast Lumber Inspection Bureau (WCLIB).

B. Wood Trim - Stained Finish: In accordance with AWI 300, "Custom" Grade, and AWI 100, Grade I, except no checks will be allowable on visible surfaces. Plain sliced maple. Well seasoned and kiln dried. Moisture content at time of fabrication shall not exceed 12%.

C. Softwood Plywood: Thickness as indicated. Formaldehyde free.
   2. Exposed Interior Use - Painted Finish: APA MEDIUM DENSITY OVERLAY (MDO).
D. Prefinished Wood Paneling System: Provide system consisting of system design, panels, extruded aluminum mounting system and trim, and accessories for a complete installation. No exposed joint trim is permitted at panel-to-panel horizontal and vertical joints. Formaldehyde free.

1. Finish
   a. Class A Smoke Spread and Smoke Developed in accordance with ASTM E84.
   c. Meets ANSI and AHA Standards for pre-finishing paneling
   d. AWI Finish System TR-4 Custom grade finish.

2. Panel Colors and Wood Species: As indicated on the drawings.

3. Exposed Trim Finish: [Aluminum; finish as indicated on the drawings] [Clear anodized aluminum].

4. Manufacturer
   a. Basis of Design: Drawings and specifications are based on the Fashion Architectural Designs from the STACKED WOOD SATINE COLLECTION.
   b. Other Acceptable Manufacturers: Textured wood wall panels manufactured by manufacturers other than the basis of design will be considered if materials meet the requirements of the Basis of Design and the color and style are acceptable matches as approved by the Architect prior to bid opening. These additionally approved manufacturers and panels will be included by Addendum. An unacceptable color match or style is reason for disapproval of product and manufacturer.

5. Accessories
   a. Molding and Trim: Extruded aluminum; pre-finished at the factory; types and shapes as recommended by manufacturer for installation system specified and substrate conditions.
   b. Adhesive: ASTM Specification C557
   c. Silicone Sealant: See Section 07 92 00.

E. Nails
1. Provide steel nails with diamond point for soft woods and blunt point for hardwoods.
2. Interior Work - Finishing Nails: 6d for 3/4" material; 9d or 10d for 5/4" material; and 12d for 1-1/2" material.

F. Cork Board: 1/2" thick; flame retardant type.

2.02 ACCESSORIES

A. Wood Filler: Oil or solvent base, tint to match surface color.

B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
   1. Wood glue shall have a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Paneling Adhesive: Comply with paneling manufacturer's written recommendations for adhesives.
1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.
   1. Adhesive shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Utility Shelf Supports: KNAPE & VOGT (KV); NEWTECH HARDWARE; SUGATSUNE AMERICA; SPUR, steel cadmium plated heavy duty double slotted supports.
   1. Standards: Equivalent to KV #85; unless otherwise indicated 48 inches high, maximum 30 inch spacing.
   2. Brackets: Equivalent to KV #185; unless otherwise indicated, 3 per standard, for 10 inch shelf.

2.03 FABRICATION

A. General: Except as specified hereinafter, fabricate all work in accordance with AWI quality standards as specified. Work not specified with a level of quality shall be not less than "Custom" quality per AWI.

B. Utility Shelving – Painted Finish: Fabricate from 3/4" MDO plywood; provide plastic T-edging on all edges.

C. Adjustable Shelving – Painted Finish: Fabricate from 3/4" MDO plywood; provide softwood trim edging on all edges.

D. Wood Paneling: Mill and assemble pieces to conform to the profiles and shapes indicated on the drawings. Field stain in accordance with section 09 91 00.

PART 3 EXECUTION

3.01 PREPARATION

A. Condition finish carpentry materials and products to average prevailing humidity conditions in installation areas before installing.

B. Install blocking and anchoring devices built into substrates for anchorage of finish carpentry items.

C. Verify mechanical, electrical, and building items affecting this Section are placed and ready to receive this work.

D. Verify field dimensions.

E. Backprime lumber for painted finish exposed on the exterior or to moisture and high relative humidity on the interior. Comply with requirements of Section 09 91 00.

F. Ventilation for Adhesives: Comply, at a minimum, with the adhesive manufacturers'
recommendations for space ventilation during and after installation. Maintain the following ventilation conditions during the adhesive curing period or for 72 hours after installation (whichever is longer): 1) supply 100% outside air 24 hours a day; 2) supply airflow at a rate of 6 air changes per hour, when outside air temperatures are between 55° F and 85° F and humidity is between 30% and 60%; and 3) supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated in the previous item 2.

3.02 INSTALLATION

A. Discard material which is unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements.

B. Install finish carpentry materials and products plumb, level, true and straight with no distortion. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level, and with 1/16" maximum offset in flush adjoining surfaces, 1/8” maximum offsets in revealed adjoining surfaces.

C. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Standing and Running Trim: Install with minimum number of joints possible; using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners and comply with Quality Standards for joinery.

E. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk concealed fasteners and blind nailing as required for a complete installation. Use fine finishing nail for exposed nailings, countersunk and filled flush with woodwork.

3.04 CLEANING AND PROTECTION

A. Repair damaged and defective finish carpentry materials to eliminate functional and visual defects. Where not possible to repair properly, replace finish carpentry as directed by the Architect.

B. Protect installed work during remaining construction operations.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch-up shop applied finishes to restore damaged or soiled areas.

END OF SECTION
SECTION 06 40 00
ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide architectural woodwork as indicated and specified. Work includes:
   1. Casework. Include the following:
      a. Custom type as detailed on the drawings.
      b. Modular type plastic laminate clad casework and components.
         Work includes fabrication and installation of standard base and wall
         cabinet components, shelving, fillers and panels.
   2. Plastic laminate countertops.
   3. Solid surfacing countertops.
   4. Solid surfacing window stools.
   5. Quartz composition countertops.
      a. Adjustable shelving, plastic laminate finish.
   7. Miscellaneous fasteners and hardware.

1.02 RELATED SECTIONS

A. Rough Carpentry: Section 06 10 00.
B. Finish Carpentry: Section 06 20 00.
C. Painting and Finishing: Section 09 91 00.

1.03 REFERENCES

A. Standards: Wherever the following abbreviations are used herein, they shall refer
   to the corresponding standard:
   2. AWI: Architectural Woodwork Institute.
   3. NEMA: National Electrical Manufacturer's Association.

1.04 SUBMITTALS

A. Product Data: Submit for all items.
B. Shop Drawings: Show location of each item, dimensioned plans and elevations,
   large-scale details, attachment devices, and other components.
   1. Provide large scale details.
   2. Indicate methods of fabrication, edging, location and construction of joints.
   3. Show locations and sizes of furring, blocking, and hanging strips,
      including concealed blocking and reinforcement specified in other
      Sections.
C. AWI Quality Standards: A photo-copy of the applicable portions of the AWI publication "Architectural Woodwork Quality Standards", latest edition, shall be submitted with each set of shop drawings.
   1. Each copy must be marked to clearly show all details, specifications and finishes proposed for this work.

D. Submit samples of all finish materials, including the following:
   1. Plastic laminate for texture and color selections. (8” x 10”).
   2. Cabinet hardware (1 of each type).
   3. Lumber with transparent finish for each species and cut. (12”)
   4. Wood veneer faced panel products with transparent finish (12” x 24”).
   5. Solid surface material.

E. Manufacturer's product data describing type and quality of the following:
   1. Plastic laminate (face grade and liner grade).
   2. Cabinet hardware (each type).

F. Submit certification that fire-retardant treatment materials comply with governing ordinances and meet or exceed ASTM E84 tests. Include certification by treating plant that treatment will not bleed through finish surfaces. Materials shall bear UL label showing Flame Spread 25 or less and smoke developed 40 or less. Mill certification is not acceptable.

1.05 DEFINITIONS

A. Exposed Portions of Casework: Include surfaces visible when doors and drawers are closed. Bottoms of casework more than 4 feet above floor and tops less than 6 feet 6 inches above floor shall be considered as exposed. Visible members in open cases or behind glass doors also shall be considered as exposed portions.

B. Semi-Exposed Portions of Casework: Includes those members behind opaque doors, such as shelves, divisions, interior faces of ends, case back, drawer sides, backs and bottoms, and back face of doors. Tops of casework 6 feet 6 inches or more above floor shall be considered semi-exposed.

C. Concealed Portions of Casework: Include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

1.06 QUALITY ASSURANCE

A. Fabricator qualifications: A firm specializing in the fabrication of millwork with a minimum of 5 years experience and a satisfactory record of performance on projects of comparable size and quality. Shop is a certified participant in AWI's Quality Certification Program.

B. Installation: Performed only by skilled finish carpenters with a minimum of 3 years experience in installing custom millwork similar to that required for this project.

C. All solid surface material type work shall be performed by a Manufacturer Certified fabricator.
D. Provide lumber factory marked with type, grade, mill and grading agency identification on concealed surfaces. Omit marking and submit mill certificates for materials to receive transparent finishes that cannot be marked on a concealed surface.

E. Quality Grade: Materials and fabrication shall be "custom grade" unless otherwise indicated on the drawings or specified herein as "premium grade", both in accordance with "Quality Standard Illustrated," of the AWI conforming to the following sections:
1. Section 100: Solid wood members.
2. Section 200: Plywood and particleboard.
3. Section 400: Casework and tops.
4. Section 1500: Factory finishing.
5. Section 1700: Installation of architectural woodwork.

1.07  DELIVERY, STORAGE AND HANDLING

A. Protect woodwork materials and items during delivery, storage and handling to prevent damage, soiling and deterioration.

B. Do not deliver woodwork materials and items until concrete, masonry, painting, grinding and other similar wet work has been completed and is thoroughly dry, outside door openings are permanently watertight, exterior windows are glazed and, in case of temperature dropping below 60° F., until temporary heating and ventilating systems are in operation.

C. Store materials in dry, well-ventilated spaces with constant minimum temperature of 60° F., and maximum relative humidity of 55%.
1. Do not store adhesives with materials that have a high capacity to absorb VOC emissions (i.e., materials which are woven, fibrous or porous in nature, such as acoustical ceilings, carpets, textiles, etc.).
2. Do not store adhesives in occupied spaces.

1.08  PROJECT CONDITIONS

A. Provide and maintain a constant temperature and humidity before, during and after installation as required to maintain optimum moisture content of installed materials.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
1.09 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

PART 2 PRODUCTS

2.01 MATERIALS

A. Lumber
   1. Provide lumber surfaced four sides (S4S) and worked to profiles and patterns shown. Nominal sizes are as shown, except where detailed dimensions are indicated.
   2. Moisture Content: Provide materials kiln-dried to maximum moisture content of 6% complying with AWI Standards, Section 100-G-3.
      a. Western Red Cedar, Ponderosa Pine, White Pine: Western Lumber Grading Rules, published by Western Wood Products Association (WWPA), or Standard Grading Rules for West Coast Lumber, No. 16, published by West Coast Lumber Inspection Bureau (WCLIB).
   4. Species: Fabricator's option.

B. Hardwood Lumber: In accordance with AWI 300, "Custom" Grade, and AWI 100, Grade I, except no checks will be allowable on visible surfaces. Well seasoned and kiln dried. Moisture content at time of fabrication shall not exceed 6%.

C. Softwood Plywood: Thickness as indicated. Formaldehyde free.
   2. Comply with PS-1, "Construction and Industrial Plywood".

D. Hardwood Plywood: "Custom" Grade, in accordance with AWI 200, Grade I (one-side or two side as required). MDF fiberboard core typical except veneer core permitted for thickness less than 1/2"; thickness as indicated; Formaldehyde free.
   1. Conform to PS-51.
   2. Species and cut to match hardwood finish lumber.
   2. Species and Cut: As indicated on casework details.

E. Particle Board (Substrate for Laminate Surfaces): High density industrial grade with a minimum density of 45 pounds per cubic foot and a moisture content between 9% maximum and 6% minimum, meeting or exceeding ANSI A208.1 or ASTM D1037; formaldehyde-free. ASTM E84, Class A.
   1. FLAKEBOARD Vesta FR Particleboard
   2. SIERRAPINE Encore FR
   3. PANEL SOURCE INTERNATIONAL Pyroblock Platinum Particleboard.

F. Medium Density Fiberboard (MDF): Thickness as specified unless otherwise
indicated on Drawings. Maximum moisture content of 8%. Formaldehyde free. Meet the following minimum standards:

1. Internal Bond: 90 psi.
2. Modulus of Rupture: 2,500 psi.
4. Density: Minimum 40 pounds per cubic foot.
5. Fire Rating: ASTM E84 Class A
   a. Smoke Developed: 95
   b. Flame Spread: 15
6. Manufacturers
   a. FLAKEBOARD Vesta FR MDF
   b. ROSEBURG FOREST PRODUCTS Medite FR
   c. PANEL SOURCE INTERNATIONAL Pyroblock Platinum MDF

G. Plastic Laminate: Conform to the requirements of the National Electrical Manufacturer's Association (NEMA) Publication Number LD-3. Plastic laminate shall be FORMICA, PIONITE, NEVAMAR or WILSONART. Colors, patterns and finishes shall be as selected by Architect from the manufacturer's full range of standard colors, patterns and finishes.

1. General Purpose Grade: 0.05 inches thick.
2. Backing Sheet Grade: 0.02 inches thick.
3. Post-Forming Grade: 0.042 inches thick.
4. Cabinet Liner: 0.02 inches thick.
5. Provide solid color type where indicated on drawings.
6. Fill and seal plastic laminate joints with Seamfil by KAMPEL ENTERPRISES, INC. or equal. Colors to match plastic laminate.

H. Hardware Items: All exposed hardware to be brushed nickel finish.

1. Drawer Slides: Self-closing, side mounting type with nylon tire, steel ball-bearing rollers. Manufactured by BLUM, GRASS, AMEROCK, KNAPE & VOGT; ACCURIDE. Load capacity as follows:
   a. 75 pounds: Drawers up to 3-1/2 inches deep: Similar to ACCURIDE Series 2132.
   b. 100 pounds: Drawers up to 8 inches deep: Similar to ACCURIDE Series 2832.
   c. 150 pounds: Drawers over 8 inches deep, all file drawers: Similar to ACCURIDE Series 4034.
2. Drawer and Door locks: 5-pin tumbler, dead bolt. KENSTAN; BEST; NATIONAL LOCK; CORBIN. Provide 2 keys per cylinder.
3. Concealed Hinges: European style, self-closing, type as required for construction. HAFELE; GRASS; PRAMETE; BLUM.
5. Continuous Hinge: Piano type.
7. Adjustable Cabinet Shelf Supports – Spoon Type: 5mm; nickel plated.
8. Adjustable Cabinet Shelf Supports-Clip Type: KNAPE & VOGT steel nickel plated
   a. Standards: KV #255 NP for dado installation.
   b. Clips: KV #256 NP.
9. Surface Mount Shelf Supports: KNAPE & VOGT (KV); NEWTECH
HARDWARE; SUGATSUNE AMERICA, steel cadmium plated heavy duty double slotted supports.

a. Standards: Equivalent to KV #85; unless otherwise indicated 48 inches high, maximum 30 inch spacing.
b. Brackets: Equivalent to KV #185; unless otherwise indicated, 3 per standard, for 10 inch shelf.

10. Catches: Magnetic, STANLEY #45 or equal by NATIONAL LOCK or EPCO.

11. Grommets: High impact ABS cable hole cover, with spring closure or slide closure in top. Color as selected by Architect. Refer to Drawings for locations and sizes. Manufactured by DOUG MOCKETT, BAINBRIDGE MANUFACTURING or US FUTABA.

12. Additional Items: As indicated on the casework details.

I. Nails
1. Provide steel nails with diamond point for soft woods and blunt point for hardwoods.
2. Interior Work - Finishing Nails: 6d for 3/4" material; 9d or 10d for 5/4" material; and 12d for 1-1/2" material.

J. Adhesive: Low-VOCS, FS MMM-A-125C, Type II, water- and mold-resistant; complying with required VOC regulations.
1. VOC Content: The volatile organic compound (VOC) content of adhesives shall not exceed the limits as follows:
   a. Water-based contact cement: 250 g/L
   b. Water-based construction adhesive: 100 g/L
   c. Plastic laminate adhesive: 50 g/L.

K. Solid Surface Material: 1/2" or 3/4" inch thick sheets.
1. Provide thicknesses as indicated on the drawings.
2. Surface burning characteristics in accordance with ASTM E 84: Class I or A, and as follows: Flame spread: <25; Smoke developed: <25.
3. Joints: Provide watertight, fused joints as recommended by manufacturer.
4. Edge Treatment: As detailed on drawings. Ease all exposed edges not otherwise detailed.
5. Make field cut-outs as required to install plumbing items and toilet accessories. See Division 22 and Section 10 28 13.
6. Manufacturer and Color Basis of Design: Corian by DU PONT as indicated on the drawings. Solid surface materials by LG Hi-Macs, FORMICA, Gibraltar by WILSONART or ARISTECH SURFACES as approved by Architect during bidding.

L. Quartz Composition Material: Non porous, scratch and high temperature resistant crushed quartz composition.
1. Thicknesses: As indicated.
2. Flexural properties: ASTM D 790, ASTM C 880
3. Compression strength: ASTM C 170
4. Certified food contact: NSF/ANSI 51 Certified.
5. Surface burning characteristics - ASTM E 84: Class I or A, and as follows: Flame spread: <25; Smoke developed: <25.
6. Joints: Provide watertight color matched, fused joints as recommended by manufacturer.
7. Edge Treatment: As detailed on drawings. Ease all exposed edges not otherwise detailed.
8. Colors: As indicated. As selected by Architect.
9. Manufacturers/Products: As indicated. Zodiac by DU PONT, Viatera by LG, Silestone by COSENTINO, CEASARSTONE, CAMBRIA.

M. Thermoset Decorative Overlay: Particle board or MDF with surface of thermally fused, melamine impregnated decorative paper complying with Laminating Materials Association (LMA) SAT-1. Formaldehyde free.

N. Tackable Wallboard
1. Description: ½” thick 7 pcf fiberboard with fabric facing.
2. Fabric: Fabric is based on various manufacturers as indicated on the drawings. Fabric manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the color and style are acceptable matches as approved by the Architect prior to bid opening. Submit fabric to Architect minimum 14 days prior to bid opening. These additionally approved manufacturers and fabrics will be included by Addendum. An unacceptable color match or style is reason for disapproval of product and MFR. No substitutions will be considered after bid opening.
3. Locations: Where indicated on casework drawings.

2.02 FABRICATION

A. General: Except as specified hereinafter, fabricate all work in accordance with AWI quality standards as specified. Work not specified with a level of quality shall be not less than "Custom" quality per AWI.

B. Custom Casework
1. Quality Standard: Custom Grade per AWI Section 400.
2. "Flush Overlay" design as shown in AWI Architectural Casework Details.
3. Core Materials
   a. Particle Board: Typical for plastic laminated finish materials.
   b. Plywood Core: Typical for wood veneered surfaces.
   c. Solid Hardwood: Typical for all drawer construction, except drawer faces.
   d. Hardboard or Luan Plywood: Drawer bottoms.
4. Plastic Laminate Facing
   a. All exposed surfaces: Plastic laminate, general purpose grade. Include on exposed face and edges of all cabinets except where detailed otherwise on the drawings. Apply to all edges of doors and drawer fronts. Doors shall have laminate on both faces. Cabinet elements (tops, counters, face panels, end panels, rails, etc.) that are finished with laminate on the exposed surfaces shall have laminate balancing sheets on the concealed or semi-concealed faces.
   b. A vinyl catalyzed factory finish (AWI Finish System No. 4) shall be applied to all semi-concealed surfaces that do not have a pressure laminate finish or a balancing sheet finish. This includes drawer interior and drawer sides, ends, edges and adjustable semi-
concealed shelving.

c. At Contractor’s option, the use of .025” thick cabinet Liner Grade laminate and .030” thick Backing sheet grade laminate may be used in lieu of AWI Finish System No. 4.

5. All casework material in 3/4” thick, excluding facing material thickness, unless otherwise detailed, required for stability, or doors in excess of 48” in any dimension. Drawer sides to be 1/2” thick; front and back 3/4”; bottom 1/4”.

6. Adjustable Shelves: Install supports at each end of all shelves and intermediate supports at all shelves over 30”.

7. Design

a. Configuration of casework is indicated on drawings.

b. Detailing and design required to provide rigid, solid and structurally adequate casework is the responsibility of the fabricator; all within parameters of AWI specifications and as approved by the Architect.

c. The following conditions require special attention:
   1) Casework exceeding 42” in width between supports.
   2) Sink and/or equipment cutouts and supports.
   3) Countertops exceeding 24” unsupported.
   4) Wall and Ceiling Mounted Casework: Provide integral framing in casework of size, strength, and in locations which allow unit to be screw attached to proper substrate and remain rigidly in place.

C. Plastic Laminate Countertops

1. Quality Standard: Custom Grade per AWI Section 400.

2. Top Core: Construct tops of 3/4” thick particle board core typical; provide exterior grade plywood (Plyform) at counters with sinks (and associated splashes) and other locations where indicated on drawings.

   a. Where double layers indicated, glue together to form monolithic 1-1/2” thick panel.

3. Splashes: Provide with minimum 1/4” scribe typical.

   a. Provide straight splashes where shown; permanently attached to top.

   b. Seal: Prior to permanent attachment of straight splashes to top, seal all joints by setting in continuous bead of clear silicone sealant.

4. Exposed Edges: Build exposed edges to 1-1/2” thick at overhang by attaching continuous strip of core material to bottom side of top.

5. Joints in core, if required, to be fitted with mechanical panel fasteners; spacing not to exceed 12” apart nor more than 3” from outside corners.

6. Finishes: Finish tops, splashes and edges with plastic laminate as follows:

   a. General purpose grade [Solid color type] [Post forming grade]

   b. Balance underside of tops with backing sheets, 0.020”.

   c. Finish bottom of all overhangs with laminate.

7. Custom Edges: Finish as indicated on drawings.

8. Edges: Except where cabinet design requires matching laminate edge, provide 3mm PVC on Front & Back Edges, 1mm PVC on Side Edges.

D. Solid Surface and Quartz Surface Material Countertops: Fabricate to profiles, sizes and edge conditions indicated on drawings and as directed by manufacturers requirements. Back and side splashes, where indicated, to be fused to top to ensure watertight joint. Where countertops do not have a continuous substrate,
locate and provide closure strips to prevent openings from countertop underside to top of support casework.

E. Adjustable Shelving – Plastic Laminate Finish: Fabricate to details indicated; conform to requirements for countertops specified herein.

2.03 SHOP FINISHING

A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

B. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling.

C. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523:
   1. Grade: Premium.
   2. AWI Finish System: TR-4, conversion varnish.
   3. Stain Colors: As indicated on drawings; Final stain colors as selected by Architect to match approved samples.
   4. Wash Coat for Stained Finish: Apply a vinyl wash coat to woodwork made from closed-grain wood before staining and finishing.
   5. Sheen: Semigloss, 55-75 gloss units.

PART 3 EXECUTION

3.01 PREPARATION

A. Condition architectural woodwork materials, items and products to average prevailing humidity conditions in installation areas before installing.

B. Install blocking and anchoring devices built into substrates for anchorage of architectural woodwork.

C. Deliver inserts and anchoring devices to be built into substrates well in advance of time substrates are to be built.

D. Before installing woodwork, examine shop-fabricated work for completion and back priming.

E. Ventilation for Adhesives: Comply, at a minimum, with the adhesive manufacturers’ recommendations for space ventilation during and after installation. Maintain the following ventilation conditions during the adhesive curing period or for 72 hours after installation (whichever is longer): 1) supply 100% outside air 24 hours a day; 2) supply airflow at a rate of 6 air changes per hour, when outside air temperatures are between 55°F and 85°F and humidity is between 30% and 60%; and 3) supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated in the previous item 2.
3.02 INSTALLATION

A. Quality: Comply with AWI Section 1700.

B. Install woodwork materials and products plumb, level, true and straight with no distortion. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops, window stools and shelves), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offsets in revealed adjoining surfaces.

C. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Install countertops level, true to alignment, accurately fit to wall conditions and securely fastened to base units and other support systems as indicated.
   1. Solid Surface Type Countertops: Form joints using tinted adhesive as recommended by top manufacturer.

E. Casework: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.

F. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk concealed fasteners and blind nailing as required for a complete installation. Use fine finishing nail for exposed nailings, countersunk and filled flush with woodwork.

G. Plastic Laminate Wall Covering: Install with adhesive as recommended by plastic laminate manufacturer.

3.03 CLEANING AND PROTECTION

A. Repair damaged and defective millwork to eliminate functional and visual defects. Where not possible to repair properly, replace millwork as directed by the Architect.  
   1. Chipped, scratched or patched plastic laminate will not be accepted and must be replaced.

B. Clean hardware, lubricate and make final adjustments for proper operation.

C. Protect installed work during remaining construction operations.

D. Clean woodwork on exposed and semi-exposed surfaces. Touch-up shop applied finishes to restore damaged or soiled areas.

E. Cover completed casework with 4-mil polyethylene film protective enclosure, applied in a manner that will allow easy removal and without damage to woodwork or adjoining work. Remove cover immediately before the time of final acceptance.

END OF SECTION
SECTION 06 83 16

FIBERGLASS REINFORCED PANELING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Fiber glass reinforced composite wall panels, trim and installation accessories.

1.02 RELATED SECTIONS

A. Joint Sealants: Section 07 92 00.

1.03 REFERENCES

A. Conform to the following standards of the American Standards for Testing and Materials (ASTM)


1.04 SUBMITTALS

A. Product Data: Provide manufacturer's standard details and catalog data demonstrating compliance with referenced standards. Provide installation instructions.

B. Samples

1. Submit 6 x 6-inch samples of each surface and color required.
2. Submit 6-inch samples of each trim profile and trim color required.
1.05 QUALITY ASSURANCE
A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
   1. ASTM E 84 (Method of test for surface burning characteristics of building Materials) Wall Required Rating – Class A.

B. Sanitary Standards: System components and finishes to comply with:
   1. United States Department of Agriculture (USDA) requirements for food preparation facilities, incidental contact.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Store products indoors and protect from moisture, construction traffic, and damage.
B. Store panels flat on clean, dry surface. Do not stand on edge or stack on fresh concrete or other surfaces that emit moisture.
C. Store panels at least 24 hours temperature and humidity conditions approximating the average environment of the finish room.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Basis of Design: Specifications are based on products manufactured by MARLITE.

B. Other Manufacturers: Subject to requirements, products by CRANE COMPOSITES, NUDO PRODUCTS, INC., VARETEX, SEQUENTIA, INC. or KEMLITE are acceptable.

2.02 PANEL MATERIALS
A. General
   1. Composite plastic panels of random chopped fiber glass roving, modified polyester copolymer, inorganic fillers, and pigments.
   2. Resistant to rot, corrosion, staining, denting, peeling, and splintering.
   3. USDA accepted.
   4. Comply with ASTM D 3841, Type II.

B. Panel:
   1. Typical Standard Panel Physical Properties:
      2. Surface burning classification: Class A.
         a. Flame spread (ASTM E 84): 25 or less.
         b. Smoke developed (ASTM E 84): 450 or less.
      4. Flexural modulus (ASTM D 790): 0.26 x 10(6) psi.
      5. Tensile strength (ASTM D 638): 5,700 psi.
      6. Tensile modulus (ASTM D 638): 0.50 x 10(6) psi.
8. Thermal Conductivity (ASTM C 17): 0.50 BTU/in./hr./sq.ft. deg.F.
9. Water absorption (ASTM D 570): 0.16% in 24 hrs. @ 77 deg.F.
10. Chemical resistance (ASTM D 543):
- Distilled water 0.59 0.19 No change.
- Ethyl alcohol, 95% 0.92 0.18 Some fibers showing.
- Sulfuric acid, 3% 0.43 0.08 Some fibers showing.
- Sulfuric acid, 30% 0.28 0.13 Some fibers showing.
- Sodium hydroxide, 1% 0.63 0.12 Some fibers showing.
- Sodium hydroxide, 10% 0.26 0.17 Some fibers exposed, reduction in glass
- Toluene 0.14 0.13 Few fibers showing.
- Sodium chloride, 1% 0.43 0.18 No change.
- Hydrochloric acid, 10% 0.24 0.01 Few fibers showing.
- Chlorine Gas NC NC No change (NC).
- Hydrogen sulfide NC NC No change (NC).
No dimensional change under any of the listed reagents.

C. Size
1. Wall panel width: 48 inches.
2. Wall panel length: Provide full-length panels unless substrate dimensions exceed available fabricated size.

D. Thickness: 0.12 inch.

E. Dimensional Tolerances:
1. Width and length: +/- 1/8 inch.
2. Thickness: +/- 10%.
3. Squareness: Not more than 1/8 inch out of square.

2.03 FINISHES

A. Exposed Surface: Pebble-like embossed finish.

B. Back Surface: Smooth. Imperfections that do not affect functional properties are not cause for rejection.

C. Colors: As selected by Architect; uniform throughout.

2.04 TRIM ACCESSORIES

A. Provide panel manufacturer's standard vinyl moldings to meet project conditions. Provide types as required by layouts and wall conditions indicated on the drawings.

B. Fasteners: Non-staining nylon drive rivets.
1. Match panel colors.
2. Length to suit project conditions.

C. Adhesive: Structural construction adhesive as recommended by manufacturer.
1. Adhesive shall have a VOC content of not more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Sealant: Clear silicone sealant. See Section 07 92 00.
PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates to receive panels to ensure surfaces are smooth, dry, true, and free of dirt, dust, oil, or grease.

B. Remove high spots. Fill low spots.

C. Verify that substrate construction is completed and approved.

D. Correct deficiencies in substrate before installing panels.

3.02 INSTALLATION

A. Install in accordance with manufacturer's printed installation instructions, using both mechanical fasteners and adhesive.

B. Cutting Panels
   1. Cut panels with carbide-tipped saw blade or swivel head shear.
   2. Allow 1/2-inch clearance in length per 8-foot panel length.
   3. Allow 1/8-inch clearance at cut-outs for penetrations.

C. Pre-drill fastener holes before applying adhesive. Use carbide-tipped drill. Space as recommended by manufacturer.

D. Apply adhesive between 50 and 90 degrees F, unless otherwise approved.
   1. Spread adhesive 1/4-inch deep over entire back side of panel to achieve 100% coverage.
   2. Do not use beads of adhesive.
   3. Do not use mechanical fasteners or adhesive alone.
   4. Roll panel surface to ensure complete contact.
   5. If necessary, install bracing to maintain intimate contact until adhesive cures in accordance with manufacturer's instructions.

E. Panel Fasteners
   1. Apply silicone sealant in pre-drilled fastener holes.
   2. Drive fasteners for snug fit. Do not over-tighten.
   3. Fasten leading edge of each panel after installing moldings.

F. Moldings: Install as recommended by panel manufacturer. Apply sealant within all trim pieces.

G. Sealants: Seal corner seams, ceiling and base junctures, around door frames and other openings, and between penetrating items and panel cut-outs.

3.03 ADJUST AND CLEAN

A. Remove scraps and debris from the site, and leave in a neat and clean condition.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

A. Whether indicated on the drawings or not, provide waterproofing in the following applications and areas:
2. Wall areas where floor slab is below grade: Semi-liquid or sheet membrane.
4. Structural slab at balcony conditions, etc.: Semi-liquid or sheet membrane.
5. Planter walls; on plant side of wall where face of wall on opposite side is exposed to view/weather: Semi-liquid or sheet membrane.
8. Other areas where indicated.

B. Surface preparation, primers, and protective covering.

1.02  RELATED SECTIONS

A. Bituminous Dampproofing: Section 07 11 13: basic foundation protection.
B. Air/Vapor Barriers: Section 07 27 26: for above grade envelope protection.
C. Ceramic tile waterproofing membrane: Section 09 30 00.
D. Building Insulation: Section 07 21 00.
E. Sealants: Section 07 92 00.

1.03  SUBMITTALS

A. Shop Drawings: Submit details of special joint or termination conditions and conditions of interface with other materials. Edge terminations, flashing details, treatment of joint penetrations or projections at large scale. Details shall reference each material, sequence of placement and application procedure.

1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

B. Product Data: Submit for all items. Include construction details, material descriptions, and tested physical and performance properties of waterproofing and manufacturer's written instructions for evaluating, preparing, and treating substrate.

C. Samples: For each exposed product and for each color and texture specified, including the following products:
1. 8-by-8-inch square of waterproofing and flashing sheet.
2. 8-by-8-inch square of insulation.
3. 4-by-4-inch square of drainage panel.
4. Plaza-deck paver, 4-by-4-inch square, in each color and texture required.

D. Statement of Application: Submit statement signed by Contractor and installer, stating that work complies with these specifications and that the installation methods complied with the manufacturer's printed specifications and instructions for the conditions of installation and use on this project.

E. Applicator's License Certificate: Copy of "Certificate of License" issued to system applicator by manufacturer.

F. Sample warranty.

G. Contamination Profile: Manufacturer shall provide the Installer, Contractor and Owner with a tabular profile of chemicals, solutions, oils, compounds or materials which are injurious to the fluid-applied membrane system. This profile shall be established by generic (or trade name) basis, including those materials normally found to exist in the work environment or likely to occur on this work. The system should not be exposed to materials (directly or indirectly) as established by the Contamination Schedule during application or after completion of the work.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in the manufacture of specific type of waterproofing membrane systems specified with ten years minimum experience.

B. Installer/Applicator: Company specializing in application of specified waterproofing with five years minimum experience and trained and approved by manufacturer.

C. Obtain primary materials for each waterproofing type required from single manufacturer. Provide secondary materials only as recommended and approved by manufacturer of primary materials.

D. Pre-Waterproofing Conference
1. Contractor: Prior to installation of waterproofing and associated work, schedule and administer a pre-installation meeting at the project site to review the material selections, installation procedure, special details, flashings, coordination, inspection procedures, and protection and repairs.
   a. Attendance: Architect, Contractor, Installer, manufacturers' representatives and trades requiring coordination with the work.
   b. Contractor: Take minutes and provide copies to all attendees.

E. Manufacturer's Representative (primary material manufacturer): Furnish services of manufacturer's technical representative at the job site at the start of installation, periodically as work progresses and after completion as necessary to advise on every phase of the waterproofing work.
1. Install entire system in accordance with the manufacturer's instructions except where more stringent requirements are indicated or specified, then the more stringent requirements shall govern.
F. Contractor: Notify Architect 72 hours in advance of scheduled waterproofing work.

G. Installer to advise General Contractor of finish and curing requirements of concrete surfaces, as relates to application of the waterproofing materials, prior to installation of those substrates.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened packaging fully identified with brands, type, grade, class and other qualifying information including instruction for use and identifying numbers.

B. Storage waterproofing materials in a dry area away from high heat, flames or sparks. Provide weatherproof covering all sides allowing for adequate ventilation.

C. Store protection board flat and off the ground, preferably on a wood platform. Provide weatherproof covering on top and all sides.

D. Store only as much material at point of use as required for each day's work.

E. Handling: Handle all materials in a manner to prevent damage of any kind. Remove damaged material from the site and replace with new specified material.

1.06 JOB CONDITIONS

A. Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate. Surfaces to receive membrane shall be free of water, dew, frost, snow and ice.

B. Ventilation: Provide positive ventilation for enclosed areas continuously throughout the application and for a minimum of 8 hours afterward or until coatings have completely cured.

C. Do not allow waste products (petroleum, grease, oil, solvents, vegetable or mineral oil, etc.) to come in contact with the membrane. Exposures to foreign materials or chemical discharges must be presented to membrane manufacturer for evaluation to determine impact on membrane. See "Contamination Profile" specified under paragraph 1.03G herein.

D. Special Precautions: Allow no open fires or spark-producing equipment in the application area until vapors and fumes have dissipated. Post "No Smoking" signs in area during application and maintain for at least 8 hours following application.

1.07 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Five (5) years from date of Substantial Completion.
B. Installer’s Special Warranty: Provide warranty for two (2) years against leaks, failures and defects. Upon notification of such defects, within the warranty period, make necessary repairs and replacements at the convenience of the Owner without additional cost to the Owner.
1. Warranty includes removing and reinstalling protection board, drainage panels, insulation, pedestals, and pavers on plaza decks.

PART 2  PRODUCTS

2.01 MATERIALS

A. Semi-Liquid Applied System
1. Membrane: Elasticized rubberized asphaltic compound, self-bonding to normal substrates, hot poured, quick setting.
2. Physical Properties
   a. Water Vapor Permeability - ASTM E96, Procedure E: 0.027 perms.
   c. Water Absorption - CGSB 37-GP-50M: Gain in weight 0.35 g maximum. Loss in weight 0.18 g maximum.
   d. Penetration - ASTM D5329: At 77 degrees F, maximum 110; at 122 degrees F, maximum 200.
   e. Elongation - ASTM D5329: 1000% minimum.
   f. Low Temperature Crack Bridging Capability - CGSB 37-GP-50M: No cracking, adhesion loss, or splitting.
3. Miscellaneous Materials: Primer, detail coatings, flashing, bonding adhesive, splicing cement, lap sealant, water cut-off mastic, pipe seals, pourable sealer, and other related items as recommended by MFR.
   a. Primer: Cut-back solvent type conforming to ASTM D41.
   b. Reinforcing Sheet: EPDM/Butyl laminate sheet in uncut rolls.
      1) Heavy Duty: 63 mils.
4. Miscellaneous: As required to complete installation.
5. Manufacturers
   a. Liquid Membrane 6125 by AMERICAN HYDROTECH
   b. TremProof 6100 by TREMCO
   c. CCW-500R by CARLISLE
   d. 790-11 by HENRY

B. Sheet Membrane System
1. Membrane: Self-adhering laminated sheet comprised of rubberized asphalt and polyethylene film; minimum 60 mil thickness. Furnish in 36" wide x 60' long rolls with release paper.
2. Physical Properties
   a. Tensile Strength, Film - ASTM D882: 5000 psi.
   c. Pliaibility, 180 degree bend over 1" mandrel - ASTM D1970: -25 degrees F.
   d. Cycling over 1/4" crack, 100 cycles - ASTM C836: At -25 degrees, no effect.
e. Permeance - ASTM E96, Method B: 0.05 perm.

f. Water Absorption: ASTM D570: 0.1% (weight/72 hours).

3. Miscellaneous Materials: Primer, detail coatings, flashing, bonding adhesive, splicing cement, lap sealant, water cut-off mastic, pipe seals, pourable sealer, and other related items as recommended by membrane manufacturer.

4. Cants: At all inside corners; minimum face 3/4".

5. Miscellaneous: As required for complete installation.

6. Manufacturers
   a. Bituthene 4000 by W.R. GRACE
   b. Mel-Rol System by W.R. MEADOWS
   c. CCW MiraDri 860/861 by CARLISLE
   d. WP-200 by HENRY
   e. Polyguard 650 by POLYGUARD PRODUCTS

C. Underslab Sheet Membrane: Reinforced, composite waterproofing sheet specifically designed for pre-applied underslab waterproofing conditions.
   1. Performance Properties
      d. Water Absorption – ASTM D570: 0.5% maximum.

   2. Miscellaneous Materials: Primer, detail coatings, flashing, bonding adhesive, splicing cement, lap sealant, water cut-off mastic, pipe seals, pourable sealer, and other related items as recommended by manufacturer.

   3. Manufacturer: The following products are acceptable provided they meet the specified performance properties:
      a. Polyguard Underseal Underslab by POLYGUARD PRODUCTS
      b. Preprufe 300 Membrane by W.R. GRACE.
      c. Mel-Rol Precon Membrane by W. R. MEADOWS.
      d. Miraply H by CARLISLE CCW

D. Accessories
   1. Vertical Protection Board
      a. Vertical Protection Board - At Elevator Pit Walls: Asphalthic hardboards "Protection Course" by W.R. MEADOWS or W.R. GRACE; 1/4" thick; one layer required.
      b. Vertical Protection/Drainage – All Other Locations
         1) Description: 3/8" thick high impact polystyrene drainage core with filter fabric adhered to core.
         2) Adhesive and Tape: Types as recommended by drainage board manufacturer.
         3) Manufacturer: Hydroduct HSF by W.R. GRACE; Amerdrain 650 by AMERICAN WICK DRAIN CORPORATION; CCW Miradrain 6200XL by CARLISLE; Hydrodrain by HYDROTECH; PolyFlow 15 by POLYGUARD PRODUCTS.
      c. Insulation Protection Board: Rigid insulation. See Section 07 21 00. Provide in addition to drainage board at all location except elevator pit walls.

   2. Horizontal Protection/Drainage Board
      a. Description: 3/8" thick high impact polystyrene drainage core with
filter fabric adhered to core.

b. Adhesive and Tape: Types as recommended by drainage board manufacturer.

c. Manufacturer: Hydroduct HSF by W.R. GRACE; Amerdrain 650 by AMERICAN WICK DRAIN CORPORATION; CCW Miradrain 6200XL by CARLISLE; Hydrodrain by HYDROTECH; PolyFlow 18 by POLYGUARD PRODUCTS.

3. Expansion Joint Fillers: Provide membrane support and additional membrane length at joints.
   a. Above Grade: Sponge foam tubing, size and properties as recommended by waterproofing membrane manufacturer.
   b. Below Grade: Closed cell neoprene gaskets; ASTM D1056 Class SC (oil resistant, medium swell), 2 to 5 psi compression deflection.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the waterproofing.
   1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
   2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D4263.
   3. Verify that compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.

B. Proceed with installation only after unsatisfactory conditions are corrected.

3.02 PREPARATION OF SUBSTRATES

A. Prepare, fill, prime, and treat substrates to receive waterproofing membrane, including joints, cracks, corners and penetrations according to manufacturer's written instructions and recommendations. Remove dust and dirt from joints and cracks according to ASTM D 4258.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction. Mask termination elevations to prevent application of waterproofing materials on surfaces exposed to view.

C. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

E. Semi-Liquid Membrane: Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
F. Outside Corners: Bevel or round outside corners of substrate by grinding to produce a minimum 3/4” face or radius if not provided under Division 03 or use other means to treat outside corners approved by waterproofing manufacturer.

G. Inside Corners: Prepare and treat using methods recommended by manufacturer.

H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to manufacturer's written instructions and recommendations and ASTM D 6135 (for sheet membrane).

3.03 INSTALLATION - SEMI-LIQUID SYSTEM

A. General
1. Comply with manufacturer's instructions and details, except where more stringent requirements are indicated or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
2. Terminate membranes above wearing surface as indicated and where concealed by subsequent finish materials. Where concealment is not possible, terminate slightly below wearing surface (approximately ½”).

B. Flashing
1. Install elastomeric flashing sheets at terminations of waterproofing membrane according to manufacturer's written instructions.
2. Prime substrate with surface conditioner.
3. Install elastomeric flashing sheet and adhere to deck and wall substrates in a layer of hot rubberized asphalt.
4. Extend elastomeric flashing sheet up walls or parapets a minimum of 8 inches above and 6 inches onto deck to be waterproofed.
5. Install termination bars and mechanically fasten to top of elastomeric flashing sheet at terminations and perimeter of waterproofing.

C. Membrane
1. Apply surface conditioner, at manufacturer's recommended rate, over prepared substrate and allow to dry.
2. Heat and apply rubberized asphalt according to manufacturer's written instructions.
   a. Heat rubberized asphalt in an oil- or air-jacketed melter with mechanical agitator specifically designed for heating rubberized asphalt.
3. Start application with manufacturer’s authorized representative present.
4. Reinforced Membrane: Apply hot rubberized asphalt to substrates and adjoining surfaces indicated. Spread to a thickness of 90 mils; embed reinforcing fabric, overlapping sheets 2 inches; spread another 125-mil-thick layer to provide a uniform, reinforced, seamless membrane 215 mils thick.
5. Apply waterproofing over prepared joints and up wall terminations and vertical surfaces to heights indicated or required by manufacturer.
6. Cover waterproofing with protection course with overlapped joints while membrane is still hot to ensure good bond.
3.04 INSTALLATION - SHEET MEMBRANE SYSTEM

A. General
1. Comply with manufacturer's instructions and details, except where more stringent requirements are indicated or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
2. Terminate membranes above wearing surface as indicated and where concealed by subsequent finish materials. Where concealment is not possible, terminate slightly below wearing surface (approximately ½”).

B. Comply with ASTM D6135.

C. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

D. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
   1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.

E. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.

F. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

G. Seal edges of sheet-waterproofing terminations with mastic.

H. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.

I. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

J. Immediately install protection course with butted joints over waterproofing membrane.

3.05 INSTALLATION – UNDER SLAB SHEET MEMBRANE

A. Preparation: As recommended by membrane manufacturer. Compact substrate as specified in Division 31, Earthwork. Remove loose aggregate or sharp protrusions. Fill gaps or voids greater than ½”. Remove standing water prior to membrane applications.

B. Installation: In accordance with manufacturer's instructions.
3.06 INSTALLATION OF DRAINAGE AND PROTECTION ASSEMBLY

A. Exposed Waterproofing System: Provide protection assemblies as follows:

1. Horizontal Surfaces: After all curing, testing and repair work is complete, install protection/drainage board assembly as follows:
   a. Install drainage panels over membrane, with tight butt joints and completely covering membrane. Adhere with adhesive as recommended by panel manufacturer.
   b. Overlap fabric onto previous panel. Adhere overlapped filter fabric with tape or mastic as recommended by manufacturer.

2. Vertical Surfaces
   a. Elevator Pit Walls: After all curing and repair work is complete and prior to backfilling, install one layer of 1/4" thick protection board over membrane, placing boards with tight butt joints and completely covering membrane.
   b. All Other Walls
      1) After all curing and repair work is complete and prior to backfilling, install one layer of drainage/protection board over membrane, placing boards as recommended by manufacturer with tight butt joints and completely covering membrane.
      2) Rigid Insulation: Provide rigid insulation in addition to drainage/protection board. See Section 07 21 00.
   c. Do not nail or otherwise penetrate membrane to attach protection boards. Use suitable adhesive compatible with membrane.

3.7 FIELD QUALITY CONTROL

A. Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish daily reports to Architect.

B. Engage an independent testing agency to observe flood testing and examine underside of decks and terminations for evidence of leaks during flood testing.

C. Prepare test and inspection reports.

3.8 CLEANING, PROTECTION AND REPAIR

A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

B. Protect installed [board insulation] [and] [insulation drainage panels] from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Horizontal Applications
   1. Do not permit foot or vehicular traffic on unprotected membrane.
2. After installation of protection board, no traffic is permitted on deck except as required to install subsequent materials and then only after additional protection is provided.

3. Provide additional (temporary) protection as follows:
   b. Light Equipment: Minimum 2x planking over plywood.

D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide bituminous dampproofing on exterior of perimeter foundation walls, turn down slabs, and concrete / masonry back-up surfaces within wall cavity from top of slab at grade down to top of footings along the subsurface perimeter that does not enclose conditioned areas of approximately 4 to 6 feet in depth.

1.02  RELATED SECTIONS

A. Waterproofing: Section 07 10 00: for all other subsurface moisture protection.

B. Air/Vapor Barriers: Section 07 27 26: for above grade envelope protection.

C. Concrete Masonry: Section 04 22 00.

D. Below Grade Foundation Walls: Structural drawings.

1.03  SUBMITTALS

A. Submit product data, manufacturer's installation instructions, manufacturer's review, guarantee, and statement of application in accordance with General Conditions and Section 01 33 23.

B. Product Data: Submit manufacturer's specifications, application instructions and general recommendations for dampproofing. Include data substantiating that materials are recommended by manufacturer for applications indicated.

C. Statement of Application: Submit statement signed by Contractor and installer, stating that work complies with these specifications and that the installation methods complied with the manufacturer's printed specifications and instructions for the conditions of installation and use on this project.

1.04  QUALITY ASSURANCE

A. Manufacturer: Company specializing in the manufacture of specific type of dampproofing system specified with ten years minimum experience.

B. Manufacturer's Representative (primary material manufacturer): When required, furnish services of manufacturer's technical representative at the job site to advise on dampproofing work. Install in accordance with the manufacturer's instructions, unless more stringent requirements are required; the more stringent shall govern.

C. Note: It is the intent of the drawings and this section to provide a complete continuous vapor barrier envelope at all perimeter walls and roof. At all junction
points between the two planes, lap membrane approximately 6” and seal with tape or other methods recommended by membrane manufacturers. Notify Architect of areas or situations where a continuous vapor barrier cannot be achieved.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened packaging fully identified with brand, type, grade, class and other qualifying information including instruction for use and identifying numbers.

B. Storage materials in a dry area away from high heat, flames or sparks. Provide weatherproof covering on top and all sides, allowing for adequate ventilation.

C. Store only as much material at point of use as required for each day's work.

D. Handling: Handle all materials in a manner to prevent damage of any kind. Remove damaged material from the site and replace with new specified material.

1.06 JOB CONDITIONS

A. Install dampproofing only when satisfactory conditions prevail. Verify requirements with manufacturer of specific products; variances may occur.
   1. Minimum temperature for installation to proceed is 40° F (verify) and rising.
   2. Substrate temperature between 40° F (verify) and 110° F.
   3. Surfaces to receive dampproofing shall be free of water, dew, frost, snow and ice.

B. Ventilation: Provide positive ventilation for enclosed areas continuously throughout the application and for a minimum of 8 hours afterward or until coatings have completely cured.

C. Do not expose membrane or accessories to a constant temperature in excess of 180° F.

D. Do not allow waste products (petroleum, grease, oil, solvents, vegetable or mineral oil, etc.) to come in contact with the material.

E. Special Precautions: Allow no open fires or spark-producing equipment in the application area until vapors and fumes have dissipated. Post "No Smoking" signs in area during application and maintain for at least 8 hours following application.

PART 2 PRODUCTS

2.01 BITUMINOUS DAMPPROOFING

A. Description: Cold-applied water based fiber reinforced asphalt compound, non-asbestos.

B. Reference: Conform to ASTM D1227, Type II, Class 1 and ASTM D1187, Type I.
C. Physical Properties
1. Solids by Weight: 52 to 54%
2. Solids by Volume: 49 to 51%
3. Permeance: 0.5 metric perms

D. Manufacturer: 220AF Fibrated Emulsion Dampproofing by KARNACK CORPORATION, Hydrocide 700B by BASF BUILDING SYSTEMS, Sealmastic Emulsion by W.R. MEADOWS.

PART 3 EXECUTION

3.01 COORDINATION
A. Coordinate application of dampproofing with laying of concrete masonry units, rigid insulation, reinforcing and veneer work. Contractor must obtain A/E's approval to apply dampproofing when CMU and veneer work progress simultaneously.

3.02 SURFACE CONDITIONS
A. Concrete Masonry Surfaces: Flush joints; free of loose mortar chipped or broken masonry or other irregularities.
B. Verify surfaces are clean, dry and free of frost, dew, loose dirt, and foreign matter.

3.03 PROTECTION
A. Mask off or otherwise protect adjoining surfaces which are not scheduled to receive dampproofing to effectively prevent spillage or overspray of materials beyond dampproofed area.

3.04 INSTALLATION
A. Comply with manufacturer's instructions and details, except where more stringent requirements are indicated or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
B. Apply dampproofing in a manner to completely cover wall surface and seal around reinforcing.
C. Application Method: Brush or spray. Thickness: 1/16" to 1/8".

3.05 CLEAN-UP
A. Clean stains from adjacent materials. Replace materials that cannot be cleaned at no additional cost to Owner.

END OF SECTION
SECTION 07 21 00

THERMAL INSULATION

PART 1  GENERAL

1.01  WORK INCLUDED

A. Rigid board insulation in masonry cavity walls.
B. Perimeter and under slab insulation.
C. Spray polyurethane foam insulation.
D. Rigid board insulation at furred masonry & concrete walls and metal panel
E. Plaza deck rigid insulation.
F. Waterproofing protection board installation, when used as combination protection board/perimeter insulation. Material specified in section 07 10 00
G. Glass fiber blanket wall and ceiling insulation.
H. Sound attenuation blankets in stud/gypsum board walls.
I. Spandrel glass/curtainwall insulation.
J. Concrete masonry unit (CMU) insulation – foamed in place.

1.02  RELATED SECTIONS

B. Wood Nailers: Section 06 10 00.
C. Roof Insulation: Section 07 53 23.
D. Firestopping (Safing): Section 07 84 00.

1.03  SUBMITTALS

A. Product Data: Submit for all items.
B. Spray Foam Insulation Qualification Data: For qualified installer.

1.04  QUALITY ASSURANCE

A. Insulation Thermal Properties: Thermal conductivity k-factors and thermal resistance R-values indicated are values at 75 degrees F., mean temperature.
1. Where insulation is identified by R-value, provide thickness required to achieve indicated R-value. Foam insulation R-values are "aged" thermal values in accordance with LTTR – Long Term Thermal Resistance predicted by ASTM C1289.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

C. Spray Foam Insulation Installers: Trained and approved by manufacturer and with experienced in performing application of SPF materials on not less than five projects with similar quantities of sprayed insulation materials in similar applications.
   1. Sample: A representative surface of not less than 100 sq. ft. shall be sprayed and approved before proceeding with spray insulation work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver insulation materials in manufacturer's original, unopened, and labeled packages.

B. Store insulation materials at the site inside storage trailers or the building in a dry, ventilated place. Exterior storage not permitted. Comply with manufacturer's recommendations for handling and protection during installation.

C. Remove fibrous batt insulation that has become wet before or after installation. Replace with new, dry insulation.

D. Protect plastic insulation from excessive exposure to sunlight. Protect at all times against ignition. Complete installation and covering of plastic insulation materials as rapidly as possible in each area of work.

PART 2 PRODUCTS

2.01a RIGID BOARD INSULATION - POLYISOCYANURATE

A. Materials: Composite Polyisocyanurate foam core with inorganic facer rigid board, conforming to the requirements of ASTM C1289-13e1 with an R-value of 5.8 per inch (for cavity wall applications); and Extruded Closed-Cell Polystyrene rigid board, conforming to the requirements of ASTM C578-87. Type IV, 25 psi, 1.6 p/cf; at R-5 per inch (for other applications itemized in 2.01.B).

B. Thicknesses/"R" Values: unless otherwise indicated on the drawings, provide:

   2. Furred Wall Application: 1-1/2 inch / R-8.7 minimum.

C. Adhesive: Types as recommended by insulation manufacturer for substrates and substrate coating materials where applicable.
D. Manufacturer: DOW CHEMICAL Styrofoam & Thermax; OWENS CORNING Foamular; PACTIV BUILDING Products Green Board; DIVERSIFOAM Products Certifoam, ATLAS ROOFING Energy Shield, APACHE Products Isoshield Silver.

2.01b RIGID BOARD INSULATION - POLYSTYRENE

A. Extruded-Polystyrene Board Insulation: ASTM C578, Type IV, 25 psi, 1.6 p/cf.; maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
   1. Plaza deck and double slab areas: ASTM C578 Type III, 60 psi, 2.2 p/cf.

B. Thicknesses: Provide the following unless otherwise indicated on the drawings.
   1. Masonry Cavity Wall Application: 2 inch.
   2. Perimeter/Under Slab Application: 2 inch.
   5. Plaza Deck: 2 inch minimum

C. Adhesive: Types as recommended by insulation manufacturer for substrates and substrate coating materials where applicable.

D. Manufacturer: Subject to compliance with requirements, provide products by DOW CHEMICAL Styrofoam; OWENS CORNING Foamular; KINGSPAN GreenGuard; DIVERSIFOAM PRODUCTS Certifoam

2.02 GLASS-FIBER BLANKET INSULATION

A. Type: Glass fiber blanket designed to friction fit with metal. Manufacturers standard lengths; widths as required to fit framing conditions; density not less than 0.75 pounds per cubic foot. Provide facings as follows:
   1. Unfaced: Conform to ASTM C665 Type I, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84; passing ASTM E 136 for combustion characteristics.
   2. Kraft Facing: Areas where insulation is not exposed (concealed behind gypsum board). Conform to ASTM C665 Type II, Class C, Category 1.
   3. Flame Resistant Foil Facing: Areas where insulation is exposed (not covered by gypsum board or concealed interstitial space between faced insulation and gypsum wall board face). Conform to ASTM C665 Type III, Class A, Category 1; flame-spread index of 25 or less.

B. Thickness (Nominal)
   1. Wall: 6", unless otherwise indicated.
   2. Ceiling: 10", unless otherwise indicated.

C. Manufacturer: Subject to compliance with requirements, provide products by JOHNS MANVILLE, OWENS-CORNING FIBERGLASS, CERTAINTEED, GUARDIAN BUILDING PRODUCTS or KNAUF INSULATION.

D. Tape: Type as approved by insulation manufacturer.
2.03 SOUND ATTENUATION BLANKETS

A. Type: Unfaced semi-rigid mineral fiber or glass fiber blankets. Conform to ASTM C665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84; passing ASTM E136 for combustion characteristics.

B. Thickness: 3 inch, unless otherwise indicated.

C. Manufacturer: Subject to compliance with requirements, provide products by JOHNS MANVILLE, THERMAFIBER, OWENS-CORNING FIBERGLAS, CERTAINTEED, ROXUL or FIBREX.

2.04 SPANDREL GLASS/CURTAINWALL INSULATION

A. Manufacturer: Subject to compliance with requirements, provide products by JOHNS MANVILLE, OWENS-CORNING FIBERGLAS, CERTAINTEED, GUARDIAN BUILDING PRODUCTS or KNAUF INSULATION; fiberglass insulation with factory-applied black fiber glass mat facing.

B. Type: Unfaced, Glass-Fiber Board Insulation: ASTM C612, Type IA; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84, passing ASTM E136 for combustion characteristics.
   1. Nominal density of 2.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.
   2. Thickness: As indicated on drawings.

C. Foil-Faced, Glass-Fiber Board Insulation: ASTM C612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84.
   1. Nominal density of 2.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.
   2. Thickness: As indicated on drawings.

D. Dark-Surfaced, Glass-Fiber Board Insulation: ASTM C612, Type IA; faced on one side with black glass-fiber mat or black polymer finish; maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84.
   1. Nominal density of 2.25 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.
   2. Thickness: As indicated on drawings.

2.05 SPRAY POLYURETHANE FOAM INSULATION

A. Closed-Cell Type
   1. Material: ASTM C1029, Type III, closed cell polyurethane foam insulation containing no CFC’s, HCFC’s and VOC’s.
   2. Physical Properties
      a. Density (ASTM D1622): Minimum 2.0 pcf
      b. Closed cell content (ASTM D6226): >90%
      c. Thermal Conductivity: R-Value = 6.4/inch. R-values are "aged"
thermal values in accordance with PIMA Bulletin #101 and RIC/TIMA Bulletin #281-1 conditioning procedures

f. Fire performance in accordance with ASTM E84 and UL 723 flame spread 25 or less and smoke development 450.

3. Thickness: As indicated or as required to fill voids where applicable.
   a. Stud Cavity: As indicated

4. Primer: Type as recommended by insulation manufacturer for adjacent and substrate surfaces. Ensure adjacent wall framing members are not deflected after installation and cure.

5. Where foam insulation is left exposed to building interior, provide approved 15 minute thermal or ignition barrier meeting the requirements of NFPA 286 and IBC Section 2603.4 (minimum ¼” gypsum board, intumescent coating or similar code complying material).
   a. Bonding Agent: Provide suitable agent to ensure adequate bond between spray foam insulation and thermal barrier.

6. Transition Membrane between Air Barrier Membrane and Roofing and Other Adjacent Materials: As recommended by manufacturer and comply with both air barrier manufacturer’s recommendations and roofing material manufacturer’s recommendations (as applicable).

7. Manufacturers: Subject to compliance with specified requirements, provide products by HENRY, DOW, JOHN MANVILLE, BASF, CERTAINTEED, GACO-WESTERN or ICYNE.

2.06 ACCESSORY MATERIALS

A. Supplementary Support: Provide galvanized wire mesh, woven wire ties or flexible metal rods where required for supplementary support of insulation in permanent proper location.

B. Insulation Clips
   1. Description: Perforated metal plates (2” x 2”) with metal spindle welded and extending through center. Speed washer (1” x 1”) snaps over spindle to secure insulation.
   2. Adhesive: Type as recommended by clip manufacturer for adhesion to the various substrates.
   3. Spacing: As recommended by manufacturer.
   4. Spindle Length: As selected to ensure tight fit without compressing insulation so as to decrease insulation value.
   5. Manufacturer: AGM INDUSTRIES, INC. Series T TACTOO Insul-Hangers; ECKEL INDUSTRIES OF CANADA; Stic-Klip Type N Fasteners; GEMCO; Spindle Type.

PART 3 EXECUTION

3.01 PREPARATION

A. Examine substrates and installation conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected.
B. Verify substrate surfaces are dry and free of irregularities or substances harmful to insulation. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

C. Verify mechanical and electrical services within walls have been installed and tested.

D. Fill miscellaneous voids and spaces in wall framing and at window and door framing with batt insulation loosely stuffed in place.

E. Spray-On and Spray Foam Insulations: Provide masking, drop cloths or other satisfactory coverings for all materials/surfaces which are not to receive insulation to prevent damage from overspray.

3.02 INSTALLATION OF RIGID BOARD INSULATION - CAVITY WALL

A. Place insulation horizontally within cavity between brick and concrete block. Place on exterior surface of concrete block.

B. Place to ensure tight joints between all insulation panels installed.

C. Use manufacturer's suggested adhesive to bond the insulation panel to the concrete block wall.

D. Place insulation panels to clear wall ties, yet maintain a tight joint between the panels.

3.03 INSTALLATION OF RIGID BOARD INSULATION - PERIMETER INSULATION

A. Place at all slab-on-grade conditions at building perimeter.

B. Adhere to substrate as required to maintain insulation in final location prior to backfilling.

C. Coordinate placement of insulation with placement of vapor barrier. See Section 07 27 26.

3.04 INSTALLATION OF RIGID BOARD - WATERPROOFING PROTECTION BOARD

A. Coordinate installation of insulation (waterproofing protection board) with application of waterproofing. See Section 07 10 00.

B. Place insulation boards with long edge horizontally on exterior waterproofed walls below grade.

3.05 INSTALLATION OF RIGID BOARD INSULATION - FURRED MASONRY AND CONCRETE WALLS

A. Place insulation between furring members; maintain tight joints between insulation panels and between insulation panels and furring members.
B. If required, use insulation manufacturer's suggested adhesive to bond the insulation panel to the wall.

C. See Section 09 21 16 for furring members.

3.06 INSTALLATION OF BLANKET/BATT INSULATION

A. Install blanket type insulation with tight fitting butt joints. Provide supplementary support at vertical and horizontal installations when required to maintain insulation in permanent proper location.
   1. Spot adhere insulation to inside face of exterior sheathing or similar back-up material as required to maintain insulation in its proper location.

B. Fit insulation between members.

C. Locate facing to room side, where applicable.

D. Install interior wall sound attenuation at interior partitions where indicated on floor plans or wall types.

3.07 INSTALLATION SPANDREL GLASS/CURTAINWALL INSULATION

A. In Curtainwall Frames at Spandrel Glass
   1. Install insulation board behind spandrel glass with black facing toward glass. Leave 2" space between glass and insulation, unless otherwise detailed.
   2. Screw-attach aluminum clip angles to storefront frames at 16" on centers.
   3. Friction-fit the insulation between curtainwall frames against the clip-angles.
   4. After insulation is properly fitted, apply a continuous piece of foil-scrim tape against insulation board and storefront frame.
   5. Apply continuous tape over spliced joints in insulation (if any).

B. Coordinate with placement of perimeter fire safing. See Section 07 84 00.

3.08 SPRAY FOAM INSULATION

A. Prepare surfaces as recommended by insulation manufacturer. Remove substances from metal deck or other metal surfaces that will prohibit insulation/metal bond. Apply primer where required by manufacturer.

B. Spray-Applied Insulation: Install Spray-application of polyurethane foam in accordance with ULC S705.2 and the manufacturer's instructions. Install in areas where indicated on the drawings. Fill all voids for a complete solid installation.

C. Trim, as needed, any excess thickness that would interfere with the application of cladding/covering system by other trades.

D. Clean-up all overspray from adjacent surfaces and floor.

END OF SECTION
SECTION 07 24 13

EXTERIOR INSULATION AND FINISH SYSTEM (PB)

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide a Class PB exterior insulation and finish system (EIFS). Work includes:
1. Field applied exterior insulation and finish system applied over gypsum sheathing and plywood sheathing.
2. Accessories to complete the work.
3. Application of acrylic finish coat over exterior gypsum board soffits/ceilings.

1.02  RELATED SECTIONS

A. Joint Sealants: Section 07 92 00.
B. Exterior Gypsum Board: Section 09 21 16.

1.03  PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with the following
1. Bond Integrity: Free from bond failure within EIFS components or between system and supporting wall construction, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
2. Weather tightness: Resistant to water penetration from exterior into EIFS and assemblies behind it or through them into interior of building that results in deterioration of thermal-insulating effectiveness or other degradation of EIFS and assemblies behind it, including substrates, supporting wall construction, and interior finish.

B. Class PB EIFS: Provide EIFS having physical properties and structural performance that comply with the following:
1. Abrasion Resistance: Sample consisting of 1-inch-thick EIFS mounted on 1/2-inch-thick gypsum board; cured for a minimum of 28 days; and showing no cracking, checking, or loss of film integrity after exposure to 528 quarts of sand when tested per ASTM D968, Method A.
2. Absorption-Freeze Resistance: No visible deleterious effects and negligible weight loss after 60 cycles per EIMA 101.01.
3. Accelerated Weathering: Five samples per ICC-ES AC219 showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, delamination, or other characteristics that might affect performance as a wall cladding after testing for 2000 hours when viewed under 5 times magnification per ASTM G 153 or ASTM G 154.
4. Freeze-Thaw: No surface changes, cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination, or indications of delamination between components when viewed under 5 times magnification after 10 cycles per ICC-ES AC219.
5. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch clean
glass substrate, cured for 28 days, and showing no growth when tested per ASTM D 3273 and evaluated according to ASTM D 3274.

6. Salt-Spray Resistance: No deleterious effects when tested according to ASTM B117 or ICC-ES AC235.

7. Tensile Adhesion: No failure in the EIFS, adhesive, base coat, or finish coat when tested per ICC-ES AC219.

8. Water Penetration: Sample consisting of 1-inch-thick EIFS mounted on 1/2-inch-thick gypsum board, cured for 28 days, and showing no water penetration into the plane of the base coat to expanded-polystyrene board interface of the test specimen after 15 minutes at 6.24 lbf/sq. ft. of air pressure difference or 20 percent of positive design wind pressure, whichever is greater, across the specimen during a test period when tested per EIMA 101.02.

9. Water Resistance: Three samples, each consisting of 1-inch-thick EIFS mounted on 1/2-inch-thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination after testing for 14 days per ASTM D 2247.


11. Impact Resistance: Sample consisting of 1-inch-thick EIFS when constructed, conditioned, and tested per EIMA 101.86; and meeting or exceeding the following:
   b. Medium Impact Resistance: 50 to 89 inch-lb.
   c. High Impact Resistance: 90 to 150 inch-lb.

12. Structural Performance Testing: EIFS assembly and components shall comply with ICC-ES AC219 when tested per ASTM E 330

1.04 SUBMITTALS

A. Product Data: Submit for all items.

B. Shop Drawings: Include plans, elevations, sections, details of components, details of penetration and termination, flashing details, joint locations and configurations, fastening and anchorage details including mechanical fasteners, and connections and attachments to other work. Coordinate control joint locations with Architect; include locations on Shop Drawings elevations.

C. Samples for Initial Selection: For each type of finish-coat color and texture indicated. Include joint sealant samples for color selection. Submit EIFS samples and sealant colors in the same submittal.

D. Samples for Verification: Submit minimum 12" x 12" samples mounted on exterior grade sheathing board for complete system components and finish color and texture selection. Include metal stud segment to indicate mechanical attachment. Include one control joint in sample board with sealant to verify color selected.

E. Manufacturer's certificate of compliance with referenced EIMA Standards.

F. Compatibility and Adhesion Test Reports: For joint sealants from sealant
manufacturer indicating the following:
1. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

G. Provide manufacturer's written maintenance instructions.

1.05 QUALITY ASSURANCE

A. System Components: Produced by the manufacturer or by manufacturers approved by the system manufacturer.

B. Installation: Performed by the system manufacturer or an applicator trained and approved by the system manufacturer. During application, the work shall be inspected by system manufacturer's representative.
1. Minimum 3 years experience installing Class PB EIFS Systems.

C. Sample panel: Provide a sample wall panel not less than 4'-0" by 4'-0" in size, showing selected color, workmanship, and finish texture proposed for the work. Sample panel shall contain all materials and components of the full scale work. Location as directed by the Architect. Sample panel may be a portion of the work and, when accepted by the Architect, remain in place. Sample panel shall include a rustication joint.

D. Fire-Test-Response Characteristics: Provide EIFS and system components with the following fire-test-response characteristics as determined by testing identical EIFS and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
2. Full-Scale Multistory Fire Test: Tested mockup, representative of completed multistory wall assembly of which EIFS is a part, complies with UBC Standard 26-4 for test method and required fire-test-response characteristics of exterior non-load-bearing wall panel assemblies containing foam-plastic insulation.
3. Full-Scale Diversified Fire Test: Tested mockup, representative of completed multistory wall assembly of which EIFS is a part, showing no significant contribution to vertical or horizontal flame spread per ASTM E108 modified for testing vertical walls.
4. Intermediate-Scale Multistory Fire Test: Tested mockup, representative of completed multistory wall assembly of which EIFS is a part, complies with NFPA 285 for test method and required fire-test-response characteristics of exterior non-load-bearing wall panel assemblies containing foam-plastic insulation.
5. Radiant Heat Exposure: No ignition of EIFS when tested according to NFPA 268.
6. Potential Heat: Acceptable level when tested according to NFPA 259.
7. Surface-Burning Characteristics: Provide insulation board, adhesives, base coats, and finish coats with flame-spread index of 25 or less and smoke-developed index of 450 or less, per ASTM E84.
1.06 DELIVERY, STORAGE AND HANDLING
A. Deliver materials in manufacturer's original, unopened and labeled packages or containers.
B. Store, handle, and protect materials in accordance with manufacturer's recommendations.

1.07 PROJECT CONDITIONS
A. Environmental Conditions: Comply with manufacturer's requirements before, during and after adhesives and coatings are applied. Do not apply EIFS adhesives or coatings during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions.
B. Protect adjacent materials and surfaces from damage and soiling during system installation.
C. Steel or wood framing to receive the gypsum sheathing panels shall be structurally sound, free from bow and in general compliance with local building code requirements. Damaged and/or bowed framing shall be replaced before installation of the gypsum sheathing panels.

1.08 COORDINATION
A. Coordinate installation of EIFS with related Work specified in other Sections to ensure that wall assemblies, including sheathing, weather-resistant sheathing paper, flashing, trim, joint sealants are protected against damage from the effects of weather, age, corrosion, moisture, and other causes. Do not allow water to penetrate behind flashing and barrier coating of EIFS.

1.09 WARRANTY
A. Manufacturer: Provide warranty providing repair or replacement of materials and workmanship from defects arising from material failure including; but not limited to, excessive fading or color change, surface defects such as cracking or crazing for a period of five (5) years from date of Substantial Performance.
B. Installer: Provide warranty providing repair or replacement of materials and workmanship from defects arising from defective workmanship for a period of two (2) years from date of Substantial Performance.

PART 2 PRODUCTS
2.01 MANUFACTURER
A. Subject to compliance with specified requirements, provide EIFS products by one of the following:
2.02 MATERIALS

A. Compatibility: Provide adhesive, fasteners, board insulation, reinforcing meshes, base- and finish-coat systems, sealants, and accessories that are compatible with one another and with substrates and approved for use by EIFS manufacturer for Project.

B. Primer/Sealer: EIFS manufacturer's standard substrate conditioner designed to seal substrates from moisture penetration and to improve the bond between substrate of type indicated and adhesive used for application of insulation.

  1. VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Flexible-Membrane Flashing: Cold-applied, fully self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

D. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. per ASTM E 2098; complying with ASTM D 578 and the following:

  1. Standard-Impact Reinforcing Mesh: Not less than 4.0 oz./sq. yd.
  2. High-Impact Reinforcing Mesh: Not less than 20.0 oz./sq. yd.
  3. Strip Reinforcing Mesh: Not less than 3.75 oz./sq. yd.
  4. Detail Reinforcing Mesh: Not less than 4.0 oz./sq. yd.
  5. Corner Reinforcing Mesh: Not less than 7.2 oz./sq. yd.

E. Base-Coat Materials: EIFS manufacturer's standard mixture complying with the following: Factory-blended dry formulation of Portland cement, dry polymer admixture, and inert fillers to which only water is added at Project site.

F. Waterproof Adhesive/Base-Coat Materials: EIFS manufacturer's standard waterproof formulation and complying with one of the following:

  1. Job-mixed formulation of Portland cement complying with ASTM C 150, Type I, white or natural color; and manufacturer's standard polymer-emulsion adhesive designed for use with Portland cement.
  2. VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24)

G. Primer: EIFS manufacturer's standard factory-mixed, elastomeric-polymer primer for preparing base-coat surface for application of finish coat.

H. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating with enhanced mildew resistance complying with the following:
1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
2. Sealer: Manufacturer's waterproof, clear acrylic-based sealer for protecting finish coat.
3. Colors: As selected by Architect from manufacturer's full color range.

I. Water: Potable.

J. Mechanical Fasteners: EIFS manufacturer's standard corrosion-resistant fasteners consisting of thermal cap, standard washer and shaft attachments, and fastener indicated below; selected for properties of pullout, tensile, and shear strength required to resist design loads of application indicated; capable of pulling fastener head below surface of insulation board; and of the following description:
   1. For attachment to steel studs from 0.033 to 0.112 inch in thickness, provide steel drill screws complying with ASTM C 954.
   2. For attachment to light-gage steel framing members not less than 0.0179 inch in thickness, provide steel drill screws complying with ASTM C 1002.
   3. For attachment to wood framing members and plywood sheathing, provide steel drill screws complying with ASTM C 1002, Type W.
   4. For attachment, provide manufacturer's standard fasteners suitable for substrate.

K. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D1784, manufacturer's standard Cell Class for use intended, and ASTM C 1063.
   1. Casing Bead: Prefabricated, one-piece type of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
   2. Drip Screed/Track: Prefabricated, one-piece type with face leg extended to form a drip, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
   3. Expansion Joint: Prefabricated, one-piece V profile; designed to relieve stress of movement.

L. Elastomeric Sealant Products: Provide EIFS manufacturers listed and recommended chemically curing, elastomeric sealant that is compatible with joint fillers, joint substrates, and other related materials, and complies with requirements for products and testing indicated in ASTM C 1481 and with requirements in Section 079200 "Joint Sealants" for products corresponding to description indicated below:
   1. Multicomponent, nonsag urethane sealant.
   2. Single-component, nonsag, neutral-curing silicone sealant.
   3. Sealant Color: As selected by Architect from manufacturer's full range.
   4. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2.03 MIXING

A. Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

**PART 3 EXECUTION**

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of EIFS.

B. Examine edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected
   1. Begin coating application only after surfaces are dry.
   2. Application of coating indicates acceptance of surfaces and conditions.

3.02 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind EIFS and deterioration of substrates.

C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.

3.03 EIFS INSTALLATION, GENERAL

A. Comply with ASTM C1397 and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

3.04 SUBSTRATE PROTECTION APPLICATION

A. Primer/Sealer: Apply over gypsum sheathing substrates to protect substrates from degradation and where required by EIFS manufacturer for improving adhesion of insulation to substrate.

B. Waterproof Adhesive/Base Coat: Apply over sloped surfaces and parapets to protect substrates from degradation.
C. Flexible-Membrane Flashing: Install over weather-resistant barrier, applied and
lapped to shed water; seal at openings, penetrations, terminations, and where
indicated by EIFS manufacturer's written instructions to protect wall assembly
from degradation. Prime substrates, if required, and install flashing to comply
with EIFS manufacturer's written instructions and details.

3.05 TRIM INSTALLATION

A. Trim: Apply trim accessories at perimeter of EIFS, at expansion joints, and
elsewhere as indicated, according to EIFS manufacturer's written instructions.
Coordinate with installation of insulation.

1. Drip Screed/Track: Use at bottom edges of EIFS unless otherwise
indicated.

2. Casing Bead: Use at other locations.

3. Flashing: Use where indicated on Drawings.

3.06 BASE-COAT INSTALLATION

A. Base Coat: Apply to exposed surfaces of insulation in minimum thickness
recommended in writing by EIFS manufacturer, but not less than 1/16-inch dry-
coat thickness.

B. Reinforcing Mesh: Embed type indicated below in wet base coat to produce
wrinkle-free installation with mesh continuous at corners and overlapped not less
than 2-1/2 inches or otherwise treated at joints to comply with ASTM C 1397 and
EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8
inches of corners. Completely embed mesh, applying additional base-coat
material if necessary, so reinforcing-mesh color and pattern are not visible.

1. Standard-impact reinforcing mesh: Over 10 feet above grade, unless
otherwise noted.

2. High-impact reinforcing mesh: Up to 10 feet above grade, unless
otherwise noted.

C. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings
extending 4 inches beyond perimeter. Apply additional 9-by-12-inch strip
reinforcing mesh diagonally at corners of openings (reentrant corners). Apply 8-
inch wide strip reinforcing mesh at both inside and outside corners unless base
layer of mesh is lapped not less than 4 inches on each side of corners.

1. At aesthetic reveals, apply strip reinforcing mesh not less than 8 inches
wide.

2. Embed strip reinforcing mesh in base coat before applying first layer of
reinforcing mesh.

3.07 FINISH COAT INSTALLATION

A. Primer: Apply over dry base coat according to EIFS manufacturer's written
instructions.
B. Finish Coat: Apply over dry primed base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

1. Texture: As selected by Architect from manufacturer's full range.

3.08 INSTALLATION OF JOINT SEALANTS

A. Prepare joints and apply sealants, of type and at locations indicated, to comply with applicable requirements in Section 07 92 00 "Joint Sealants" and in ASTM C1481.

1. Clean surfaces to receive sealants to comply with indicated requirements and EIFS manufacturer's written instructions.
2. Apply primer recommended in writing by sealant manufacturer for surfaces to be sealed.
3. Install sealant backing to control depth and configuration of sealant joint and to prevent sealant from adhering to back of joint.
4. Apply masking tape to protect areas adjacent to sealant joints. Remove tape immediately after tooling joints, without disturbing joint seal.

3.09 FIELD QUALITY CONTROL

A. Special Inspections: Contractor will engage a qualified special inspector to perform special inspections as stipulated in IBC Chapter 17.

3.10 CLEANING AND PROTECTION

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION
SECTION 07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Type 1 - Fluid-applied vapor retarding air barrier on CMU and concrete.
   2. Type 2 - Fluid applied vapor permeable air barrier on sheathing.

1.02 RELATED SECTIONS

A. Gypsum Board Assemblies for wall sheathings and wall sheathing joint-and-penetration treatments: Section 09 21 16.

B. Building Insulation for foam-plastic board insulation: Section 07 21 00.

C. Joint Sealants for joint-sealant materials and installation: Section 07 92 00.

D. Through-Wall Flashing Membrane: Section 04 22 00.

1.03 DEFINITIONS

A. ABAA: Air Barrier Association of America.

B. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.04 REFERENCES

A. The following standards are applicable to this section:
   3. ASTM E1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls

1.05 SUBMITTALS
A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.

B. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction. Include details of interfaces with other materials that form part of air barrier. Include details of mockups.

C. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with the barrier; signed by product manufacturer.

D. Qualification Data: For Applicator.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers.

1.06 QUALITY ASSURANCE

A. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mockups: Before beginning installation of air barrier, apply air barrier to masonry mock-up constructed under section 04 22 00, build mockups cold-formed metal framing and sheathing construction indicated and apply air barrier to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.
   1. Coordinate construction of mockup to permit inspection by testing agency of air barrier before external insulation and cladding is installed.
   2. Include junction with foundation wall intersection.
   3. If Architect determines air barrier applications to mockups do not comply with requirements, reapply air barrier until approved.

C. Pre-installation Conference: Conduct conference at Project site.
   1. Include installers of other construction connecting to air barrier, including roofing, waterproofing, architectural precast concrete, masonry, sealants, windows, glazed curtain walls, and door frames.
   2. Review air barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures, sequence of installation, testing and inspecting procedures, and protection and repairs.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by manufacturer.
B. Remove and replace liquid materials that cannot be applied within their stated shelf life.

C. Store rolls according to manufacturer's written instructions.

D. Protect stored materials from direct sunlight.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply barrier to a damp or wet substrate or during snow, rain, fog or mist.

1.09 WARRANTY

A. Submit manufacturer's 10 year material warranty.

PART 2 PRODUCTS

2.01 FLUID-APPLIED MEMBRANE AIR BARRIER – TYPE 1

A. Class 1 Fluid-Applied, Vapor-Retarding Membrane Air Barrier: Cold-applied, elastomeric membrane.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Elastomeric Modified Bituminous Membrane:
      1) HENRY COMPANY; Air-Bloc 06.
      2) CARLISLE COATINGS & WATERPROOFING; Barriseal.
      3) MEADOWS, W. R., INC.; Air-Shield LM.
      4) STO CORPORATION; Sto Guard Vapor Seal.
   b. Composite Rubber Membrane:
      1) RUBBER POLYMER CORP. Rub-R-Wall Airtight.
      2) BASF Enershield – I
      3) MOMENTIVE – GE SEC2600 SilShield AWB

2. Physical and Performance Properties
   a. Air Permeability ASTM E2178: 0.004 cfm / ft² @ 1.57 lbs / ft² and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft² for 1 hour and gust wind load pressure of 62.8 lbs/ft² for 10 seconds when tested at 1.6 lbs/ft² to ASTM E331
   b. Water vapor permeance: 0.09 perms to ASTM E96
   c. Wet Film Thickness: Per manufacturer as required to achieve performance and code compliance.
   d. Surface Burning: ASTM E 84 Class A flame spread and smoke developed.

B. Self-adhering transition membrane: SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film. Membrane shall have the following physical properties:

1. Air leakage: <0.0001 CFM/ft² @ 1.6 lbs/ft² to ASTM E283
2. Vapor permeance: 0.05 perms to ASTM E96
3. Membrane Thickness: 0.0394" (40 mils)
4. Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M
5. Elongation: 200% to ASTM D412-modified

2.02 FLUID-APPLIED MEMBRANE VAPOR/AIR BARRIER – TYPE 2

A. Fluid-Applied, Vapor Permeable Membrane Air Barrier: Cold-applied, elastomeric membrane.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. Elastomeric Modified Bituminous Membrane:
      1) HENRY COMPANY; Air-Bloc 31.
      2) CARLISLE COATINGS & WATERPROOFING; Barritech VP.
      3) MEADOWS, W. R., INC.; Air-Shield LMP.
      4) STO CORPORATION; Emerald Coat.
      5) Momentive – GE SEC2600 SilShield AWB
   b. Silicone or Rubber or Acrylic Membrane:
      1) RUBBER POLYMER CORP. Airtight VP.
      2) BASF Enershield – HP
      3) DOW Defend Air 200

2. Physical and Performance Properties
   a. Air Permeability ASTM E2178: 0.004 cfm / ft² @ 1.57 lbs / ft² and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft² for 1 hour and gust wind load pressure of 62.8 lbs/ft² for 10 seconds when tested at 1.6 lbs/ft² to ASTM E331
   b. Water vapor permeance: 14 perms to ASTM E96 Method B
   c. Wet Film Thickness: Per manufacturer as required to achieve performance and code compliance.
   d. Surface Burning: ASTM E 84 Class A flame spread and smoke developed.

B. Self-adhering transition membrane: Vapor permeable air barrier membrane consisting of a microporous film laminate, backed with adhesive, which allows water vapor to permeate through while acting as a barrier to air and rain water. Membrane shall have the following physical properties:
1. Air leakage: <0.002 CFM/ft² @ 1.6 lbs/ft² to ASTM E283
2. Membrane Thickness: 17 mils
3. Low temperature flexibility -40 degrees F: Pass to ASTM D3111

2.03 AUXILIARY MATERIALS

A. Primer and block filler: Liquid waterborne or solvent-borne primer recommended for substrate by manufacturer of air barrier material.


C. Joint Reinforcing Strip: Air barrier manufacturer's glass-fiber-mesh tape.
D. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

E. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

F. Stainless-Steel Sheet: ASTM A240, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

G. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft density; flame spread index of 25 or less according to ASTM E162; with primer and non-corrosive substrate cleaner recommended by foam sealant manufacturer.

H. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

I. Joint Sealant: ASTM C920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 07 92 00.

J. Other materials as recommended by barrier manufacturer for a complete air and water tight barrier.

**PART 3 EXECUTION**

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Verify that concrete has cured and aged for minimum time period recommended by air barrier manufacturer.
3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
4. Verify that masonry joints are flush and completely filled with mortar.
5. Proceed with installation only after unsatisfactory conditions are corrected.

3.02 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.03 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D4258 before coating surfaces.
   1. Prime substrate and apply a single thickness of preparation coat strip extending a minimum of 3 inches along each side of joints and cracks. Apply a double thickness of air barrier membrane and embed a joint reinforcing strip in preparation coat.

B. Gypsum Sheathing: Fill joints greater than 1/4 inch with sealant according to ASTM C1193 and with air barrier manufacturer's written instructions. Apply first layer of fluid air barrier membrane at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air barrier membrane over joint reinforcing strip.

3.04 TRANSITION STRIP INSTALLATION

A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
   1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
   2. Install transition strip so that a minimum of 3 inches of coverage is achieved over both substrates.

B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
   1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed for required bond with adequate drying time between coats.

C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

E. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts and doors. Apply manufacturer’s recommended transition strip so a minimum of 3” of coverage is achieved over both substrates. Maintain 3” of full contact over firm bearing to perimeter frames with minimum of 1” full contact
   1. Transition Strip: Roll firmly to enhance adhesion.
   2. Elastomeric Flashing Sheet: Apply adhesive to wall, frame, and flashing sheet. Install flashing sheet and termination bars, fastened at 6” o.c. Apply lap sealant over exposed edges and cavity side of flashing sheet.
   3. Preformed Silicone-Sealant Extrusion: Set in full bed of silicone sealant applied to walls, frame, and membrane.

G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors and miscellaneous penetrations of air barrier membrane with foam sealant.

H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

I. Seal top of through-wall flashings, specified in Section 04 00 00, to air barrier with an additional 6-inch-wide, strip.

J. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

K. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.05 AIR BARRIER MEMBRANE INSTALLATION

A. Apply air barrier membrane to form a seal with strips and transition strips to achieve a continuous air barrier according to manufacturer’s written instructions.

B. Apply air barrier membrane within manufacturer’s recommended application temperature ranges.

C. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
   1. Prime glass-fiber-surfed gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

D. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
1. Membrane Air Barrier: 40-mil dry film thickness or greater thickness as required to meet specified performance properties.

E. Apply strip and transition strip a minimum of 1 inch onto cured air membrane according to air barrier manufacturer's written instructions.

F. Do not cover air barrier until it has been tested and inspected by testing agency.

G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.06 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Continuous structural support of air barrier system has been provided.
3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings.
4. Site conditions for application temperature and dryness of substrates have been maintained.
5. Maximum exposure time of materials to UV deterioration has not been exceeded.
6. Surfaces have been primed, if applicable.
7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
8. Termination mastic has been applied on cut edges.
9. Strips and transition strips have been firmly adhered to substrate.
10. Compatible materials have been used.
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.
13. All penetrations have been sealed.

C. Tests: Testing to be performed will be determined by the Owner's testing agency from among the following tests:

1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186, smoke pencil with pressurization or depressurization.
2. Quantitative Air Leakage Testing: Testing not to exceed the test pressure differential, positive and negative, indicated in "Performance Requirements" Article for air barrier assembly air leakage according to ASTM E283.
D. Remove and replace deficient air barrier components and retest as specified above.

E. Special Inspections: Arrange for and facilitate special inspection in accordance with IBC Chapter 17.

3.07 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
   1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed for more than 60 days or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
   2. Protect air barrier from contact with incompatible materials and sealants not approved by air barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION
SECTION 07 42 13
METAL WALL PANELS

PART 1 GENERAL

1.01 WORK INCLUDED
A. Prefinished, horizontally installed, steel wall panel system consisting of siding, subgirts, trim, flashing and sealant work for a complete installation.

1.02 RELATED SECTIONS
A. Flashing: Section 07 62 00.

1.03 REFERENCES

1.04 SUBMITTALS
A. Shop Drawings: Submit for all items. Include the following:
   1. Panel profile and gage.
   2. Erection layout.
   3. Wall openings.
   4. Special framing details.
B. Manufacturer's product specifications, standard details, certified product test results, installation instructions and general recommendations as applicable to materials and finishes for each component and for total system of preformed panels.
C. Samples: Submit minimum 9" long by full width sample of panel showing finish, pattern, color, gage and profile.

1.05 QUALITY ASSURANCE
A. For the purpose of establishing minimum aesthetic, functional and quality standards for the work of this section, proprietary standards are specified.
B. The manufacturer, referred to as "Fabricator" shall assume undivided responsibility for all components of metal panel work, and shall demonstrate not less than 5 years successful experience in fabrication and installation of metal panel systems similar to work of this project.

C. Performance Test Standards: Provide metal panel systems which have been pretested and certified by manufacturer under installed conditions as indicated for resistance as indicated to air and water infiltration and structural deflection and failure.

D. Qualifications of Installer: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section. The firm shall have not less than 5 years of successful experience in erection of metal panel systems similar to system required for this project.

E. Painted Finishes: Factory painted finish to be performed by an applicator specifically approved by the paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of the finish.

1.06 HANDLING AND STORAGE

A. Exercise care so as not to damage or deform material.

B. Stack on platforms or pallets and cover to protect from weather.

C. If an anti-stick compound or ply is used it shall be readily removable and not adversely affect the finish surfaces.

1.07 WARRANTY

A. Prior to initial payment, metal wall panel manufacturer shall furnish the Owner with a written manufacturer's warranty certifying that all wall panel work was furnished and installed in complete accordance with the Contract Documents.

B. Manufacturer's warranty shall certify that the installation will be free of defects in design and failures of materials, and construction and shall be warranted against leakage for a period of 5 years from the date of completion. Failure of materials or workmanship includes air infiltration, excessive deflections, deterioration of finish or construction in excess of normal weathering, and defects in joint sealants, and other components of the work.

C. Finish: Warranted for 20 years from date of substantial completion against:
   1. Color change more than 5 NBS units as determined in accordance with procedures set forth in ASTM D2244.
   2. Crack, peel or otherwise lose adhesion, the term "crack" not to include minute facing defects which may occur during fabrication of the coating building products.
   3. Chalk in excess of ASTM rating #8; the chalk rating to be determined in accordance with procedures outlined in ASTM D4214.
D. Should defects develop during the warranty period, such defects will be repaired by the metal panel manufacturer at no expense to the Owner.

PART 2  PRODUCTS

2.01  MATERIALS

A. Wall Panel Design Requirements
   1. Water Penetration: The exterior sheet shall allow no uncontrolled water leakage at 4.0 psf air pressure differential when tested in accordance with NAAMM Test Procedure TM-1.

B. Panel
   1. Material: Smooth galvanized steel conforming to ASTM A653, SS Grade 50, minimum yield stress of 50,000 psi, structural quality galvanized coating, designation G90.

   2. Description
      b. Depth: 1 3/8”.
      c. Basis of Design: INTERCEPT Entyre Panel System by CENTRIA
      d. Equivalent MFR’s systems: MORIN and METL-SPAN.

C. Trim: as provided by siding manufacturer, finish and color of trim as detailed to match siding.

D. Accessories
   1. Mounting Angles: Minimum 16 ga., galvanized steel; 2” x 2”; provide with slotted holes for plumb adjustment.
   2. For Installation on Insulated Masonry Walls and Light Gage Framing Walls: Provide 2” deep horizontal structural “Z”s” min. 16 gage G-90 galvanized, spacing and gage to be determined by siding manufacturer’s engineer and ¾” deep vertical subgirts min. 16 gage G-90 galvanized, with spacing determined by siding manufactures engineer. Z’s shall accommodate 2” rigid insulation boards to be installed between Z’s, coordinate Z spacing with insulation board widths.
   3. Flashings: Same material, gage and finish as adjacent panel material.
   4. Closure Strip: Flexible closed cell neoprene conforming to ASTM D1056 Grade SCE41.

E. Fasteners: Manufacturer’s standard items, conforming to the following minimums:
   1. Material: Type 305 stainless steel.
   2. Length: 3/4” for flashing and 1” or longer as required for siding.
   3. Exposed Fasteners: Color heads to match siding.

2.02  FINISHES

A. Panels and Trim
   1. Exposed Surfaces
      a. Material/Manufacturer: Fluoropolymer finish containing not less than 70% PVDF (Kynar 500) resins; "Trinar" by AKZO; "Duranar" by PPG; "Fluropon" by VALSPAR. Total dry film thickness not less
than 1.0 mils, or coatings meet or exceed the requirements of AAMA 2605.


c. Color: Color: As selected by Architect from paint manufacturer's complete specified line.

2. Unexposed Surfaces: Manufacturer's standard primer.

2.03 FABRICATION

A. General: All components of metal wall panel system shall be of the materials, design, sizes and thickness shown on approved shop drawings and/or specified herein.

B. Joints in Metal Work: Carefully match all exposed work to produce continuity of line and design, with all joints, unless otherwise shown or specified, being accurately fitted and rigidly secured.

C. Protection of Metals: Provide protection against galvanic action wherever non-compatible metals are in contact.

PART 3 EXECUTION

3.01 INSPECTION

A. After lines and grades have been established, and before beginning installation, examine all parts of the structure affecting the installation of the metal siding panels. Should conditions be found which, in installer's opinion, will prevent the proper execution of the metal siding panel work, installer shall report such conditions, in writing, to the General Contractor.

B. Installation work shall not proceed in that area until such conditions are corrected or adjusted to the satisfaction of the Installing Contractor.

3.02 INSTALLATION

A. Siding

1. Erect in accordance with the drawings and manufacturer's instructions and recommendations.

2. Erect sheets true and plumb, in alignment with horizontal and vertical edges of the building. Final appearance of the wall shall be visually flat, straight and free from defect.

3. Seal all panel/panel, panel/trim, and accessory/panel joints to provide resistance to specified water penetration.

B. Flashing

1. Install watertight, without waves, warps, buckles, fastening stresses, or distortion allowing for expansion and contraction.

2. Hem exposed edges.

3. Angle bottom edges of exposed vertical surfaces to form drips.
4. Hold down clips: Install as indicated or required.

C. Trim: Provide extruded trim at corners, openings, panel terminations, and other areas indicated.

3.03 ERECTION TOLERANCES

A. Provided the clearances shown on approved shop drawings are maintained and supporting substructure is installed to proper tolerances, all parts of the metal siding system, when completed, shall be within the following tolerances:

1. Maximum variation from plane or location shown on approved shop drawings: 1/4” per 12’ of length, or 1/2” in any total length.
2. Maximum offset from true alignment between two identical members abutting end-to-end in line: 1/8”.

3.04 DAMAGED PANELS

A. Do not install panels that are bent, chipped, or otherwise damaged.

B. Refinish all abraded surfaces to match original finish, using materials and methods recommended by siding manufacturer. Materials shall be fully compatible with the original finish system.

C. Repaired surfaces shall be uniform and free from variations in color and surface texture from that of adjacent, like surfaces.

D. If repaired sheet is not acceptable to the Associate, remove sheet and replace with a new sheet, at no additional cost to the Owner.

3.05 REMOVAL OF DEBRIS

A. All debris caused by or incidental to the installation work shall be removed from the jobsite as the work progresses. Waste debris will not be permitted to accumulate.

3.06 CLEANING AND PROTECTION

A. Cleaning: Clean finished surfaces as recommended by panel manufacturer, and in accordance with Section 01 74 00 requirements.

1. Clean siding surfaces of dirt, grime and other surface blemishes.

B. Protection: Installer shall advise 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.

END OF SECTION
PART 1 – GENERAL: not used

PART 2 – PRODUCTS

2.01 The Total Roofing System Warranty shall be provided on the form of Section 07 50 36. No other warranty form is acceptable, and no other warranty, stipulations, or qualifications may be incorporated or attached. If more than one building, roof, or type of membrane is provided in the Contract, provide a separate warranty for each, even if they are alike. All informational blanks on the warranty form shall be filled in prior to execution.

PART 3 – EXECUTION

3.01 Prior to the Manufacturer’s final inspection, which is a distinct and different inspection from the Designer’s final inspection of the Work of the Contract, and prior to the Manufacturer’s execution of the Total Roofing System Warranty, submit a mock-up of the Total Roofing System Warranty to the Designer, completely filled out with all information except, if not yet certain, the warranty number and individual persons names, titles, signatures, dates of signature, and contact information. Obtain Designer’s approval of this mock-up, and use this for the executed warranty. Execute the Warranty in two (2) counterparts for inclusion in the two (2) sets of Project data Binders (See specification section 01 78 21). All signatures on counterparts shall be “wet” (blue ink on paper, affixed by hand) signatures. Provide copies attached to final pay requests (See specification 01 29 76).

3.02 Filling in the upper portion of page 1:

A. SBC Project Number: fill in the “the Project” identification shown on page 1 of the construction Agreement in the format of 000/000-00-000XX, in which characters might or might not have been included for the Xs.

B. Warranty Period: fill in “thirty (30) years”.

C. Warranty Number: fill in a unique number provided by the Manufacturer for its own tracking purposes. Fill this is identically in the blanks near the upper right of each page of the form.

D. Building, Campus and Address: fill in:
   1. the name of the institution;
   2. “main campus” or the name of the campus if not the main campus;
   3. the name of the building and address or the campus ID number;
   4. if only a portion of a building, indicate which portion using conventions of the institution;

E. Roofing System Manufacturer & Address: fill in completely.

F. Roofing System Manufacturer Contact, Phone, and Email: fill in the name of the appropriate person to provide warranty service response on behalf of the Manufacturer, and their commonly used phone number and email address.

G. Manufacturer Authorized Roofing Applicator: fill in name and address of the “Roofing Contractor” (or subcontractor) that installed the System covered by this warranty.

H. Designer: fill in name of Designer shown on page 1 of the construction Agreement.

I. Contractor: fill in name of the general Contractor shown on page 1 of the construction Agreement, if different from the Applicator identified above. If the same, fill in “same”.

3.03 Filling in THE TOTAL ROOFING SYSTEM COMPONENTS on page 1

Refer to the roofing system specifications for the list of components to be included in the Total Roofing System Warranty. The components already named in the form shall be included if they occur in this system. Strike out components already named in the form that are not included in this roofing system and add components not already named in the form that are specified for inclusion.
3.04 Filling in where THE ROOFING CONTRACTOR CERTIFIES on page 1:
   A. Roofing Contractor: fill in the name of the Roofing Contractor, same as the Authorized Roofing Applicator above (per 3.02.G in this section).
   B. Authorized Signature: a suitably authorized representative of the Roofing Contractor with authority to bind the Roofing Contractor to the terms of this certification shall sign here.
   C. Fill in the name of the person providing the Authorized Signature, their title within the Roofing Contractor organization, and the date on which the signature is affixed.

3.05 Filling in where THE MANUFACTURER WARRANTS on page 1:
   A. Manufacturer: fill in the name of the Manufacturer, same as the Roofing System Manufacturer above (per 3.02.E in this section).
   B. Authorized Signature: a suitably authorized representative of the Manufacturer with authority to bind the Manufacturer to the terms of this Warranty shall sign here.
   C. Fill in the name of the person providing the Authorized Signature, their title within the Manufacturer organization, and the date on which the signature is affixed.

3.06 Filling in the ROOFING SYSTEM INFORMATION on page 2:
   A. Fill in an “X” or similarly in one of the provided boxes to indicate that the roof is a “New Roof” over new construction or is a “Reroof” over existing construction.
   B. Warranty Number: fill in same as in upper right of page 1.
   C. Area of Roof Installed: fill in the total square feet (SF) of the roof installed.
   D. Date of Substantial Completion: Fill in the date certified by the Designer.
   E. Date of Warranty Expiration: Fill in the date equal to the Date of Substantial Completion (per 3.06.D this section) plus the Warranty Period filled in at the top of page 1 (per 3.02.B this section).
   F. ROOFING SYSTEM COMPONENTS:
      Complete all information for each item listed. Provide complete description of each component in the system. When different components or systems are present, describe each condition and location. If the particular component is not used in this system, fill in “n/a” in the space.
   G. MANUFACTURER’S MEMBRANE INFORMATION:
      Provide Manufacturer unique roll identification number for each roll used in this project.
   H. MANUFACTURER FINAL INSPECTION:
      1. The Manufacturer’s final inspection is limited in scope to the Roofing System, and is a distinct and different inspection from the Designer’s final inspection of the Work of the Contract.
      2. Fill in name and title of the Manufacturer’s representative making the inspection. Fill in the date of the inspection. Provide signature by that representative.
      3. Fill in the name and title of the Designer representative that was present at inspection.
      4. Fill in the name and title of the Owner’s representative (other than the Designer) that was present at inspection.

3.07 Executing the Warranty by the TOTAL ROOFING SYSTEM MANUFACTURER at the bottom of page 4:
   A. Fill in Roofing System Manufacturer’s name, same as on page 1 (per 3.02.E and 3.05.A this section).
   B. Once the roof work is acceptable to the Roofing System Manufacturer, affix signature of Roofing System Manufacturer’s authorized and binding representative. Fill in date of signature.
   C. Fill in the name and title of the Roof System Manufacturer’s signatory.

END OF SECTION
SECTION 07 50 36
TOTAL ROOFING SYSTEM WARRANTY
State of Tennessee

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<tr>
<th>SBC Project Number</th>
<th>Warranty Period (Years)</th>
<th>Warranty Number</th>
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Building, campus, and address

Roofing System Manufacturer ("Manufacturer") and address

Roofing System Manufacturer Contact
Phone
email

Manufacturer Authorized Roofing Applicator ("Roofing Contractor"): and address

Designer
General Contractor (if different from applicator above)

The Roofing System Manufacturer, (Manufacturer) warrants to the Tennessee Board of Regents (Owner) of the above building, that subject to the Terms, Conditions, and Limitations stated in this no dollar limit (NDL) warranty, the Manufacturer will repair any leak in the Total Roofing System installed by a Manufacturer authorized roofing applicator (Roofing Contractor) for a period stated above commencing with the date of Substantial Completion. The Manufacturer will repair or replace system defects or failures.

THE TOTAL ROOFING SYSTEM COMPONENTS are defined as the following; all materials as manufactured or authorized by the Manufacturer: including, but not limited to: membrane, flashings, counterflashings, adhesives and sealants, insulation, cover boards, fasteners, fastener plates, fastening bars, metal work, insulation adhesives, and any other products utilized in this installation. (Strike out materials not included in this system and add other materials included as required):

THE ROOFING CONTRACTOR CERTIFIES that the Total Roofing System was installed in strict accordance with the Manufacturer's recommendations utilizing only the Manufacturer's authorized products to install the Total Roofing System and that all products were protected while in their possession prior to installation and had no moisture or water trapped in the Total Roofing System. The Roofing Contractor certifies that all necessary steps were taken to ensure that all conditions were met for the issuance of The Total Roofing System Warranty by the Manufacturer.

Roofing Contractor
Authorized Signature
Print or Type Name
Title
Date

THE MANUFACTURER WARRANTS that if it cannot supply a specified product for inclusion in a Total Roofing System Warranty, the Roofing Contractor must obtain prior written approval from the Manufacturer for all products not supplied by the Manufacturer to be incorporated in the Total Roofing System Warranty. The Manufacturer will issue a Total Roofing System Warranty. In addition to a final inspection of the completed installation by the Manufacturer, the Manufacturer is also entitled to supplement their final field inspection with the Roofing Contractors above certification. There will be NO exceptions or exclusions to the Total Roofing System Warranty based upon products used or installation issues by the authorized Roofing Contractor, provided all materials installed are provided or authorized by the Roofing System Manufacturer.

Manufacturer
Authorized Signature
Print or Type Name
Title
Date
ROOFING SYSTEM INFORMATION

<table>
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<tr>
<th>New Roof</th>
<th>Reroof</th>
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Warranty Number

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<th>Area of Roof Installed (SF)</th>
<th>Date of Substantial Completion</th>
<th>Date of Warranty Expiration</th>
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TOTAL ROOFING SYSTEM COMPONENTS – list all that apply:

- Type of Roof deck(s)
- Type of metal flashing / trim / coping, etc.
- Type of vapor barrier
- Type of air barrier
- Type and thickness of flat insulation
- Type and slope of tapered insulation
- Type of recovery board
- Type of flashing
- Membrane type and color

MANUFACTURER’S MEMBRANE INFORMATION
List manufacturer’s roll identification for ALL rolls of used: If additional space is needed, attach additional sheet

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<tr>
<th>Manufacturer's roll identification</th>
<th>Method of attachment</th>
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MANUFACTURER FINAL INSPECTION performed by:

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Designer Representative present for Final Inspection:

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Owner Representative present for Final Inspection: (when practical)

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1. Owner shall provide the Manufacturer with written notice within thirty (30) days of the discovery of any leak(s) in the roof system.

2. The Manufacturer shall within fourteen (14) calendar days, commencing with receipt of written notice from the Owner, inspect the roofing system in the presence of the Owner's representative (when practical) and if the cause(s) of the leak(s) is found the responsibility of the Manufacturer under this warranty, promptly make or cause to be made, the repair(s) or replacements(s) necessary to return the roofing system to the condition which is watertight and remediate moisture. All repair expenses incurred in connection herewith will be the responsibility of and borne by the Manufacturer.

3. If upon joint inspection by the Manufacturer and the Owner’s representative of the roofing system as provided in Paragraph 2, the cause(s) of any leak(s) is found not the responsibility of the Manufacturer under this warranty, the Manufacturer will immediately advise the Owner of the type and extent of repair(s) required to be made at the Owner's expense and if such repair(s) be promptly and reasonably made by the Manufacturer, this warranty will remain in effect for the unexpired portion of the warranty period; otherwise, this warranty will become null and void with respect to the area(s) or item(s) affected.

4. In the event the Manufacturer and Owner disagree as to the cause(s) and responsibility of the leak(s), then the Owner, without prejudice to any other remedy Owner may have, may make repair(s) of any leak(s) in accordance with Manufacturer recommendations if timely made available. Such action by the Owner shall not constitute a violation of this warranty. The Owner reserves the right to pursue reimbursement from the Manufacturer for all cost(s) and expense(s) of such repair(s), subject to the Manufacturer's responsibility under this warranty. If it is determined that the Manufacturer has no responsibility for the leak(s) under this warranty, the Owner will reimburse the Manufacturer for direct expenses encountered for trips requested by the Owner after the initial inspection.

5. In the event an emergency condition arises where, in the reasonable opinion of the Owner immediate reasonable repair(s) are necessary to avoid substantial damage to the building or its contents and the Manufacturer advises the Owner in writing of its inability, for reasons beyond its control, to inspect and repair the roof system as necessary within fourteen (14) days of written notification from the Owner, then the Owner may make such temporary repair(s) as in the opinion of the Owner are essential and necessary and such action by the Owner shall not constitute a violation of this warranty. In these circumstances, the Manufacturer shall reimburse the Owner for all reasonable costs and expenses of such temporary repair(s) subject to the Manufacturer's responsibility under this warranty.

6. In the event the Manufacturer fails to respond to written notification of known or suspected leak(s) as provided in Paragraph 2, the Owner may, after fourteen (14) days following receipt by the Manufacturer of an additional written notice and without prejudice to any other remedy he may have, make permanent repair(s) of any leak(s) and recover all reasonable costs and expenses of such repair(s) from the Manufacturer. The Manufacturer will, upon demand by the Owner, promptly reimburse the Owner these reasonable repair costs and expenses. Such action by the Owner shall in no way negate the responsibilities of the Manufacturer under this warranty for the unexpired portion of the warranty period.

7. Except as provided in Paragraphs 4, 5 & 6, any alterations of the roofing system after completion and acceptance including the placement of fixtures, utilities and equipment on or through the roof or additions thereto, will render this warranty null and void with respect to the area(s) or item(s) affected unless prior written authorization of such alterations of the roof system or additions thereto is given by the Manufacturer. Such authorization will not be unreasonably withheld.

8. This warranty shall not be applicable to the extent the roofing system sustains damage(s) by any of the following:
   (a) Acts of God and natural disasters, including but not limited to lightning, hurricanes, tornadoes, and earthquakes, winds of (3 second) peak gust speeds of 72 MPH or higher (determined by the nearest US Weather Station measured at 10 meters above ground or at the given address if reliable pinpoint wind data is available for the address), hail with a diameter greater than two inches;
   (b) Acts of negligence (whether of omission or commission), fire, accidents, or misuse, including but not limited to vandalism, civil disobedience, or acts of war, provided same are not caused by the Manufacturer and/or the Contractor.
   (c) Failure by the Owner to use reasonable care in maintaining the roof and appurtenances, provided same caused the leak(s) or item(s) affected; or,
   (d) For built-up and modified bitumen roofs: A roof design or specification authorized by the Owner with less than 1/8" per foot slope for drainage.
   (e) Building design issues that affect the performance of the Total Roofing System.

9. When the roof system has been damaged by any of the foregoing causes, repair(s) shall be at the Owner's expense and such repair(s) shall be made as provided in Paragraph 3; otherwise, this warranty will become null and void with respect to the area(s) or item(s) affected.
10. Until such time as the third year of this warranty has expired, the Manufacturer's obligations hereunder shall be joint and several with the Contractor. For the purpose of this paragraph, all of the Contractor's actions, whether of omission or commission, that are subject to this warranty are likewise the actions of the Manufacturer hereunder and shall in no way negate or reduce the responsibilities of the Manufacturer under this warranty.

11. As part of the repair of leaks, the Manufacturer shall replace roof insulation included in this warranty that become damaged as a result of a roof leak, provided the roof leak is not excluded under the Terms, Conditions, and Limitations set forth in this warranty. The replacement of damaged roof insulation shall be limited to those boards that have lost the structural integrity necessary to support and restrain the System when it is subjected to dynamic loads such as typical roof service traffic, winds up to 72 mph, hail up to two inches in diameter, and periodic accumulations of water, snow, or ice. In the event that roof insulation is damaged as a result of a roof leak excluded under the Terms, Conditions and Limitations set forth in this warranty, the Manufacturer will advise the Owner of the type and extent of insulation and recovery board replacement to be made at the Owner's expense. Failure by the Owner to properly make these repairs in a reasonable manner using a Manufacturer licensed applicator and within a reasonable period of time shall render this Warranty null and void in the area of the damage. Neither the Manufacturer nor the Owner shall have any obligation to replace roof insulation and recovery board if the area affected by the leak is less than fifty (50) square feet.

12. The Manufacturer certifies that it:
   (a) Manufactures or purchases products for the purpose of designing, developing, and marketing a roof system;
   (b) Provides recommendations, specifications, and details for the roofing system materials and installation;
   (c) Trains and authorizes Roofing Contractors;
   (d) Provides technical assistance to Roofing Contractors;
   (e) Approves or prepares shop drawings; and,
   (f) Provides a technical representative employed by the Manufacturer for the final inspection, and to all inspections required by this warranty.

13. During the period of this warranty, the Manufacturer, its agents or employees, will have free access to the roof during regular business hours of the Owner.

14. Owner shall be responsible for the costs associated with the removal and replacement, as well as any damage caused by the removal and replacement of any overburden, super strata, or overlays, either permanent or temporary, excluding accepted stone ballast or pavers, as necessary to expose the system for inspection and/or repair.

15. Alterations or repairs to the System that are not completed in accordance with Manufacturer's published specifications, not completed by an authorized contractor, and/or where current notification procedures were not followed are excluded and this warranty will become null and void with respect to the area(s) or item(s) affected.

16. For a 30 year single ply membrane roof system, the Total Roofing System Warranty shall cover the proper repair of leaks caused by unintentional, accidental and occasional puncture damage to the membrane as a result of normal rooftop inspection, maintenance or service; however, it does not cover damage caused by snow removal or damage caused by other trades during construction. There shall be no man hour limitation per year on accidental puncture repairs covered by this provision of the warranty. Resulting wet insulation shall be treated as set forth in Paragraph 11 above.

TOTAL ROOFING SYSTEM MANUFACTURER

__________________________
Roofing System Manufacturer name

__________________________
Authorized Signature & Date

__________________________
Print or Type Name & Title
SECTION 07 53 23

ELASTOMERIC MEMBRANE ROOFING – EPDM

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide an elastomeric sheet roofing system as shown / specified. Work includes:
   1. Adhered, smooth surface elastomeric sheet roofing system.
   2. Insulation.
   3. Cover board.
   4. Flashing, pipe seals, and roofing accessories.
   5. Installing roof flashings and sheet metal furnished under Section 07 62 00.
   6. Membrane flashing under metal copings.

1.02  RELATED SECTIONS

A. Rough Carpentry:  Section 06 10 00.
B. Flashing and sheet metal:  Section 07 62 00.
C. Roof Drains, Vents and Curbs: Divisions 22 and 23.

1.03  QUALITY ASSURANCE

A. Manufacturer Qualifications: To participate as a qualified company in production of Elasto/Plastic materials, the company must have a minimum of ten (10) years as the sole manufacturer of the brand name. Manufacturer shall also furnish notarized certification that he has been in business and had roofs installed for a minimum of ten (10) years.

B. Installer Qualifications: An experienced roofing installer approved or licensed by roofing materials manufacturer and with not less than ten (10) years of successful experience installing elastomeric sheet roofing systems similar to those required for this project.
   1. Installer’s Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress. Maintain proper supervision of workmen.

C. Manufacturer’s representative shall conduct timely inspection of the roof installation to satisfy all warranty requirements.

D. Factory Mutual (FM) Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals’ "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.
   1. Fire/Windstorm Classification: Class 1A-75.
   2. Hail Resistance: MH.
E. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

F. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

G. Owner reserves the right to cut test panels from the finished roof in order to determine that minimum requirements have been met.
   1. Roof Installer: Repair, at no additional cost to the Owner, the roof where test panels were taken.

H. Insulation Thermal Properties: Thermal conductivity k-factors and thermal resistance R-values indicated are values at 75 degrees F., mean temperature.
   1. Where insulation is identified by R-value, provide thickness required to achieve indicated R-value. Foam insulation R-values are "aged" thermal values in accordance with LTTR – Long Term Thermal Resistance predicted by ASTM C1289-13.

1.04 SUBMITTALS

A. Shop Drawings: Submit for all items. Include as a minimum the following:
   1. Layout of roof showing sheet sizes and field joint and fastener locations.
   2. Location and type of penetrations.
   3. Layout of mechanical fasteners, including perimeter requirements.
   4. Perimeter, penetration and special details.
   5. Description of all materials.
   6. Conformance to fire classifications requirements of IBC 1505.
   7. Setting plans for tapered insulation.

B. Manufacturer's Approval: Obtain manufacturer's written approval of final shop drawings prior to beginning roofing operations.

C. Samples: Submit samples of all roofing and flashing materials, walkways and fasteners; 12" square samples of membrane indicating color and thickness.

D. Submit certification from roofing manufacturer that:
   1. Roofing membrane and the selected roofing insulation are compatible.
   2. Specifications and drawing details are acceptable for the deck and surfacing materials to which materials are to be applied.
   3. Installer is trained and approved for this type of installation.
   4. Roof system is adhered properly to meet or exceed the requirements of the specified FM requirements.

E. Submit specimen copy of manufacturer's roofing warranty.

F. Submit field quality-control reports.
G. Contamination Profile: Manufacturer shall provide applicator and building Owner with a tabular profile of chemicals, solutions, oils, compounds or materials which are injurious to the sheet membrane. Establish profile on a trade name or generic basis, include those materials normally found to exist in the roof environment or likely to occur on this roof.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened, undamaged, labeled bundles or containers.

B. Store roofing materials, insulation and accessories at the site in storage trailers or the building in a dry, well-ventilated, weather tight place. Exterior storage not permitted. Comply with manufacturer's recommendations for handling and protection during installation.
   1. Handle rolled goods to prevent damage to edge or ends.
   2. Do not apply roofing materials to damp, frozen, dirty or dusty substrate surfaces.

C. Protection
   1. Protect adjacent materials and surfaces from damage and soiling during roofing system installation.
   2. Provide special protection or avoid heavy traffic on completed roofing work.
   3. Protect paving and structure walls adjacent to hoists before starting work.
   4. Do not overload the building structure with storage of materials or installation equipment on the substrate decking.
   5. Handle and store materials and equipment to avoid damage to substrate decking.

1.06 PROJECT CONDITIONS

A. Environmental Conditions: Install roofing only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.07 WARRANTY

A. Contractor and roofing subcontractor shall warrant the total roofing system (membrane, insulation and flashing) with respect to workmanship and proper application for two (2) years from the date of acceptance by the Owner. Should any leaks covered under the warranty occur during this period, corrective action will be taken by the Contractor to repair the roof to the satisfaction of the owner and membrane manufacturer. ALL CORRECTIVE WORK WILL BE DONE AT NO COST TO THE OWNER.

B. The manufacturer(s) of the materials used shall provide a written thirty (30) year guarantee on the complete roof installation. Upon warranty inspection and acceptance of the roof, the guaranty will be turned over to the Owner on behalf of the Contractor, by an authorized representative of the manufacturer. The guaranty shall begin when the project is completed and accepted by the Owner. Submit final guaranty in triplicate.
1. Warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories and other components of membrane roofing system.

2. System shall be warranted for all requirements specified herein, including for wind uplift as required.

C. Corrective measures on leaks shall be undertaken within seventy-two (72) hours after notification has been received by the Contractor or membrane manufacturer from the Owner.

D. If manufacturer, Contractor or roofing installer has any variance with these specifications in order to comply with required guarantees, submit same in writing to the Architect within 10 days prior to bid.

PART 2 PRODUCTS

2.01 MEMBRANE ROOFING

A. Manufacturers: CARLISLE SYNTEC SYSTEMS; JOHNS MANVILLE, FIRESTONE and GENFLEX.

B. Membrane Materials and Components


2. Elastomeric Sheet Membrane: EPDM (ethylene propylene diene monomers) formed into uniform flexible sheets, not less than 90 mils (.090") thick.

3. Flashing: 60 mil (.060") thick EPDM sheet flashing of required shapes and sizes to suit conditions. Provide cured or uncured applicable for conditions

C. Auxiliary Roofing Materials: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.

1. General

   a. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

   b. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

      1) Plastic Foam Adhesives: 50 g/L.
      2) Gypsum Board and Panel Adhesives: 50 g/L.
      3) Multipurpose Construction Adhesives: 70 g/L.
      4) Fiberglass Adhesives: 80 g/L.
      5) Single-Ply Roof Membrane Adhesives: 250 g/L.
      6) Single-Ply Roof Membrane Sealants: 450 g/L.
      7) Non-membrane Roof Sealants: 300 g/L.
      8) Sealant Primers for Nonporous Substrates: 250 g/L.
      9) Sealant Primers for Porous Substrates: 775 g/L.
     10) Other Adhesives and Sealants: 250 g/L.
2. Bonding Adhesive: Type recommended by sheet material manufacturer for membrane, substrate and project conditions indicated.

3. Splice Adhesive: Type recommended by sheet material manufacturer for membrane, substrate and project conditions indicated. Compatible with materials with which used.

5. Splice Wash, Lap Sealant, Pourable Sealer, Water-Block Sealer, Fastener Sealer and Night Sealer: Sheet material manufacturer's recommended materials for waterproof sealing of seams in membrane and waterproof sealing of joints between flashings and roofing membrane, adjoining surfaces, projections and penetrations through the roofing membrane. Compatible with materials with which used.

6. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

7. Prefabricated Pipe Seals: Manufacturer's standard type.

2.02 INSULATION


1. Tapered Insulation: 1/4" per foot. No slope under ¼" per foot permitted.

2. R-Value: Provide thickness for average R of 25 over entire roof area.

3. Minimum Thickness at Drain: 2".

4. Provide high density board for roof system under outdoor terrace. Coordinate PSI rating with design loads for terrace.

B. Coverboard: Provide one of the following:

1. ½" glass-mat, water-resistant gypsum substrate, primed surface; ASTM C1177, (adhered in adhesive). Dens-Deck by GEORGIA-PACIFIC, Secure Rock Roof Deck by USG, GlasRoc Roof Board by CERTAINTEED (adhered in adhesive)

C. Provide adhesives as recommended by insulation manufacturer for substrates encountered.

D. Mechanical fasteners for attachment of insulation to decking shall be approved by the insulation manufacturer for the system specified.

1. The same brand fastener is to be used throughout the roof system.

2. Number of fasteners and layout will be as recommended by the manufacturer and as per FM Approval Guide for the specified wind uplift.

3. Length of fastener shall be determined by the thickness of the decking and any fill, and will vary in thickness of the insulation. Fasteners shall be of length to achieve a minimum of 1-inch penetration. Mechanical fasteners for attachment of Insulation NOTE: All subsequent layers of Insulation and Underlayment are to be adhered in adhesive.

E. Crickets (Tapered Insulation): Provide tapered insulation crickets sloped approximately ½" per foot. Locate and arrange as indicated on drawings or as required to divert water at rooftop equipment or vertical obstructions.

1. Material: Polyisocyanurate; conform to requirements and manufacturers specified herein.
2.03 MISCELLANEOUS ITEMS

A. Wood Members: Comply with requirements of wood blocking, Section 06 10 00, for wood members indicated as roofing system work. Provide wood pressure treated as specified.

B. Sheet Metal and Flashings: Furnished under Section 07 62 00.

C. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, minimum ¼” thick, and acceptable to membrane roofing system manufacturer.

2.04 FASTENERS

A. Provide roofing membrane manufacturer's recommended type mechanical fastener for metal deck. Type, size and spacing shall be as required to maintain specified system warranty.

PART 3 EXECUTION

3.01 INSPECTION

A. Pre-Installation Conference: Not less than two weeks before start of roofing installation, meet at project site with Architect, Contractor, roofing installer, roofing material manufacturer's representative and mechanical and electrical trades. Review project requirements, required submittals, status of substrate work, areas of potential conflict and interference, availability of materials, installer's personnel, equipment and facilities, construction schedule, weather and forecasted weather conditions, and coordinate methods, procedures and sequencing requirements for proper installation, integration and protection of the work.

B. Examine substrates and installation conditions. Do not proceed with insulation and roofing work until unsatisfactory conditions have been corrected.

C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Verify that work which penetrates roof deck, or requires men or equipment to traverse roof deck, has been completed.

B. Examine substrate surfaces for adequate anchorage, foreign materials, moisture and unevenness that would prevent the execution of roofing system specified.

C. Correct unsatisfactory conditions before starting roofing. Roof deck surface conditions shall comply with manufacturer's requirements and be acceptable to the roofing system installer.

D. Protect other work from spillage of roofing materials. Repair or replace other work
damaged by installation of the elastomeric membrane roofing system work.

3.03 INSTALLATION

A. Insulation: Install insulation in accordance with roof insulation manufacturer's recommendations. Mechanically fasten insulation to deck using approved fasteners. Fasteners shall penetrate insulation and deck. Tightly butt all insulation board joints. Fill joints wider than 1/4” as recommended by roofing membrane manufacturer.
1. Do not install insulation faster than can be immediately covered with roofing.
2. Do not leave uncovered edges or surfaces of insulation at the end of the day.
3. Conform to FM recommendations for fastener spacing at roof perimeters and corners.
4. Joints of multiple later insulation should be staggered over joints of the underlying insulation.
5. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and adhere to insulation.

B. Elastomeric Membrane: Comply with roofing manufacturer's instructions and recommendations for handling and installing elastomeric membrane roofing.
1. Start at low point of roof and work towards high point to minimize entry of water under the roofing system or as recommended by the manufacturer.
2. Unroll and position roofing sheet membrane without stretching. Allow membrane to "relax" for at least 30 minutes before adhering, splicing and flashing.
3. Position adjoining sheets in the same manner providing proper lap at edges for splicing and at adjacent vertical surfaces.
4. Apply bonding adhesive to both sheet membrane and substrate surfaces and fully adhere sheet membrane to the substrate in accordance with manufacturer's recommendations. Broom bonded membrane to achieve maximum contact.
5. Clean overlap areas of sheets. Join overlaps with splice cement, roll splices, and seal with lap sealant in accordance with manufacturer's recommended lap splice procedure.

C. Flash and make watertight equipment curbs for mechanical equipment located on the roof.

D. General flashing details for roof penetrations, curbs, parapets and roof perimeters shall comply with roofing material manufacturer's standard details and recommendations for flashings.
1. Provide base flashing at perimeters and edges of membrane abutting parapets, walls, curbs or other construction. Provide prefabricated pipe seals for pipe and conduit penetrations, properly cemented to membrane and sealed to pipe or conduit with stainless steel clamp and top bead of sealant.
2. Mechanical fasteners below counterflashing, where required at perimeter
flashings, to be fully enclosed with suitable membrane to form water tight seal.

3. Minimum height of membrane flashing terminations to be 8" above top of membrane, unless otherwise indicated.

E. Install roof flashing and sheet metal work furnished under Section 07 62 00.
1. Metal Coping: Provide membrane flashing under all new copings.
   a. At Coping Adjacent to Roof: Extend base flashing up parapet and over top of coping; extend down exterior face of coping approximately 2".
   b. At Independent Copings: Provide membrane flashing over top of wall and extend down both sides approximately 2".

F. Walkways: Install walkways where indicated on drawings. Adhere walkway pads to membrane. Maintain approximately 4" between pads.

G. Blocking Shim blocking solidly as required to make top surface of blocking level with top of insulation.

3.04 CLEANING AND PROTECTION

A. Patch installations by other trades and make all necessary repairs as required.

B. Upon completion of roofing work, clean gutters and drains of foreign materials and aggregate and remove all debris and surplus materials.

C. Protect finished roof areas from foot traffic and construction damage until final acceptance.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide flashing and sheet metal work as shown and specified. Work includes:
1. Flashing, counterflashing, copings and edge conditions (gravel) stops.
2. Miscellaneous flashings (step, drip, flat/slope roof transition, etc.).
3. Miscellaneous rooftop concealed flashing.
4. Sheet metal roofing and related flashing, trim and accessories.
5. Fasteners, sealants, solder and accessories to complete the work.

1.02  RELATED SECTIONS

A. Masonry Flashing: Section 04 22 00.
B. Metal Wall Panels: Section 07 42 13

1.03  QUALITY ASSURANCE

A. Comply with Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) "Architectural Sheet Metal Manual" recommendations for fabrication and installation of the work.

B. Reference Standards

C. Subcontractor: Subcontract sheet metal associated with roofing as a part of the roofing contract for undivided responsibility.

D. Attachments to or penetrations in roofing systems to be made only with full approval of roofing manufacturer. Obtain approvals as required for installation of work under this section. Notify Architect if deviations from documents is required to obtain approval from roofing manufacturer prior to fabrication.

E. SPRI Wind Design Standard: Manufacture and install copings and fascia tested according to SPRI ES-1 and capable of meeting the design pressures indicated on the Structural Drawings.
F. Painted Finishes: Factory painted finish to be performed by an applicator specifically approved by the paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of finish.

1.04 SUBMITTALS

A. Shop Drawings and Product Data: Submit on all sheet metal work specified herein. Drawings to show all expansion joint details, joint details, waterproof connections to adjoining work and at obstructions and penetrations, methods of attaching to building and all formed sections. Include the following:
   1. Coping, edge condition stops and pre-finished components as detailed.

B. Submit 8" square material samples for each type of sheet metal required.

C. Submit full width by 8" long samples of all manufactured and fabricated items. Provide with specified finish and color.

1.05 PROJECT CONDITIONS

A. Do not proceed with the installation of flashing and sheet metal work until substrate construction, blocking and other construction to receive the work are completed.
   1. Metal roofing work is to follow progress of substrate as close as practical to limit exposure of insulation and wood materials.

1.06 WARRANTY

A. Contractor's warranty required for membrane roofing system work shall include all related roof flashing and sheet metal work. Refer to Section 07 53 23.

B. Provide Contractor's guarantee for all sheet metal work under this Section to be free from defects of material and workmanship for a period of two years. Work that is not water tight or is damaged by winds that do not exceed 90 mph will be considered defective.

C. Provide manufacturer's guarantee of paint finish against failure of paint finish. Failure includes blistering, peeling, cracking, flaking, checking, excessive color change and chalking. Color change shall not exceed 5 N.B.S. units (per ASTM D523) and chalking shall not less than a rating of 8 per ASTM D4214.
   1. Warranty Period: 20 years.

PART 2 PRODUCTS

2.01 MATERIALS

A. Prefinished Aluminum Sheet - All Flashings Exposed to View (use where flashing material contacts aluminum finish surfaces)
   1. Description: 3004 alloy aluminum sheet with factory applied finish.
   2. Finish
      a. Exposed Surfaces
         1) Material/Manufacturer: Fluoropolymer baked enamel finish
with Kynar 500 (70%) resins by ELF ATOCHEM OF NORTH AMERICA INC.; "Trinar" by AKZO; "Duranar" by PPG; "Fluropon" by VALSPAR or equal. Total dry film thickness not less than 1.0 mils


3) Color: As selected by Architect from paint manufacturer's complete specified line.

4) Application: Apply coating systems in strict accordance with manufacturer's printed instructions and recommendations. Refer to Quality Assurance in Part 1.

b. Concealed Surfaces: Can be manufacturer's standard coating for concealed surfaces.

3. Thicknesses: Provide the following minimum thicknesses:
   a. Flashing and Counterflashing: .032".
   b. Coping: .040".
   c. Edge Conditions (Gravel) Stop/Fascia: .040"
   d. Miscellaneous Flashing (not otherwise identified): .032".

B. Galvanized Steel Sheet - All Flashings Exposed to View (use where flashing material contacts non-aluminum finish surfaces)

1. Material: Galvanized steel, ASTM A653, G90 coating factory applied finish

2. Finish
   a. Exposed Surfaces
      1) Material/Manufacturer: Fluoropolymer baked enamel finish with Kynar 500 (70%) resins by ELF ATOCHEM OF NORTH AMERICA INC.; "Trinar" by AKZO; "Duranar" by PPG; "Fluropon" by VALSPAR. Total dry film thickness not less than 1.0 mils
      2) Reference: Meet the requirements of AAMA 621, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates.
      3) Color: As selected by Architect from paint manufacturer's complete specified line.
      4) Application: Apply coating systems in strict accordance with manufacturer's printed instructions and recommendations. Refer to Quality Assurance in Part 1.
   b. Concealed Surfaces: Can be manufacturer's standard coating for concealed surfaces.

3. Thicknesses: Provide the following minimum thicknesses:
   a. Flashing and Counterflashing: 0.0276
   b. Copings: 0.0396". (20 gauge)
   c. Edge Conditions (Gravel) Stop/Fascia: .0396"
   d. Others: 0.0276". (24 gauge)

C. Miscellaneous Flashing - Not Exposed to View: Galvanized steel, ASTM A653 G60. Mill phosphatized for paint adhesion. 0.0276", (24 gauge) minimum unless otherwise indicated.
D. Stainless Steel: AISI Type 304; .018” thick; ASTM A240.
   1. Finish: NAAMM Manual AMP 503; Type 2D – Dull stainless steel finish; Architectural Quality

E. Fasteners: Provide same metal as sheet metal or other non-corrosive compatible metal recommended by sheet metal manufacturer.

F. Bituminous coating: Acid and alkali resistant solvent type black bituminous mastic.

G. Joint Sealants: See Section 07 92 00. Color matched to factory finished materials at roofing, fascia, coping and similar type systems.

H. Metal accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work; matching or compatible with material installed, non-corrosive, size and gage as required for performance.

I. Underlayment
   1. Membrane: Bituthene Ice and Water Shield by W. R. GRACE; Polyken 640 Underlayment Membrane by POLYKEN TECHNOLOGIES; Polyguard Deck Guard by POLYGUARD PRODUCTS; Weather Watch by GAF; Winterguard by CERTAINTEED, a modified bituminous membrane, minimum 40 mils thick, self-adhering, self-sealing moisture barrier.

J. Wood members: Requirements of Rough Carpentry, Section 06 10 00.

2.02 PREFABRICATED MATERIALS

A. Coping
   1. Fabricated in 10'-0" lengths to sizes indicated of 0.063" smooth aluminum. Provide manufacturer's standard 12" wide, 20 gage perforated galvanized steel cleats, molded styrene or aluminum gutter chairs and special adhesive for cleat installation. Coping cover snapped-on to cleat spaced 5'-0" on center.
   2. Special Shapes: Provide units fabricated to radius indicated on drawings and to curve indicated on drawings. Provide metal locking corners.
   3. Provide factory welded and mitered corners, butt joints and concealed .032" aluminum cover plates.
   4. Manufacturers
      a. HICKMAN, W. P. COMPANY; “Permasnap Coping”.
      b. PETERSEN ALUMINUM CORP.; “Tite-Loc Coping”.
      c. ARCHITECTURAL PRODUCTS CO.; “Snap-Tight Coping”.
      d. CARLISLE SYN TEC, INC.; “SecurEdge 200 Coping”.
      e. FIRESTONE BUILDING PRODUCTS; “Firestone Coping System”.
      f. JOHNS MANVILLE, INC.; “Presto Lock Coping System”.

B. Edge Conditions (Gravel) Stop
   1. Fabricated in 10'-0" lengths to sizes indicated of 0.05" smooth aluminum, formed. Provide with galvanized spring clip (retainer) spaced at 12" o.c.
   2. Provide factory welded and mitered corners, butt joints and concealed .032" aluminum cover plates.
3. Manufacturers
   a. W.P. HICKMAN CO., Model No. TE 8.25.
   b. METAL-ERA, INC.; Anchor-Tite Fascia.
   c. CARLISLE SYN TEC, INC.; Secur Edge 300 Fascia System.
   d. FIRESTONE BUILDING PRODUCTS; Edge Guard and Fascia.
   e. JOHNS MANVILLE, INC.; Presto-Lock Fascia System.

C. Reglet and Counterflashing
   1. Description: Surface mounted type, roll formed, prefinished aluminum.
   2. Manufacturer
      a. METAL ERA, INC. two-piece Reglet #CFR2-500
      b. CHENEY FLASHING COMPANY; "Type B Reglet".
      c. FRY REGLET CORPORATION; "MA Masonry Reglet".
      d. W. P. HICKMAN CO.; "Drive-Lock-In-Wall Counter Flashing".

D. Soffit Panels: Aluminum, solid and ventilated type. Formed to approximately 3/8" thick panel with reveals at approximately 5"-6" on center.
   1. Finish: Match type specified hereinbefore.
   2. Colors: As selected by Architect.
   3. Provide all trims, carriers and fasteners required for a complete installation.
   4. Manufacturer: REYNOLDS METALS COMPANY Double 5 ReynoGuard Soffit, ALCOA Traditional Select or equal.

E. Finish
   1. Exposed Surfaces
      a. Material/Manufacturer: Fluoropolymer baked enamel finish with Kynar 500 (70%) resins by ELF ATOCHEM OF NORTH AMERICA INC.; "Trinar" by AKZO; "Duranar" by PPG, "Fluropon" by VALSPAR. Total dry film thickness not less than 1.0 mils
      c. Color: As selected by Architect from manufacturer's complete line.
   2. Concealed Surfaces: Can be manufacturer's standard coating for concealed surfaces.

2.03 FABRICATION

A. Shop fabricate sheet metal work to comply with standard industry standards as shown by SMACNA in the "Architectural Sheet Metal Manual."

B. Form sections square, true and accurate to size and profile, free from distortion and other defects detrimental to appearance or performance. Make all lines, edges, angles and moldings straight, sharp, true; reinforce for rigidity and strength.

C. Fabricate for watertight and weatherproof performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage or
deterioration of the work. Form exposed sheet metal work with exposed edges folded back to form hems. Fabricate with seams overlapping in the direction of water flow.

D. Fabricate non-moving seams in sheet metal with flat lock or butt hairline joints except as otherwise indicated. Fabricate corners mitered, soldered and sealed as one piece. Locate corner joints 2'-0" from corners and intersections.

E. Seal movable non-expansion type joints with joint sealant. Form joints as indicated, if not, in compliance with industry standards to receive joint sealants.

F. Provide for separation of metal from non-compatible or corrosive substrates by coating concealed surfaces with bituminous coating or other permanent separation as recommended by the sheet metal manufacturer.

G. Coping - Shop formed: SMACNA Page 3.9 (Figure 3-4) and 3.13 (Figure 3-6), as applicable with continuous cleats both sides and concealed fasteners. Slope to drain towards roof. Corners to be mitered and soldered or welded.
   1. Seams: SMACNA table 3-1 on Page 3.4. Butt joint and backup plate type, 12" wide centered on joint.
   2. Cleats: 0.050" stainless steel.

H. Trim for Roof Hatches: Provide galvanized sheet metal trim to cover all construction from bottom of roof deck to hatch or vent.
   1. Trim to form 90° bend at bottom of roof deck with minimum 3-inch return and lap hatch or vent curb not less than 2".
   2. Provide hemmed edge at curb.
   3. Provide lapped covers for joints or corners if trim package fabricated from more than one piece. Joint covers to lap joints by minimum 2" and have hemmed edges.

**PART 3 EXECUTION**

3.01 PREPARATION

A. Examine substrates and installation conditions. Do not install flashing and sheet metal work until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

C. Coordinate flashing and sheet metal work with other work for the correct sequencing of items which make up the entire membrane or system of weatherproofing and rain drainage.

3.02 INSTALLATION

A. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations, and drawing details for installation of the work.
B. Install prefabricated items in accordance with manufacturer's instructions and recommendations.

C. Anchor units securely in place by methods indicated, providing for thermal expansion. Conceal fasteners and expansion provisions whenever possible. Install joint sealants where indicated.

D. Set units true to lines and levels indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

E. Separate sheet metal work from dissimilar metals, treated wood, and cementitious materials. Provide roofing felt underlayment and rosin-sized paper slip sheet over treated wood surfaces.

F. Fabricate, support and anchor downspouts in a manner which will withstand thermal expansion, stresses and full loading by ice or water without damage, deterioration or leakage.

G. Continuously seal exposed joints where flashing or counter flashing terminates into reglets after sheet metal is adequately wedged and secured.

H. Metal flashings which may be built into masonry mortar joints shall be preformed with corrugations, ribs or crimps which will maintain integrity of mortar bond for masonry.

I. Coping
   1. Install membrane roofing flashing over top of parapet substrate prior to installing coping. See Section 07 53 23. Coordinate installation.
   2. Apply continuous bead of sealant on both sides of joints immediately prior to setting coverplates.

END OF SECTION
SECTION 07 76 16

ROOF DECKING PAVERS

PART 1  GENERAL

1.01  WORK INCLUDED

A. Work of this Section includes concrete pavers and paver pedestals.

1.02  RELATED SECTIONS

A. Roof Membrane System: Section 07 53 23.

B. Insulation Board: Section 07 53 23, and as detailed on drawings

1.03  SUBMITTALS

A. Manufacturer's Product Data: Submit for all items. Include product description and color samples for selection by Architect.

B. Shop Drawings: Include layout drawings indicating sizes and colors. Layout to include layout of pedestals indicating approximate pedestal height to provide level paver installation.

C. Samples: If requested by Architect, Submit a full size sample of paver unit required. Include the full range of style, size, exposed finish, color, and texture proposed for the work.

1.04  DELIVERY, STORAGE AND HANDLING

A. Protect paving units from damage, chipping, and soiling during delivery and storage. Store off the ground on pallets or wood platforms.

B. Do not incorporate chipped or damaged units into the work.

1.05  PROJECT CONDITIONS

A. Review installation procedures and coordinate paving work with other work affected by the concrete paving work.

PART 2  PRODUCTS

2.01  CONCRETE PAVERS

A. Material: Precast concrete;

B. Performance Requirements:
3. Moisture Absorption – ASTM C140: Less than 6%.
5. ASTM C67 freeze-thaw resistance: no breakage/1% maximum mass loss

C. Thickness: 2", approximately 25 lbs./sq. ft.

D. Finish: Non-slip texture.

E. Sizes: face size 24 inches square

F. Colors: To be selected by Architect.

G. Paver products based on the following Manufacturer systems:
NITTERHOUSE MASONRY;  http://www.nitterhousemasonry.com/products/architectural-pavers/
Tectura Designs by WAUSAU TILE;  info@tecturadesigns.com
Products by HANOVER ARCHITECTURAL PRODUCTS, HASTINGS PAVEMENT CO or
SUNNY BROOK or are acceptable providing they meet or exceed the requirements
specified herein.

2.02 PEDESTALS

A. Description: Provide paver supports fabricated of high density polyethylene;
copolymer polypropylene, or equivalent ; designed with spacer ribs to space
pavers at approximate 1/8" to 1/4". Pedestals to have multiple stacking shims or
similar method to enabling leveling of concrete pavers.  Provide shims and
accessories as required.  Loading: 1,000 lbs. per pedestal.

B. Pedestal system products based on the following Manufacturer systems:
ETERNO IVICA (Adjustable Support SE Series SE0-SE4) http://www.pedestal-eternoivica.com
WAUSAU TILE (Tectura Designs) info@tecturadesigns.com
BISON INNOVATIVE PRODUCTS (B Series)
Products by manufacturers listed in paragraph above are acceptable providing they
meet or exceed the requirements specified herein

C. Pedestals and Accessories
1. Tabs and Shim Plates:
   a. The SBR rubber Tab units provide spacing tabs, 3/16 inch or 1/8
      inch, allowing for drainage and air circulation.  Tabs to have a shore
      hardness of 70, allowing for resiliency without sound transmission.
      Tab sizes to correspond with various sizes of pavers.
   b. Shim Plates are 1/16· inch, 1/8· inch and 1/4· inch thick and of
      various sizes to correspond with various size Tabs.  Shim Plates to
      be of the same material as the Tab.

2. Pedestals shall accommodate various pitches and height changes of the
   project area.  Unit has outside dimension of 7 inches square and provides
   surface contact of 49 square inches.  Unit adjusts from a minimum of
   2· 1/2 inches to a maximum of 21 inches and can tilt to a level plane.
   Units to be high impact copolymer polypropylene.  Tabs are used on top of
PART 3 EXECUTION

3.01 INSTALLATION

A. Do not proceed with installation of pedestals and pavers until installation of waterproofing and waterproofing protection (insulation).

B. Install pedestals and concrete pavers in accordance with manufacturers' instructions and recommendations. Layout pavers in accordance with layout indicated on drawings.

C. Shim or otherwise adjust pedestals to provide a level solid base to receive concrete pavers.

D. Cut pavers using masonry saw. Do not install pavers that are chipped, cracked or otherwise defective.

END OF SECTION
SECTION 07 81 10
SPRAY-APPLIED FIREPROOFING

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide rated installations which comply with indicated ratings for fire endurance, flame spread, and combustibility; including applicable code interpretations by governing authorities, and listing and labeling by UL or FM where applicable.

B. This Section includes both mineral fiber type and cementitious type fireproofing. Unless otherwise indicated, the Contractor may use either type of fireproofing on the project. A combination of types may be used (i.e. mineral fiber type on decks and cementitious type on framing members).
   1. However, unless otherwise indicated, one type shall be used throughout the entire project for each type of application (i.e. the same type shall be used for all beams; the same type for all decks; etc).

1.02  RELATED SECTIONS

A. Firesafing:  Section 07 84 00.

B. Structural Steel:  Section 05 12 00.

1.03  QUALITY ASSURANCE

A. Applicator: Acceptable to fireproofing manufacturer.

B. Regulatory Requirements
   1. Underwriters' Laboratories, Inc.: Products, execution and thickness shall conform to approved UL designs as published in UL Fire Resistance Directory.
   2. Conform to IBC for fire resistance ratings.

C. References: Wherever the following abbreviations occur, they shall refer to the corresponding standard:

1.04  SUBMITTALS

A. Manufacturer's Product Data: Submit for all items. Include instructions for bonding and applying fireproofing.

B. Submit copies of certified test reports of:
   1. Manufacturer's certification or independent test reports confirming that materials meet or exceed performance criteria specified.
2. Reports from independent testing agencies of product proposed for use, which indicate conformance to ASTM E84 and E119.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials in original unopened packages bearing the manufacturer's name, brand and UL label verifying compliance with UL's quality control inspection program and the appropriate fire resistance ratings.

B. Keep materials dry until ready for use. Keep materials off the ground, under cover and away from sweating walls and other damp surfaces. Discard materials that have been exposed to water before actual use.

1.06 JOB CONDITIONS

A. Environmental Requirements
   1. Do not apply fireproofing when temperature of substrate, material and surrounding air is below 40°F. Maintain temperature 24 hours before and 24 hours after application of fireproofing.
   2. Provide ventilation in areas to receive fireproofing during and for 24 hours after application, to help dry material and maintain nontoxic, unpolluted working area.

PART 2 PRODUCTS

2.01 MINERAL FIBER TYPE

A. Materials
   1. Metal Lath: 3.4 pound per square yard expanded diamond steel lath, galvanized finish; with reinforcing members, anchorage and accessories as appropriate for substrate conditions and applications indicated.
   2. Sprayed-On Mineral Fiber Fireproofing: Non-combustible (ASTM E136), non-asbestos, mineral fiber mixed with binders, fillers and additives for spraying in place to form a rigid, porous fireproofing blanket with thermal insulating K value of 0.30 at 75°F.
   3. Sealer: Manufacturer's standard sprayed-on resinous coating, for control of dusting without significant increase in surface burning characteristics. Color tinted to distinguish sealed fireproofing from unsealed.

B. Manufacturer: Specifications are based on ISOLATEK INTERNATIONAL (CAFCO). Equal products manufactured by AMERICAN SPRAYED FIBERS INC. and AD FIRE PROTECTION SYSTEMS (SOUTHWEST FIREPROOFING) are acceptable providing the performance requirements specified herein are maintained.

C. Performance Requirements: Factory mixed material applied to provide compliance with specified performance specifications and test criteria.
   1. Dry Density: No less than 12pcf.
   2. Deflection - ASTM E759: No cracks or delaminations.
4. Air Erosion - ASTM E859: Maximum allowable weight loss of the fireproofing material is 0.025 g/m².
5. Compressive Strength - ASTM E761: The fireproofing shall not deform more than 10 percent when subjected to 500 psi compressive forces.
6. Surface Burning Characteristics - ASTM E84:
   Flame Spread: 10.
   Smoke Developed: 0.
7. Indentation Hardness - ASTM C569: Less than 0.50 inch.

D. Water: Clean; potable.

E. Hour Ratings and UL Test Designs: As indicated on drawings.

2.02 CEMENTITIOUS TYPE

A. Type: Spray applied cementitious fireproofing.

B. Manufacturer: Specifications are based on MK-6 by W. R. GRACE. Equal products by ISOLATEK INTERNATIONAL (CAFCO), AD FIRE PROTECTION SYSTEMS (SOUTHWEST FIREPROOFING), CARBOLINE COMPANY or ALBI MANUFACTURING are acceptable providing the performance requirements specified herein are maintained.
   1. Fibrous Ingredients: Asbestos or mineral wool are not permitted; comply with OSHA Regulation 29, FR, 1926.58.

C. Factory mixed material applied to provide compliance with specified performance specifications and test criteria.
   1. Dry Density: The field density shall be measured in accordance with ASTM Standard E605. Minimum average density shall be that required by the manufacturer, listed in the UL Fire Resistance Directory for each rating indicated, ICBO Evaluation Report, as required by the authority having jurisdiction, or minimum average 15 pcf, whichever is greater.
   2. Deflection: Material shall not crack or delaminate when tested in accordance with ASTM E759.
   3. Impact Resistance: Fireproofing material tested in accordance with ASTM E760 shall not crack or delaminate.
   4. Bond Strength: Fireproofing, when tested in accordance with ASTM E736, shall have a minimum average bond strength of 200 psi and a minimum individual bond strength of 150 psi.
   5. Air Erosion: Maximum allowable total weight loss of the fireproofing material shall be 0.005 g/ft² when tested in accordance with ASTM E859. Sample surface shall be “as applied” (not pre-purged) and the total reported weight loss shall be the total weight loss over a 24 hour period from the beginning of the test.
   6. Compression: The fireproofing shall not deform more than 10 percent when subjected to 1200 psi compressive forces in accordance with ASTM E761.
   7. Corrosion Resistance: Steel shall be tested in accordance with ASTM E937 without evidence of corrosion of the steel.
   8. Surface Burning Characteristics - ASTM E84:
Flame Spread: 0.
Smoke Developed: 0.

9. Resistance to Mold: The fireproofing material shall be formulated at the time of manufacturing with a mold inhibitor. Fireproofing material shall be tested in accordance with ASTM G21 and shall show resistance to mold growth for a period of 28 days for general use.

10. Combustibility: Material shall have a maximum total heat release of 20 MJ/m$^2$ and a maximum 125 kw/m$^2$ peak rate of heat release 600 seconds after insertion when tested in accordance with ASTM E1354 at a radiant heat flux of 75 kw/m$^2$ with the use of electric spark ignition. The sample shall be tested in the horizontal orientation.

11. VOC Content: 0.0 g/L.

**PART 3 EXECUTION**

3.01 INSPECTION

A. Verify that surfaces to receive fireproofing material are free of oil, grease, loose mill scale, or other substances which may impair proper adhesion.

B. Confirm compatibility of surfaces to receive fireproofing material.

C. Verify clips, hangers, supports, sleeves and other items required to penetrate fireproofing are in place.

D. Verify ducts, piping, equipment or other items which would interfere with application of fireproofing materials are not positioned until fireproofing work is completed.

E. Beginning of installation means acceptance of substrates and installation conditions.


3.02 PROTECTION

A. Protect adjacent surfaces and equipment from damage by overspray, fallout and dusting.

B. Close off and seal ductwork in areas where fireproofing is being applied.

C. Protect applied sprayed fireproofing from damage.

3.03 APPLICATION

A. Apply fireproofing in strict accordance with manufacturer's instructions.
B. Apply fireproofing in sufficient thickness to achieve rating with as many passes as necessary to cover with monolithic blanket of uniform density and texture.

C. Apply adhesive as recommended by fireproofing manufacturer to horizontal surfaces.

D. Apply sealer to all mineral fiber type fireproofing. Apply at rates as indicated by manufacturer.

3.04 CLEANING, PROTECTING, AND REPAIR

A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

B. Protect fireproofing, according to advice of product manufacturer and Installer, from damage resulting from construction operations or other causes so fire protection will be without damage or deterioration at time of Substantial Completion.

C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fire protection. As installation of other construction proceeds, inspect fireproofing and patch any damaged or removed areas.

3.05 CLEANING

A. After completion of fireproofing work, equipment shall be removed and all exposed wall and floor areas shall be left in a broom-clean condition.

END OF SECTION
SECTION 07 81 23

INTUMESCENT FIREPROOFING

PART 1    GENERAL

1.01   WORK INCLUDED

A. Preparing surfaces to receive fireproofing.
B. Protection of adjacent surfaces from overspraying.
C. Spray application of intumescent, fire-resistive coatings on interior, exposed structural steel wide flange columns, beams, pipe columns, and related exposed structural steel to provide rated fireproofing.
D. Application of decorative topcoat.

1.02   RELATED SECTIONS

A. Exposed Structural Steel:  Section 05 12 13.
B. Firestopping:  Section 07 84 00.

1.03   REFERENCES

A. American Society for Materials and Testing
2. ASTM D 638:  Tensile Strength.
5. ASTM D 1002:  Standard Test Method for Bond Strength.
7. ASTM D 4541:  Bond Strength.

B. Underwriters’ Laboratories

C. Steel Structures Painting Council (SSPC)
1. SSPC-SP-1 Solvent Cleaning.
2. SSPC-SP-2 Hand Tool Cleaning.
3. SSPC-SP-3 Power Tool Cleaning.
4. SSPC-SP-6 Commercial Blast Cleaning.

1.04   SUBMITTALS

A. Product Data:  Submit for all items.
1. Indicate product characteristics, performance, and limitation criteria.
B. Submit manufacturer's installation instructions.

C. Submit manufacturer's certification that products meet or exceed specified requirements.

D. Submit certified test reports indicating the following:
   1. Bond Strength of Fireproofing: ASTM E760, tested to provide minimum bond strength twenty times weight of fireproofing materials.
   2. Fire test reports of fireproofing application to substrate materials similar to project conditions.
   4. Submit applicator's current certification, by product manufacturer, as a factory trained and manufacturer approved installer of this product.

E. Sample: Submit 12" x 12" sample of fireproofing indicating thickness, density, fire rating, and finish texture that will be used in the finished project. Resubmit until approved by Architect. Approved sample will demonstrate minimum quality of work.

1.06 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five years documented experience.

B. Applicator: Company specializing in applying the work of this Section with minimum 3 years documented experience and approved by manufacturer.

C. Field Tests: Installer shall hire and pay for the services of an independent testing agency to test random samples, as applied, to verify thickness of intumescent fireproofing, in accordance with SSPC-PA2, Steel Structures Painting Council, "Paint Application Specification No.2 - Measurement of Dry Paint Thickness with Magnetic Gages".
   1. Testing agency must be approved by Architect prior to their being retained by the Installer.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire resistance ratings.

B. Submit certification of acceptability of fireproofing materials to authority having jurisdiction and to Architect.

1.08 ENVIRONMENTAL REQUIREMENTS

A. When temperature is less than 40° F, follow manufacturer's field instructions for cold weather installation. So not apply when surface temperature is less than 5° F above the dew point.
B. Provide ventilation in areas to receive fireproofing during and 72 hours, minimum, after application, to dry materials and dissipate solvent odors.

C. Maintain non-toxic, unpolluted working area. Provide temporary enclosure to prevent spray from contaminating air.

1.09 SEQUENCING AND SCHEDULING

A. Sequence work in conjunction with placement of ceiling hanger tabs, mechanical component hangers, and electrical components.

B. Steel surfaces with less than 3 feet clear working access may necessitate applying materials to inaccessible surfaces prior to erection of the finished steel members.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Specifications are based on AD Firefilm III manufactured by the CARBOLINE COMPANY. Equal system manufactured by CAFCO, HILTI INC. or ALBI MANUFACTURING is acceptable providing it meets the performance requirements specified herein.

2.02 MATERIALS

A. Intumescent Fireproofing: Water based, factory mixed, asbestos free, intumescent material blended for uniform texture; conforming to the following requirements:
   1. Bond Strength: ASTM D4541, minimum 125 psi.
   3. Surface Burning Characteristics, ASTM E84: Class A.
   4. Durometer Hardness: ASTM D2240, minimum 65-70 Shore D.
   5. Abrasion Resistance: ASTM D4060, maximum 103 mg loss at 1000 cycles.
   6. VOC: 0 lbs./gal.

B. Provide field applied primer compatible with shop applied primer as recommended by intumescent fireproofing manufacturer. Provide CARBOLINE Rustbond or similar type by other listed fireproofing manufacturers.

B. Primer: Type recommended or approved by fireproofing manufacturer.

C. Top Coat: Type as recommended by intumescent fireproofing manufacturer.
   1. Colors: As selected by Architect.

PART 3 EXECUTION

3.01 INSPECTION
A. Verify that surfaces are ready to receive work.
B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
C. Verify ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is complete.
D. Verify that voids and cracks in substrate are filled, and projections are removed where fireproofing is exposed to view as a finish material.
E. Beginning of installation means applicator accepts existing substrate.

3.02 PREPARATION
A. Work in accordance with SSPC guidelines SP-1, SP-2, SP-3, or SP-6 as appropriate to prepare substrate.
B. Clean substrate of dirt, dust, grease, oil, loose material, or other matter which may affect bond of fireproofing.
C. Seal all penetrations or open ended fireproofing termination by chamfering at a 45 degree angle and sealing with high heat silicone sealant.

3.03 PROTECTION
A. Protect floor areas from this Work by completely covering with tarps or 4 mil polyethylene sheets.
B. Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting.
C. Close off and seal ductwork in areas where fireproofing is being applied.

3.04 APPLICATION
A. Apply primer and fireproofing in accordance with manufacturer's instructions. Do not apply to surfaces that would prohibit proper adhesions.
B. Apply primer in accordance with primer manufacturer's recommendations. Provide primer "cut-back" three inches for bolted connections and 12 inches for welded connections.
C. Apply fireproofing in sufficient thickness to achieve 2 hour fire rating unless otherwise indicated, with as many passes necessary to cover with monolithic blanket of uniform hardness, density and texture. Spray and roll smooth the finished surface.

3.05 FIELD QUALITY CONTROL
A. Inspections will be performed to verify compliance with requirements. Inspection and Testing shall be in accordance with AWCI Technical Manual 12-B "Standard
Practice for the testing and Inspection of Field Applied Thin-Film Intumescent Fire-resistive materials”.

B. Patch fireproofing, which has been cut away to facilitate work of other trades, so as to maintain complete coverage of full thickness on appropriate substrate.

C. Correct unacceptable Work and provide further inspection to verify compliance with requirements, at no cost.

3.06 CLEANING

A. Clean work under provisions of Section 01 74 00.

B. Remove excess material, overspray, droppings, and debris.

C. Remove fireproofing from materials and surfaces not specifically required to be fireproofed.

D. Leave work ready to receive decorative finishing.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and/or hot gases through penetrations, openings, construction joints or at perimeter fire containment in or adjacent to fire-rated barriers in accordance with requirements of local Codes.

B. Firestopping shall be used in locations including, but not limited to, the following:

1. Penetrations through fire resistance rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

2. Penetrations through fire resistance rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

4. Sealant joints in fire resistance rated construction.
   a. Gaps between the top of walls and ceilings, floor or roof assemblies; includes filling metal deck flutes where applicable.
   b. Openings around structural members penetrating floors or walls.
   c. Control joints.
   d. Floor joints not requiring expansion joints.

5. Walls enclosing plenum spaces, rated and unrated.
   a. Gaps between the top of walls and ceilings or roof assemblies.
   b. Openings around items which penetrate walls.

6. Other locations indicated.

1.02  RELATED SECTIONS

A. Masonry: Section 04 22 00.

B. Spray-applied Fireproofing: Section 07 81 10.

B. Gypsum Wallboard: Section 09 21 16.

C. MPE: Plumbing (Division 22); HVAC (Division 23); Electrical (Division 26).

1.03  DEFINITIONS

A. Firestopping: Material or combination of materials (assembly) to retain integrity of fire rated construction by maintaining an effective barrier against the spread of flame, smoke, and gases.
B. Through-penetration: Any penetration of a fire-rated wall or floor that completely breaches the barrier.

C. Through-Penetration Firestop Systems: Material or combination of materials which are field constructed of fill, void, or cavity materials and forming materials, designed to resist fire spread when installed as a complete firestop system.

D. Through-Penetration Firestop Devices: Factory built products designed to resist fire spread. Complete when delivered to site; ready for installation.

E. System: The use of a specific firestop material or combination of materials in conjunction with a specific wall or flow construction type and specific penetrants.

F. Barrier: Any bearing or non-bearing wall or floor that has an hourly fire and smoke rating.

G. Membrane-penetration: Any penetration in a fire-rated wall that breaches only one side of the barrier.

H. Fire Resistive Joint: Any gap, joint, or opening, static or dynamic, between two fire rated barriers including where the top of a wall meets a floor; wall edge to wall edge applications; floor edge to floor edge configurations; floor edge to wall.

I. Perimeter Barrier: Any gap, joint, or opening, whether static or dynamic, between a fire rated floor assembly and a non-rated exterior wall assembly.

1.04 REFERENCES

A. American Society for Testing and Materials (ASTM)
   4. E2174: Standard Practice for On-Site Inspection of Installed Fire Stops

B. National Fire Protection Association (NFPA)
   1. 70: National Electrical Code (NEC)

C. Underwriters' Laboratories (UL)
   1. UL1479: Fire Tests of Through Penetration Fire Stops.
   2. UL2079: Tests for Fire Resistance of Building Joint Systems

D. Firestop Design Classification References
   1. Warnock Hersey Listing Manual
   2. UL Fire Resistance Directory - Vol. 1

E. Factory Mutual (FM) Research
   1. FM Approval Standard of Firestop Contractors – Class 4991
1.05 SYSTEM PERFORMANCE REQUIREMENTS

A. System Design and Product Selection: Contractor responsible for selection of products and tested designs that fulfill the firestopping requirements of this section.

B. General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gasses.

C. F-Rated Through Pentryation Firestop Systems: Provide through penetration firestop systems with F ratings indicated as determined per ASTM E814, UL 1479 but not less than that equaling or exceeding the fire resistance rating of the constructions penetrated.

D. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T -rated assemblies are required where specified by codes or where the following conditions exist:
   1. Where firestop systems protect penetrations outside of wall cavities.
   2. Where firestop systems protect penetrations located outside fire resistive shaft enclosures.
   3. Where firestop systems protect penetrations located in construction containing doors required to have a temperature rise rating.
   4. Where firestop systems protect penetrating items larger than a 4 inch diameter nominal pipe or 16 square inch in overall cross sectional area.

E. L – Rated Through-Penetration Firestop Systems: Provide firestop systems with L ratings, in addition to F and T ratings, as determined per UL 1479, where indicated by Code.

F. Fire Resistive Joint Sealants: Provide joint sealants with fire resistance ratings indicated, as determined per ASTM E119, UL 1479 and UL 2079 but not less than that equaling or exceeding the fire resistance rating of the construction in which the joint occurs.

G. For firestopping exposed to traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions and will meet load requirements.
   1. For piping penetrations for plumbing and wet pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
   2. For floor penetrations with annular spaces exceeding 4” in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads either by installing floor plates or by other means
   3. For penetrations involving insulated piping, provide through-penetration firestop systems not required removal of insulation.

H. For through-penetration firestop systems exposed to view, provide products with flame spread of less than 25 and smoke developed ratings of less than 450, as determined per ASTM E 84.

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East Tennessee State University RP2 FIRESTOPPING
I. Where there is no specific third party tested and classified firestop system available for an installed condition, obtain from the firestopping material manufacturer an Engineering Judgment (EJ) to be submitted to the Approving Authority and Authority Having Jurisdiction for approval prior to installation. The EJ shall follow International Firestop Council (IFC) guidelines.

1.06 SUBMITTALS

A. Submit in accordance with the requirements of Section 01 33 23 and the General Conditions.

B. Product Data: Manufacturer's specifications and technical data for each material including composition and limitations, documentation of UL or other nationally recognized independent testing laboratories firestop systems to be used, and manufacturer's installation instructions. Manufacturer's engineering judgement identification number and drawing details if no tested system available

C. Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each thru-penetration firestop system, and each kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.
   1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.
   2. Where project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration approved by firestopping manufacturer with modifications marked.

D. Product certificates signed by manufacturers of firestopping products certifying that their products and installation comply with specified requirements. Certification shall be signed by the Installer.

E. Certification is required from manufacturer that Installer has been trained in the handling and installation of their products.

F. Firestopping installer shall provide a letter of certification stating that all firestopping systems have been installed in accordance with the Contract Documents.

1.07 QUALITY ASSURANCE

A. Meet requirements of ASTM E814 or UL 1479 tested assemblies that provide a fire rating equal to that of construction being penetrated and other ASTM Standards as applicable for the installation.
B. Requirements of Regulatory Agencies: Comply with the applicable requirements for fire separations and penetrations of the following:
1. See local governing codes for the time rated construction requirements.
2. NFPA 70 and NFPA 101.

C. Installer: Specialist in the installation of type(s) of firestopping required; trained and approved by firestop manufacturer; and have successfully completed not less than 5 firestop projects similar in type and size to that of this Project.

D. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy".

E. Do not use any product containing solvents that require hazardous waste disposal or which after curing dissolve in water.

F. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.

G. Single Source Responsibility: Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer.
1. Materials of different manufacture than allowed by the tested and listed system shall not be intermixed in the same firestop system or opening.
2. Tested and listed firestop systems are to be used before an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) is installed.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver firestopping undamaged products to project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacturer; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials. Comply with recommended procedures, precautions, or remedies described in material safety data sheets as applicable.

B. Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

C. Do not use damaged or expired materials.

1.09 PROJECT CONDITIONS

A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by
natural means or, where this is inadequate, forced air circulation.

1.10 SEQUENCING AND SCHEDULING
A. Coordinate this Work as required with work of other trades. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

B. Do not cover up those firestopping installations that will become concealed behind other construction until Owner's inspection agency and authorities having jurisdiction, if required, have examined each installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Provide products from one or more of the following manufacturers according to the suitability of the product for the intended purpose.
1. W.R. GRACE (Flamesafe System)
2. FYRESLEEVE INDUSTRIES
3. TREMCO
4. HILTI, INC.
5. SPECIFIED TECHNOLOGIES (STI).
6. 3M FIRE PROTECTION PRODUCTS.
7. THE RECTORSEAL CORPORATION (Metacaulk and Bio Fireshield).
8. NELSON FIRESTOP PRODUCTS.

2.02 MATERIALS - GENERAL
A. As selected by Contractor. See 1.05 - System Performance Requirements.

B. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
1. All materials shall comply with ASTM E814 or E 119 (UL 1429), and shall be manufactured of nontoxic, non-hazardous, asbestos free materials, and unaffected by water or moisture when cured.
2. Primers: Conform to manufacturer's recommendations for primers required for various substrates and conditions.
3. Backup Materials: Backup materials, supports, and anchoring devices shall be provided as required by UL testing.
4. Provide all firestopping sealant materials within the VOC limits.

C. Accessories: Provide components for each firestopping system needed to install fill materials and to comply with "System Performance Requirements" in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated systems. Accessories include but are not limited to the following items:
1. Permanent forming/damming/backing materials must be noncombustible and may include the following:
a. Semi-refractory fiber (mineral wool) insulation.
b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
c. Joint fillers for joint sealants.
2. Temporary forming materials.
4. Collars and Steel sleeves.

2.03 RATED STUD DEFLECTION ASSEMBLY

A. Gypsum Wallboard: See Section 09 21 16.

B. Insulation: Mineral wool, 3.5 PCF minimum density.

C. Firestopping Compound: Types as manufactured by listed manufacturers in 2.01A

D. Accessories: Provide all fasteners, clips and other related installation accessories as required for a complete UL approved assembly.

2.04 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions are corrected. Verify penetrations are properly sized and in suitable condition for application of materials.

3.02 PREPARATION

A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form release agents from concrete.
B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer’s recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop systems seal with substances.

3.03 INSTALLING THROUGH-PENETRATION FIRESTOPS

A. General: Comply with the "System Performance Requirements" in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:
   1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
   2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
   3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 INSTALLING FIRE RESISTIVE JOINT SEALANTS

A. General: Comply with the "System Performance Requirements" in Part 1 with ASTM C1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.

B. Install joint fillers to provide support of sealants during application and at position required to produce the cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire resistance rating required.

C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
D. Tool non-sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.05 INSTALLING PERIMETER FIRE BARRIER SYSTEMS

A. General: Comply with “System Performance Requirements” article in Part 1 and with the firestop manufacture’s installation and drawings pertaining to products and applications indicated.

B. Install metal framing, curtain wall insulation, mechanical attachments, safining materials and firestop materials as applicable within the system design.

3.06 IDENTIFICATION

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
   1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage”.
   2. Contractor's name, address, and phone number.
   3. Through-penetration firestop system designation of applicable testing and inspecting agency.
   4. Date of installation.
   5. Through-penetration firestop system manufacturer's name.

3.07 FIELD QUALITY CONTROL

A. The inspector shall advise the contractor of any deficiencies noted.

B. Do not proceed to enclose firestopping with other construction until inspection agency has verified that the firestop installation complies with the requirements.

C. Where deficiencies are found, repair or replace the firestopping so that it complies with requirements of tested and listed system design.

3.08 CLEANING

A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration.
at time of Contract Completion. If, despite such protection, damage or
deterioration occurs, cut out and remove damaged or deteriorated through-
penetration firestop systems immediately and install new materials to produce
through-penetration firestop system complying with specified requirements.

END OF SECTION
SECTION 07 91 13
COMPRESSION SEALS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Work in this section includes exterior vertical and horizontal expansion joint seals

1.02 RELATED SECTIONS

A. Expansion Joint Cover Assemblies: Section 07 95 13.
B. Sealants: Section 07 92 00.

1.03 SUBMITTALS

A. Manufacturer's Literature and Data
   1. Submit copies of MFR's current literature and data for each item specified
   2. Clearly indicate movement capability of cover assemblies and suitability of material used in exterior seals for ultraviolet exposure.

B. Certificates: Material test reports from approved independent testing laboratory indicating and interpreting test results relative to compliance of fire-rated expansion joint assemblies with requirements specified.

C. Shop Drawings
   1. Showing full extent of expansion joint cover assemblies; include large-scale details indicating profiles of each type of expansion joint cover assembly, splice joints between sections, joiners with other type assemblies, special end conditions, anchorages, fasteners, and relationship to adjoining work and finishes.
   2. Include description of materials and finishes and installation instructions.

D. Samples of each type and color of flexible seal used in work.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in the original, intact manufacturer labeled containers.

1.05 PROJECT CONDITIONS

A. Coordinate the installation of the joint system with related work. Protect installed units until completion of entire project.

B. Ambient temperature shall not be lower than 40°F during installation. Note that gap size will change with cold and hot temperature extremes. Gap measurement should optimally be carried out at the mid-point of the average temperature range for the area of installation.
C. Substrate Surfaces: Free of dust, oil, grease, wax, moisture, and frost. The gap wall surfaces must be thoroughly cleaned.

D. No installation performed in rainy weather, or if rain is expected within one hour before installation. All surfaces must be completely dry prior to installing system.

E. Upon completion of this work, remove trash and debris on the site caused by work under this section.

1.06 QUALITY ASSURANCE

A. Installer: Approved in writing by manufacturer.

B. Compression seal manufacturer representative will perform a quality assurance site visit, document completed compression seal installations and submit a written condition report with any action items.

PART 2 PRODUCTS

2.01 VERTICAL SEALS

A. Provide exterior seal consisting of a silicone pre-coated, preformed, pre-compressed, self-expanding, sealant system. Seal shall combine factory-applied, 15 Shore-A hardness, low-modulus silicone and impregnated expanding foam sealant. Joint Thicknesses: As indicated on drawings.

B. Materials

1. Expanding Polyurethane Foam: Open-cell foam impregnated with a waterproof polymer sealing compound; uncompressed foam impregnation density of to be minimum 9 lbs./cu.ft as tested by ASTM D3575

2. Silicone External Color Facing: Factory-applied to the foam. Coating width to be a minimum of 1.75 -1.85 times the designed, or field measured, joint gap width. Colors: As selected by Architect.

3. Physical Properties: Manufacturer to certify that the material has been tested and meets the values in the table below and has been performance tested according to the listed performance tests and exhibits results that meet those listed below:

   a. Durometer Hardness-Silicone Coating; ASTM D2240, Shore A 15
   b. Ultimate Elongation; ASTM D3574: 105-145%.
   c. Tensile Strength; ASTM D3574: Minimum 21 psi.
   d. Thermal Conductivity; ASTM C518: 0.34 BTU. IN/HR. FT² °F.
   e. Water Penetration of Curtain Walls by Uniform Static Air Pressure Difference; ASTM E331: UP TO 20.88 PSF—PASSED
   f. Structural Performance of Curtain Walls by Uniform Air Pressure Diff. (Gust Loads); ASTM E330: +62.66 PSF, -56.39 PSF-Passed

C. Fabrication/Design

1. Supply seal pre-compressed to less than the joint size, packaged in shrink-wrapped lengths (sticks) with a self-adhesive on one face.

2. Depth of seal as recommended by manufacturer.
3. End to end joins of consecutive lengths of material to be joined by mitering and adhering as recommended by manufacturer. To obtain identical color sealant, use liquid silicone sealant supplied by manufacturer from same color batch as was used to form the bellows.

D. Drawings and specifications are based on Wabo®WeatherSeal II manufactured by WATSON BOWMAN ACME or equal. Similar system manufactured by, EMSEAL, WILLIAMS PRODUCTS INC., SCHUL INTERNATIONAL or ERIE METAL SPECIALTIES is acceptable providing the system meets the performance requirements specified herein.

2.02 HORIZONTAL SEALS

A. Materials
2. Nosings: Cold applied; pourable two-part polyurethane material (epoxies not permitted) mixed with aggregate with sand particles not to exceed 30-mesh. Aggregate loading ratio by weight of liquid resin to aggregate not to exceed 1:2.

B. Joint Thicknesses: As indicated on drawings.

C. Physical Properties - Rubber Sealing Glands: Manufacturer to certify that the material has been tested and meets the values in the table below and has been performance tested according to the listed performance tests and exhibits results that meet those listed below:
2. Ultimate Elongation; ASTM D412: 440%.
3. Tensile Strength; ASTM D412: 1000 psi.

D. Drawings and specifications are based on Wabo®FireShield FSH-Horizontal manufactured by. WATSON BOWMAN ACME Similar systems by EMSEAL or LYMTAL are acceptable providing system meets the performance requirements specified.

PART 3 EXECUTION

3.01 INSPECTION AND PREPARATION

A. Joint configuration and the joint surfaces shall be as detailed in the drawings. All known detrimental conditions shall be reported immediately in writing.

B. Do not proceed with the installation of joint sealer if the joint is other than designed, until written notification of these conditions is submitted to the manufacturer and Architect, and a written acknowledgement with an order to proceed is provided.
C. Proceeding with joint sealer indicates conditions are acceptable to the installer.

3.02 INSTALLATION

A. Install in accordance with the manufacturer’s recommendations and instructions.

B. Cut profile to the correct length of the appropriate gap for installation, without pulling or exerting excess tension.

END OF SECTION
PART 1   GENERAL

1.01   SCOPE

A. General: Prepare joints and apply sealant at all locations which normally require sealing to prevent infiltration of air, water, and insects and to reduce transmission of sound.

B. Apply sealants to exterior and interior non-static joints. Do not seal normal drainage points or weep holes. Include the following:
1. masonry control and expansion joints.
2. around louvers, exterior trim, windows, door frames, aluminum entrances and other penetrations or openings in exterior walls
3. threshold bedding
4. joints between different wall materials.
5. termination joints between wall materials and adjacent materials
6. perimeter seal of metal door and borrowed light frames where they abut masonry and abut drywall in shower rooms, toilet rooms and kitchens
7. composite wall panel joints
8. other applications indicated

C. Sealing of joints in concrete construction, including sidewalk joints, concrete paving joints and floor joints, tile floor expansion joints and other floor joints as indicated.

D. Sealing of all exterior and interior locations where materials or equipment do not fit together or against the adjoining surface with a hairline joint.

E. Caulking of interior static joints. Include the following:
1. intersection of exposed structure or ceiling construction with masonry walls
2. perimeter seal of metal door and borrowed light frames where they abut drywall, except in shower rooms, toilet rooms and kitchens
3. intersection of grilles and louvers with adjacent surfaces
4. intersection of cabinets/casework, similar items applied to/recessed in walls
5. other applications indicated

F. Sealing between wall and wall mounted plumbing fixtures and floor and floor mounted plumbing fixtures.

G. Sealing at intersection of plastic laminate tops and side/backsplashes to each other and to wall. Seal penetrations through ceramic tile work.

H. Sealing at reglets and flashings set in sealant.

I. Joints, perimeter, and penetrations in fire-rated assemblies. Use firestopping specified in Section 07 84 00.
J. Trim exposed masonry flashing.

K. Joints, perimeter, and penetrations in sound-rated assemblies; Section 09 21 16.

1.02 RELATED SECTIONS

A. Firestopping Sealants: Section 07 84 00.

1.03 GENERAL PERFORMANCE

A. Except as otherwise indicated, joint sealant is required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application.

B. Failures of installed sealant to comply with this requirement will be recognized as failures of both materials and workmanship.

1.04 SUBMITTALS

A. Submit manufacturer's product data and installation instructions.
   1. Certification, in the form of manufacturer's standard data sheet or by letter, stating that each type of compound and sealant to be furnished complies with these specifications.
   2. Statement that each product to be furnished is recommended for the application shown and is compatible with all materials to which applied.
   3. Instructions for handling, storage, mixing, priming, installation, curing and protection for each type of sealant.

B. Submit manufacturer's color chart for color selections.

C. Submit cured sealant samples in colors required for the work. A/E's approval will be for color only; compliance with other requirements is Contractor's responsibility.

1.05 STORAGE AND HANDLING

A. Prevent inclusion of foreign matter or damage of materials by water or breakage. Materials showing evidence of damage shall be rejected.

B. Procure and store in original containers until ready for use.

1.06 WARRANTY

A. Installer's Warranty: Contractor and joint sealant applicator shall jointly warranty joint sealant work for two (2) years from date of final acceptance. Warranty shall include replacing joints which fail to perform as airtight; or fail in adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration and stain resistance, general durability or any other form of apparent deterioration (excluding inherent qualities and limitations clearly specified in the manufacturer's submitted product data).

B. Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant
manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section for ten (10) years from date of final acceptance.

C. Warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.

2. Disintegration of joint substrates from natural causes exceeding design specifications.

3. Mechanical damage caused by individuals, tools, or other outside agents.

D. Comply with these specifications for repair or replacement of work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Definition: The term "sealant" will be understood to be an elastomeric type. The term "caulk" will be understood to be a synthetic resin base of highest quality acrylic latex compound.

B. General

1. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the limits for VOC content calculated according to 40 CFR 59, Subpart D (EPA Method 24):

   a. Architectural Sealants: 250 g/L.

   b. Sealant Primers for Nonporous Substrates: 250 g/L.

   c. Sealant Primers for Porous Substrates: 775 g/L.

3. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

4. Colors: As selected by Architect from manufacturer's full range; selected colors to match adjacent materials.

5. Where exposed to foot traffic, select materials of sufficient strength and hardness to withstand stiletto heel traffic without damage or deterioration of sealant system.

C. Manufacturers: BOSTIK; DOW CORNING CORP; EUCLID CHEMICAL; TREMCO MANUFACTURING CO.; GENERAL ELECTRIC CO. / MOMENTIVE; SIKA CHEMICAL CO.; MAMECO INTERNATIONAL; BASF BUILDING SYSTEMS; VULCHEM. Manufacturer's listed under the following applications are for basis of design. Equal products by above listed manufacturers are acceptable.
D. Exterior Vertical and Overhead Joints: Single-component neutral curing silicone sealant meeting ASTM C920, Type S, Grade NS, Class 50.
1. DOW 791
2. GE SCS9000 Silpruf NB
3. TREMCO Spectrum 2
4. PECORA 895 NST

or

D1. Exterior Vertical and Overhead Joints: Single or multi-component elastomeric polyurethane sealant meeting ASTM C920, Type M or S, Grade NS, Class 50.
1. PECORA Dynatrol II
2. TREMCO Dymeric 240
3. BOSTIK Chem-Calk 2020
4. PACIFIC POLYMERS INTERNATIONAL Elastothane230 LM Type II
5. POLYMERIC SYSTEMS INC. PSI-901

E. Horizontal Wearing Expansion Joints; Interior and Exterior
1. Type: Two-part polyurethane based elastomeric sealant, complying with ASTM C920, Class 25, Type M, Grade P. Self-leveling or gun grade type as recommended by manufacturer for application shown.
2. Location: For joints in exterior concrete pavements, sidewalks and interior floors.
   a. BOSTIK Chem-Calk 555-SL
   b. EUCLID Eucolastic II
   c. SONNEBORN Sonolastic SL 2
   d. TREMCO THC 900/901

F. Interior Vertical and Overhead Joints: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
1. DOW 799
2. GE SCS2000 SilPruf
3. TREMCO Spectrum 2
4. PECORA 895 NST

or

F1. Interior Vertical and Overhead Joints: Single or multi-component polyurethane gun-grade, non-sag sealant complying with ASTM C920, Type S or M, Class 25, Use NT, M, A, Grade NS.
1. EUCLID Eucolastic I or II
2. BASF Sonolastic NP 1 or NP 2
3. BOSTIK Chem-Calk 900
4. TREMCO Dymonic

G. Sealants at Countertops, Backsplashes and Plumbing Fixtures: ASTM C920, Type S, Grade NS, Class 25. Provide with mildew resistive additive.
1. Sealant Colors
   a. Countertops and Backsplashes: Clear.
   b. Plumbing Fixtures: white, unless colored fixtures are selected, then sealant color shall match fixture color.
2. Manufacturers/Products
   a. DOW 786
   b. GE SCS1700 Sanitary.
   c. SONNEBORN Sonolastic Omniplus
d. TREMCO Tremsil 600

e. PECORA 898 Sanitary Sealant

H. Caulk Joints – Interior, Static - Paintable: High quality acrylic latex compound, non-staining non-bleeding complying with ASTM C834, as supplied by one of the above listed manufacturers.

I. Exterior and Interior Joints Subject to Water Immersion: Two-part elastomeric polysulfide sealant, meeting ASTM C920, Type M, Grade NS, Class 25.
   1. SONNEBORN Sonolastic Two-Part
   2. EPOXY SYSTEMS 913
   3. CMI Sealtight Deck-O-Seal

2.02 ACCESSORIES

A. Joint Primer/Sealer: Non-staining type, recommended by sealant manufacturer; compatible with joint forming material.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming material.

C. Bond Breaker Tape: Pressure sensitive polyethylene or plastic tape, recommended by sealant manufacturer, to suit applications where bond to substrate should be avoided for proper joint sealant performance.

D. Joint Backing: Compressible rod stock conforming to ASTM C1330, Type B; material as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

E. Solvents: Cleaning agent recommended by the manufacturer of the sealant in writing to Architect.

F. Expanding Control Joint Filler
   1. Description: Precompressed, closed-cell, self-expanding foam. Self stick pressure sensitive adhesive (PSA) on one or two sides as required by substrate conditions
   2. Size: As required for specific joint width and thickness.
   3. Manufacturer: EMSEAL, WILLIAMS PRODUCTS, ILLBRUCK, SCHUL INTERNATIONAL or POLYTITE MANUFACTURING CORP.

PART 3 EXECUTION

3.01 INSPECTION

A. Pre-Installation Meeting
   1. Prior to sealant installation, and at the Contractor's direction, meet at project site to review material selections, joint preparations, installation procedures, weather conditions and coordination with other trades.
   2. Include sealant installer, Contractor, Architect, manufacturer's
representative and representatives of other trades or subcontractors affected by the sealant installation.

B. Examine substrates and installation conditions. Do not proceed with joint sealant work until unsatisfactory conditions have been corrected.

C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Clean, seal and prime surfaces in accordance with manufacturer's recommendations. Confine primer/sealant to areas of sealant bond.

B. Remove dust, dirt, loose coatings, moisture and other substances which could interfere with sealant bond.

C. Remove lacquers and protective films from metal surfaces.

D. Architectural Concrete and Stone: Apply masking around joints to protect adjacent surfaces from defacement and staining during sealing operations. Repair damaged masking until sealant is installed.

3.03 INSTALLATION

A. Apply joint sealant as late as possible in construction, preceding painting and following cleaning operations. Do not apply sealant during inclement weather conditions or when temperature is above or below manufacturer's limitations for installation.

B. Install joint sealant materials and accessories in strict accordance with manufacturer's installation instructions.

C. Set joint filler units at depth or position in joint as indicated to coordinate with other work. Do not leave voids or gaps between ends of joint filler units.

D. Install sealant backer rod, except where recommended to be omitted by sealant manufacturer for application indicated. Use rod diameter that will cause compression when installed.

E. Install bond breaker tape and where required by manufacturer's recommendations to ensure that sealants will perform as intended.

F. Apply joint sealants in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces on both sides. Fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. At horizontal joints between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt. Hand tool and finish all joints.

G. Install joint sealants within recommended temperature ranges and to depths indicated or when not indicated, as recommended by sealant manufacturer. For
normal moving vertical and horizontal joints, fill joints to a depth equal to 50% of joint width, but not more than 1/2" deep nor less than 1/4" deep, measured at the center section of bead.

H. Confine materials to joint areas with masking tapes or other acceptable methods. Remove excess sealant materials promptly as work progresses and clean adjoining surfaces.

I. Masonry Flashing: Where sealant joint is in direct contact with flexible masonry flashing, trim flashing flush with face of masonry after sealant in installed and cured. Verify during this procedure that weep holes have not been compromised during sealing operations.

3.04 CLEANING

A. Upon completion, remove and dispose of masking materials; remove all excess sealing materials; clean adjacent materials of all soil and stain resulting from sealing operations.

1. Replace damaged material and material which cannot be properly cleaned.

END OF SECTION
PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide expansion joint covers, including all accessories and closures required for a complete installation. Assemblies include, but are not necessarily limited to, the following:
   1. Wall to wall.
   2. Floor to floor.
   3. Wall to floor.

B. Joint covers included in this Section are generally those exposed to view.

C. Coordinate with all trades associated with materials that expansion joint covers are attached to or in contact with; obtain approvals as required; obtain special details required for proper installation of expansion joint covers.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's catalog cuts and other information showing sizes, materials and finishes.

B. Shop Drawings: Submit typical joint cross-section(s) indicating pertinent dimensioning, general construction, component connections, and anchorage methods.

C. Samples: Submit samples for approval, minimum 6" long, for each type of device proposed. Samples to show all components required for expansion joint cover assembly.

1.03 QUALITY ASSURANCE

A. Manufacturer: Shall have a minimum ten (10) years experience specializing in the design and manufacture of Architectural Expansion Control Systems.

B. Application: The specified expansion control systems shall be installed by a Certified Applicator, factory trained and certified in the proper installation of the specified expansion control system.

C. Floor devices to be watertight.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver products in each manufacturer's original, intact, labeled containers and store under cover in a dry location until installed. Store off the ground, protect from weather and construction activities.
PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Catalog numbers specified below are based on expansion joint covers manufactured by WATSON BOWMAN ACME (WBA). These model numbers are to establish a level of quality. Equal products manufactured by CONSTRUCTION SPECIALTIES, INC. (CSI); BALCO; or MM SYSTEMS CORPORATION are acceptable providing they meet the requirements specified herein and the design intent of the drawings.

3. Floor-to-Floor: WBA FJG 200.
4. Wall-to-Floor: WBA FJG 200C.
5. Other types required but not identified herein by catalog number will be of the same type or series as listed above for similar type application.

2.02 MATERIALS

A. General: Provide extruded 6063-T5 alloy aluminum devices; clear anodized finish for wall and ceiling covers; mill finish for floor covers.

B. Provide models as indicated on drawings.

C. Fasteners

1. Masonry Anchors: Expansion type; length as required to provide minimum 2" embedment into sound masonry.
2. Bolts: Stainless steel, flat or oval head, of sizes required for conditions.

D. Fire rated: Where required provide ceramic fiber fire barrier backing system designed to provide the required fire rating and cycle tested.

1. Fire rating: As indicated
2. Density: 8 pcf

2.03 FABRICATION

A. General: Fabricate joint cover assemblies as detailed. Provide sealing washers, gaskets, splice covers, and closures as required for complete and secure installations.

1. Fabricate special transitions and corner fittings as required.
2. Miter and weld joints as applicable.
3. Provide necessary and related parts, devices, water barrier, anchors, form clips, and other items required for water-resistant and fire-resistant installations.
4. Provide corners, tees, transitions, curb risers, assembled with connection mitered or interlocking and secured to ensure proper fit and alignment.
5. Special conditions shall be shop fabricated.
6. Floor cover plates shall have surfaces to comply with ADA requirements.
7. Provide components in single lengths where possible; minimize site splicing.
PART 3  EXECUTION

3.01 INSTALLATION

A. General
1. Verify that existing conditions including block-outs are ready to receive expansion joint systems.
2. Beginning the work of this section means acceptance of existing conditions.

B. Install in strict compliance with manufacturer's instructions and recommendations.

C. At existing floor conditions, remove concrete as required and repour to accommodate specified device.

D. Adjust finished height of floor devices for smooth transition with finish flooring materials; verify heights of approved floor finishes before installation of expansion joint covers.
   1. Locate wall and ceiling devices in continuous contact with adjacent surfaces.
   2. Make splices as recommended by manufacturer.
   3. Exposed Butt Joints: Make tight, flush and hairline.

3.02 CLEANING AND PROTECTION

A. Do not remove strippable protective material from joint devices until Architect approves the removal.

B. When Architect permits removal of protective material, remove protective material and clean surfaces in accordance with manufacturer's instructions.

END OF SECTION
SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1  GENERAL

1.01  SUMMARY

A. Section includes:
   1. Standard steel doors and frames.
   2. Fire rated steel doors and frames.
   4. Plumbing chase access doors and frames. Provide rated doors and frames in rated walls.

1.02  RELATED SECTIONS

A. Wood Doors: Section 08 14 00.

B. Door Hardware: Section 08 71 10.

1.03  QUALITY ASSURANCE

A. Provide metal doors and frames fabricated by one manufacturer to ensure uniformity in appearance and construction.

B. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard.
   3. SDI: Steel Door Institute.
   4. DHI: Door and Hardware Institute.

C. Fire rated doors and frames: Provide units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per ASTM E152, and are labeled and tested by Factory Mutual (FM), Underwriters Laboratories (UL), or other National Recognized testing agency. Units shall bear testing agency labels.
   1. Provide UL labels permanently fastened on each door and frame which is within the size limitations established by NFPA and UL for labeling.
   2. Provide anchors for UL labeled frames required by the authority having jurisdiction.

D. Sound transmission class: Provide certificate that door assemblies have been tested in accordance with ASTM E413 and ASTM E1408 to achieve minimum sound transmission class (STC) specified.

1.04  SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each type of standard metal door and frame required.
B. Submit shop drawings. Identify doors and frames in accordance with drawing door schedule. Indicate:
   1. Elevations of each door design.
   2. Hardware locations, installation methods and hardware reinforcements.
   3. Dimensions and shapes of materials, anchorage and fastening methods.
   4. Door frame types, profile of molding and details.
   5. Wall opening construction and connection to other work.

C. Certificates documenting:
   1. Fire testing: Fire-rated units have been successfully tested in accordance with Paragraph 1.03C.
   2. Sound transmission class (STC): Acoustically rated doors have been successfully tested in accordance with Paragraph 1.03D.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver metal doors and frames cartoned or crated for protection during transit and job delivery. Provide sealed wrapping for factory.

B. Store doors and frames inside the building in a dry, well-ventilated area. Protect from damage, wetting and deterioration in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: STEELCRAFT MFG. CO; CECO CORP.; REPUBLIC BUILDERS PRODUCTS CORP; CURRIES.

2.02 MATERIALS AND COMPONENTS

A. Materials
   1. Metallic-Coated Steel: Commercial quality, hot dipped, A-60 galvannealed steel in accordance with ASTM A653, “Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process”.
   2. Cold-Rolled Steel: Commercial Steel in accordance with ASTM A1008, “Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low-Alloy and High Strength with Improved Formability”; Type B; suitable for exposed applications.
   3. Hot-Rolled Steel Sheet: Commercial Steel in accordance with ASTM A1011, “Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High Strength Low-Alloy with Improved Formability, and Ultra-High Strength”; Type B; free of scale, pitting, or surface defects; pickled and oiled.

B. Comply with SDI 100 material and fabrication recommendations and as specified.

C. Standard Metal Doors
1. Provide flush type doors with seamless faces, 1-3/4" thick, internally reinforced. Top and bottom closed flush.
   a. Provide glass lites where indicated.
2. Exterior Doors: Provide doors complying with requirements of ANSI 250.8 for Level 3 (extra heavy duty) and Model 1 (flush design) and ANSI A250.4 for physical endurance Level A.
   a. Fabricated from metallic-coated (galvanized) steel face sheets, mill phosphatized
   b. Rigid polystyrene core
   c. Tops and bottoms closed with flush galvanized steel caps.
3. Interior Doors: Provide doors complying with requirements of ANSI 250.8 for Level 2 (heavy duty) and Model 1 (flush design) and ANSI A250.4 for physical endurance Level B
   a. Fabricated from cold rolled steel; stretcher-leveled standard flatness.
   b. Kraft resin impregnated honeycomb or polystyrene slab core bonded to door face sheets with thermal adhesive.
4. Hardware Reinforcements: Meet or exceed ANSI/SDI A250.6 requirements.
5. Edge Profile: 1/8" bevel in 2" core on hinge and lock edges.
6. Astragals for pairs of doors: Manufacturer's standard for labeled and non-labeled openings. Factory prepare for hardware as scheduled in Section 08 71 10. Mount astragal to overlap on key side of doors.
7. Louvers: Inserted fixed type, minimum free area of 38%.
8. Adjust door widths where full mortise continuous gear hinges are used.

D. Standard Metal Frames
1. Interior Frames: Fabricated from either commercial grade cold-rolled steel conforming to ASTM A1008 or commercial grade hot-rolled and pickled steel conforming to ASTM A1011, minimum 0.053" thick. Set-up and welded type, all miters clean cut, reinforced, fully face welded with exposed welds ground smooth.
2. Exterior Frames: Fabricated from commercial grade metallic –coated (galvanized) steel conforming to ASTM A653, minimum 0.053" thick, and shall have an A-60 zinc coating (0.30 ounces per square foot per side). Set-up and welded type, all miters clean cut, reinforced, fully face welded with exposed welds ground smooth.
   a. Back prime frames with asphaltic emulsion.
3. Profile: Double rabbet, jamb face and depth as indicated.
4. Hardware Reinforcements: Meet SDI 107 requirements.
5. Transoms and Sidelites: Provide for loose glazing stops to be secured with countersunk screws. Provide ¾” stops for sidelites and transoms where the individual glass areas for fire rated openings exceeds the allowable area for 5/8” stops.

E. Fire Doors and Frames
1. Comply with Fire-Rated Door Requirements in Paragraph 1.03C.
3. Classification: As indicated.
4. Conform to requirements of Standard Metal Door and Frames specified.

F. Frames for Glazed Openings (Borrowed Light): Minimum 0.0516” (18 gage) with
integral stop, profile and size per drawings. Provide loose metal glazing stops of same gage as frame.

1. Provide for loose stops to be secured with countersunk screws. Provide 3/4” stops for sidelites and transoms where the individual glass areas for fire rated openings exceeds the allowable area for 5/8” stops.

2. Verify thickness of glazing material before fabrication and glazing clearances required.

3. Frame components to be face welded, except required loose glazing stops, at connections with exposed welds ground flush and smooth with frame surfaces.

4. Fire Rated Frames: Provide for ratings indicated in accordance with paragraph 2.02D.

2-Hour Rated Frames: Provide with labels and all components required. Heat Barrier Frame by TECHNICAL GLASS PRODUCTS or 2-hour rated frame assembly manufactured by companies listed in 2.01A herein.

2.03 FABRICATION

A. Reinforce and prepare doors and frames to receive hardware. Fit for hardware at the factory to template. Do all necessary cutting, drilling and tapping. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

B. Provide surfaces smooth and free from defects, warp or buckle with arrises straight and sharp.

C. Reinforce doors and frames to receive surface applied hardware. Drilling and tapping for surface applied finish hardware may be done at project site.

D. Locate finish hardware as shown on drawings or, if not shown, in accordance with DHI "Recommended Locations for Builder's Hardware."

E. Door and Frame Fabrication

1. Provide cutouts for mortised hardware, accurately located and made to fit.

2. Punch frames for door silencers, three on strike side for single doors. Factory install plastic caps. Stick-on silencers are not acceptable.

3. Exterior and Interior Frames: Provide minimum three anchors of suitable design for each jamb; galvanized anchors for units built into exterior walls.

4. Floor Anchors: Provide floor clip on bottom of each jamb. Provide angle spreaders at bottom of each set-up frame.

F. Shop Painting

1. Clean, bonderize or chemically treat and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

2. Clean steel surfaces of mill scale, rust oil, grease, dirt and other foreign materials before application of paint. Sand free of imperfections.

3. Apply one baked-on shop coat of rust-inhibitive prime paint in accordance with ASNI A224.1. Provide a smooth, uniformly finished surface ready to receive finish paint.
PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates, rough openings and installation conditions. Do not proceed with metal door and frame work until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

A. Install metal doors and frames in accordance with manufacturer's instructions and recommendations.

B. Placing Frames
   1. General
      a. Comply with ANSI/SDI A250.11 (SDI 105) "Recommended Erection Instructions for Steel Frames."
      b. Erect frames in proper position to receive partition work before construction of enclosing walls. Set frames accurately in position, plumbed, aligned with heads level and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders.
      c. Grout frames as indicated on the drawings. Coordinate grout placement with adjoining materials and door hardware.
   2. At Masonry Construction: Locate wall anchors at 16" on center. Building-in of anchors and grouting of frames is specified in Section 04 22 00.
   3. Fire-Rated Frames: In accordance with NFPA standard No. 80 and SDI 118.
   4. Metal Stud Partitions: Install at least 3 wall anchors per jamb at hinge and strike levels. Attach wall anchors to studs with tapping screws.

C. Door Installation
   1. Install doors plumb and in true alignment in prepared openings. Fit metal doors accurately in frames, within clearances specified in ANSI/SDI A250.8 (SDI100).
   2. Install fire-rated doors with clearances as specified in NFPA Standard No. 80 and SDI 118.

D. Immediately after erection, sand smooth rusted or damaged areas of door and frame coat and apply touch-up prime coat of compatible air-drying primer.

3.03 FIELD QUALITY CONTROL

A. Final Adjustment: Provide final adjustment as follows:
   1. Door Contact with Silencers: Doors shall strike a minimum of two (2) silencers without binding lock or latch bolts in strike plate.
   2. Head, Strike and Hinge Jamb Clearance: 1/8".
3. Meeting Edge Clearance, Pairs of Doors: +1/16"
4. Bolts and Screws: Leave tight and firmly seated.

END OF SECTION
SECTION 08 14 00
WOOD DOORS

PART 1   GENERAL
1.01  WORK INCLUDED
   A. Provide the following types of wood doors: Solid core and Fire rated.
1.02  RELATED SECTIONS
   A. Installation: Section 06 20 00.
   B. Hollow Metal Door Frames: Section 08 11 13.
   C. Door Hardware Section 08 71 10.
1.03  QUALITY ASSURANCE
   A. Provide wood doors fabricated by one manufacturer to ensure uniformity in appearance and construction.
   B. Reference Standards
      1. Underwriters' Laboratories - UL 10C (positive pressure) - Fire Tests of Door Assemblies
      2. Window and Door Manufacturers Association (WDMA): WDMA IS 1A-04.
      4. NFPA 80 - Fire Doors and Windows
      5. NFPA 252 - Standard Methods of Fire Tests for Door Assemblies
   C. Engineered Wood Products
      1. Determine formaldehyde concentrations in air from wood products under test conditions of temperature and relative humidity in accordance with ASTM D6007 or E1333.
      2. Determine Volatile Organic Compounds (VOC), excluding formaldehyde, emitted from manufactured wood-based panels per ASTM D6330.
1.04  SUBMITTALS
   A. Submit manufacturer's product data and installation instructions for each type of wood door required.
      1. Include details of core and edge construction.
      2. Include certification indicating compliance with specification requirements.
   B. Submit Shop Drawings
      1. Indicate location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking and other pertinent data.
      2. Identify doors in accordance with drawing door schedule.
C. Submit sample corner section, 12” square, showing required veneer and edge construction.

D. Finish Samples
   1. Factory Finished Doors: Submit three (3) flitch samples of each species of face veneer with factory applied stain and finish as specified and indicated illustrating expected range of color and grain variation.
   2. Field Finished Doors: Submit three (3) flitch samples of each species of face veneer as specified and indicated illustrating expected range of grain variation. Samples will be used to select and approve field stain color as specified in Section 09 91 00.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store and protect doors in accordance with manufacturer's recommendations and WDMA.

B. Following are general guidelines. For more specific information refer to WDMA's Appendix Section "Care and Installation at Job Site."
   1. Deliver doors in manufacturer's original unopened protective packaging or wrapper.
      a. Store doors flat and off the floor on a level surface in a dry, well-ventilated building. Do not store on edge. Protect doors from dirt, water and abuse.
      b. Do not subject interior doors to extremes in either heat or humidity. HVAC systems should be operational and balanced, providing a temperature range of 50 to 90 degrees Fahrenheit and 30% to 50% relative humidity.
      c. When handling doors, always lift and carry. Do not drag across other doors or surfaces. Handle with clean hands or gloves.
      d. Each door will be marked on top rail with opening number.

1.06 LABEL DOOR REQUIREMENTS

A. Fire Ratings Compliance: Comply with the label requirements of NFPA and applicable local codes. Fabricate doors and frames in accordance with requirements of NFPA Standard No. 80 and U.L. Standards as follows:
   1. Neutral Pressure Testing - UBC 43-2 or 7-2-94; or UL10B.
   2. Positive Pressure Testing UBC 7-2-97 or UL10C

B. Ratings Certifications
   1. Provide U.L. labels permanently fastened on each door that is within the size limitations established by NFPA and U.L. for labeling.
   2. Provide anchors for U.L. labeled frames required by the authority having jurisdiction.

1.07 WARRANTY

A. Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
a. Warping (bow, cup, or twist) more than 1/4 inch in a 42 x 84 inch section.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty Period for Solid-Core Exterior Doors: Two years from date of Substantial Completion.

**PART 2 PRODUCTS**

2.01 MATERIALS AND COMPONENTS

A. Interior Flush Doors Solid Core: Meet or exceed WDMA I.S.1A Industry Standard for Wood Flush Doors requirements and as specified. WDMA I.S.1A. Performance Grade – Extra Heavy Duty.

1. Interior Flush Doors Solid Core – Non-Rated and 20 Minute Rated Fire Doors: Provide one of the following cores with hardwood veneers:
   a. Particle board Core (PC-5); which complies with ANSI Standard A208.1, Type 1, Grade LD-2.

2. Interior Flush Fire Doors – Above 20 Minute Rated: FD solid core with hardwood face veneer.
   a. Rating as indicated on drawings.
   b. Provide one of the above cores or the following as required to maintain fire rating:
      1) Non-combustible mineral composite material that is necessary for higher hourly ratings per manufacturer’s approval

B. Moldings: Trim louver and glass openings with recessed bead type wood moldings, species matching door face veneer species. Profiles as selected by the Architect from manufacturer's standard profiles.

1. Glass Lites in Fire Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips required for opening size and fire rating indicated.


2.02 FABRICATION

A. Flush Doors: Fabricate doors in accordance with WDMA I.S. 1A, "Premium Grade" requirements for transparent stained finish. Formaldehyde free.

1. Core Construction: Bond stiles and rails to core and sand entire unit prior to assembly of face veneers.
2. Number of Plies: 5.
3. Face Veneers: Minimum 1/50" thick before sanding, plain sliced white oak.
5. Adhesive: Type I, waterproof.
6. Edge Strips: Stile edges hardwood species matching face veneer; bonded to core; 1-1/8" minimum width after trimming. Top and bottom edges hardwood of mill option.
7. Match Between Veneer Leaves: Book matched for color and grain.
8. Assembly of Veneer Leaves on Door Faces: Running match.
9. Hardware: Factory machine for mortise hardware using template provided by hardware manufacturer.
10. Reinforcement: Reinforce doors to receive hardware specified.
   a. Hinge Attachment: Stiles and rails to be continuously glue bonded to the core so that screw stress is transmitted directly to the core.
   b. Closure, Exit Device and Other Surface Mounted Hardware: Provide top rail 2-1/2" or more in width to hold closer fasteners and solid wood blocking for all other surface applied hardware.

B. Fire Rated Doors: Conform to "Flush Door" requirements specified above. Provide doors of U.L. classification indicated.
   1. Reinforcement: Reinforce doors to receive hardware specified.
      a. Surface applied hardware located where screws cannot penetrate the above mentioned stiles or wood rails shall be through bolted.

C. Factory Finish
   1. Comply with recommendations of WDMA for factory finish of doors utilizing manufacturer's standard stain and clear top finishing system similar:
      a. Filler/Stain: Color as selected by Architect.
      b. Clear sealer.
      c. Clear topcoat.
      d. Sanding.
      e. Clear topcoat.
      f. Packaging.

D. Individually package doors at factory with manufacturer's standard packaging or wrapping for delivery to job site.

E. Manufacturer: MASONITE ARCHITECTURAL-ASPIRO; EGERS; V T INDUSTRIES.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substances, rough openings and installation conditions. Do not proceed with wood door installation until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Verify metal frame dimensions and hardware mortises in metal frames with metal frame manufacturer.
3.03 INSTALLATION

A. Condition doors to average prevailing humidity in installation area before hanging.

B. Install doors in accordance with manufacturer's installation instructions. Job fit and prepare doors to receive hardware. Bevel 1/8" in 2" at strike edges for clearance in arc of swing. Seal cut surfaces, tops, bottoms and edges with sanding sealer after fitting and machining.

C. Hang doors straight, plumb and square securely anchored into position. Adjust doors to provide uniform clearance and to contact stops uniformly. Remove and replace doors that are warped, bowed or otherwise damaged and cannot be properly fit to the opening.

D. Install fire-rated doors in corresponding fire-rated frames in accordance with requirements of NFPA No. 80.

3.04 PROTECTION

A. Protect installed doors from soiling, staining and damage until final acceptance.

B. Repair or replace doors damaged beyond acceptable repair as directed by the Architect.

END OF SECTION
**SECTION 08 31 13**

**ACCESS DOORS**

**PART 1  GENERAL**

1.01  WORK INCLUDED

A. Provide wall, partition and ceiling access doors for access to mechanical and electrical equipment as indicated. Provide fire-rated where indicated or specified.

1.02  RELATED SECTIONS

A. Finish Painting: Section 09 91 00.

B. MPE systems requiring access: Divisions 21 thru 28.

1.03  QUALITY ASSURANCE

A. Coordination: Furnish inserts and anchoring devices that must be built into other work for installation of access panels. Coordinate delivery with other work to avoid delay.

1.04  SUBMITTALS

A. Submit product data and shop drawings for each item. Include installation instructions for conditions involved.

**PART 2  PRODUCTS**

2.01  MATERIALS AND FABRICATION - WALL AND CEILING TYPES

A. General: Provide access panel assembly manufactured as an integral unit, complete with all parts and ready for installation. Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.

B. Standard Access Door

1. Description: Minimum 14 gage steel panels with minimum 16 gage steel frames. Units to have concealed hinges.

2. Provide with exposed 1” frame flange.

3. Manufacturer: Provide panels by one of the following, subject to the above requirements.
   a. J. L. INDUSTRIES INC. Model TM
   b. LARSEN’S MANUFACTURING Model L-MPG
   c. BABCOCK-DAVIS Model B-NT
C. Fire-Rated Access Door
   1. Description: Minimum 20 gage interior and exterior steel panels with minimum 16 gage steel frames and masonry wall type anchors welded to frame.
      a. Automatic Closing: Provide self-closing spring device to assure positive latching.
      b. Fire-Rating: U.L. label equal to wall rating indicated on drawing.
      c. Provide interior lock/latch release device.
      d. Core: Fire-rated mineral fiber.
   2. Manufacturer: Provide panels by one of the following, subject to the above requirements.
      a. J. L. INDUSTRIES INC. Model FD
      b. LARSEN’S MANUFACTURING Model L-FRAP
      c. BABCOCK-DAVIS Model B-IT

D. Locks: Provide cylinder locks on all access doors. Provide 2 keys per access door. Key all access doors alike.


PART 3 EXECUTION

3.01 INSPECTION
   A. Installer must examine areas and conditions under which access panels are to be installed and must notify General Contractor, in writing, of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION
   A. Comply with manufacturer's instructions for installation of access panels.
   B. Coordinate installation with work of other trades.
   C. Set frames accurately in position and securely anchor to supports with face panels level in relation to adjacent finish surfaces.

3.03 ADJUST AND CLEAN
   A. Adjust hardware and panels after installation for proper operation.
   B. Remove and replace panels or frames that are warped, bowed or otherwise damaged.

END OF SECTION
SECTION 08 33 26

OVERHEAD COILING GRILLES

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide complete operating grille assembly, including grille curtain, guides, counterbalance mechanism, hardware, motor operator and controls and installation accessories.

1.02  RELATED SECTIONS

A. Steel frame members: Section 05 50 00.

1.03  QUALITY ASSURANCE

A. Quality Control: Provide overhead coiling grille as complete units produced by a single manufacturer specializing in the production of this type of work, including hardware, accessories, mounting and installation components.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

C. Insert and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for the installation of the units. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.04  SUBMITTALS

A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions.

B. Shop Drawings: Submit shop drawings; show rough openings, finish openings, anchorage details and head, jamb and sill details. Show grille construction, finishes of grille and components.

PART 2  PRODUCTS

2.01  MANUFACTURERS
A. Subject to compliance with requirements, provide products by COOKSON; CORNELL, McKEON, OVERHEAD DOOR CORPORATION or WAYNE DALTON.

B. Obtain overhead coiling grilles from single source from single manufacturer.
   1. Obtain operators and controls from overhead coiling-grille manufacturer.

2.02 CURTAIN (GRILLE) MATERIALS AND CONSTRUCTION

A. Operation Cycles: Grille components and operators capable of operating for not less than 20,000. One operation cycle is complete when a grille is opened from the closed position to the fully open position and returned to the closed position.

B. Grille Curtain Material: Stainless steel.

C. Grille Curtain: Fabricate all overhead coiling grille curtains of 5/16" diameter rods evenly spaced horizontally (6") and vertically (2") in straight in-line pattern; galvanized steel end links.
   1. Provide countertop height grilles where indicated.

D. Bottom Bar: Continuous, tubular shape; material and finish to match grille.

E. Curtain Jamb Guides: Material and finish to match grille; fitted with vinyl inserts.

F. Locking
   1. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.
   2. Cylinder Lock: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
      a. Lock Cylinders: Cylinders specified in Section 08 71 10; keyed to building keying system.
   3. Safety Interlock Switch: Equip power-operated grilles with safety interlock switch to disengage power supply when grille is locked.

2.03 COUNTERBALANCING MECHANISM

A. Counterbalance grille by means of adjustable steel helical torsion spring, mounted around a steel shaft and mounted in a spring barrel and connected to curtain with the required barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Barrel: Fabricate spring barrel of hot-formed structural quality carbon steel, welded or seamless pipe, of sufficient diameter and wall thickness to support roll-up of curtain without distortion and limit barrel deflection to not more than 0.03" per foot of span under full load.

C. Provide spring balance consisting of one or more oil-tempered steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast steel barrel plugs to secure ends of springs to barrel and shaft.
1. Fabricate torsion rod for counterbalance shaft of case-hardened steel, of required size to hold fixed spring ends and carry torsion load.

D. Brackets: Provide mounting brackets of manufacturer's standard design, either cast iron or cold-rolled steel plate with bell mouth guide groove for curtain.

E. Hood: Square. Material and finish to match grille; intermediate supports as required. Face of wall mount.

1. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
   b. Stainless Steel: 0.025-inch- thick stainless-steel sheet, Type 304, complying with ASTM A 666 or ASTM A 240.
   c. Aluminum: 0.040-inch- thick aluminum sheet, complying with ASTM B 209, of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.

2.04 ELECTRIC OPERATOR

A. Electric Motor Operation: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Standard duty, up to 25 cycles per hour and up to 90 cycles per day.

1. Electrical Characteristics:
   b. Volts: 115 V [verify prior to bid].
   c. Hertz: 60.

2. Limit Switches: Equip motorized grille with adjustable switches interlocked with motor controls and set to automatically stop grille at fully opened and fully closed positions.

3. Sensing Edge Protection: Automatic safety sensor edge, located within astragal or mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

4. Operator Controls: Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V AC or DC.

5. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
   a. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.

2.05 FINISHES

A. General
   1. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.
   2. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Stainless-Steel Finish: Directional Satin Finish: No. 4.

C. Aluminum Finish: Clear anodic finish, AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker

D. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, application, and baking.

E. Factory Prime Finish: Manufacturer's standard color.

PART 3 EXECUTION

3.01 INSPECTION

A. Installer must examine the supporting structure and the conditions under which the work is to be performed and notify the General Contractor in writing of conditions which are detrimental to proper and timely completion of the work.

B. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 INSTALLATION

A. Install grille complete with necessary hardware, guides, hoods, anchors, inserts, hangers and equipment supports in accordance with manufacturer's instructions and recommendations.

B. Adjust height of bottom bar of grille as directed by Architect to finish flush with ceiling where assembly is mounted above ceiling.

3.03 FIELD ADJUSTMENT

A. Upon completion of installation including the work by other trades, test and adjust doors to operate easily, free from warp, twist or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

END OF SECTION
PART 1 GENERAL

1.01 DESCRIPTION

A. Provide all materials, labor, equipment and services necessary to furnish, deliver and install all work under this section as shown on the contract documents, specified herein, and as specified by the job conditions.

1.02 RELATED SECTIONS

A. Metal Fabrication: Section 05 50 00.
B. Rough Carpentry: Section 06 10 00.
C. Painting: Section 09 91 00.
D. Electrical: Division 26.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of door. Include operating instructions and maintenance instructions.

B. Shop Drawings: Submit shop drawings for each type and size of door. Show rough opening, finish opening, anchorage details and head and jamb details. Show door construction and finishes.

C. Maintenance and Operating Manuals: Furnish complete manuals describing the materials, devices and procedures to be followed in operating and maintaining all of the fire and smoke rated curtains under this section. Include manufacturer's brochures and parts lists describing the actual materials used in the product.

D. Product Approval Reports: Submit copy of manufacturer's listing report and authorization to mark clearly detailing the description of product, fire endurance test method, test results and test conclusions of the test criteria as conducted and witnessed by a United States accredited testing laboratory such as Underwriters Laboratories (UL) or Intertek-Warnock Hersey (Intertek). Testing agency’s Listing Report shall clearly state that the fire and smoke rated curtains have been tested and approved to the standards and criteria of UL 10B and UL 10C (20 minutes), UL 10D (3 hours) and UL 1784 Smoke & Draft rating without the use of an artificial bottom seal.

1.04 QUALITY ASSURANCE

A. Fire & Smoke Rated Assemblies: Provide all curtains with fire and smoke
resistance rating required to comply with governing regulations inspected, tested, listed and labeled by UL or Intertek and complying with NFPA 80 for class of opening. Provide units tested, approved and labeled under the UL 10B, UL 10C, UL 10D and UL 1784 standards. Provide testing agency label permanently fastened to each fire curtain assembly as evidence of product compliance.

B. Oversize Assemblies: Where units exceed the testing laboratory’s label size, an Oversize Certificate label issued by either UL or Intertek shall be provided and permanently fastened to each fire curtain assembly as evidence of product compliance. Oversize assemblies requiring the joining of curtain sections together on site by the installer must require documented field certification by UL or Intertek

C. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.

D. General: Deliver and store materials in manufacturer's original packaging, labeled to show name, brand and type. Store materials in a protected dry location off the ground in accordance with manufacturer's instructions.

1.05 WARRANTY

A. Fire & Smoke Rated Curtain Warranty: Provide Two (2) Year Warranty signed by the manufacturer and installer agreeing to repair or replace work which has failed as a result of defects in materials or workmanship. Upon notification within the warranty period, such defects shall be repaired at no cost to the owner

PART 2 PRODUCTS

2.01 MATERIALS

A. Curtain: Shall be of a reinforced fabric curtain, consisting of a fiberglass fabric with integral stainless steel wire weave and three (3) hour fire retardant coating. Curtain shall be at minimum no less than .54 mm thick.

B. Egress Door: Shall be an integral fire and smoke rated, 3 hour rated, manually operable soft surface swinging type egress door. The swinging egress door shall be readily operable by pushing it from the egress side without special knowledge or effort and shall comply with opening force requirements as outlined under the International Building Code (IBC)

C. Bottom Bar: Shall consist of a tubular member formed to fit curtain, provide stiffness, limit deflection and allow for a tight fitting closure. Bottom bar shall be designed of adequate size and weight to keep the curtain fully extended, taut and level during self-closing while preventing any deflection caused by the building’s air pressure currents.

D. Guide Assemblies: Each guide assembly shall be fabricated of a steel mounting adjustment angle and with integral pressure retaining side guides. The side guides are to be designed with an overall viewable exposed profile of no greater than 1/2” in width.
E. Endplates: Fabricated of minimum 14 gauge steel endplates provided to house and support ends of the barrel assembly

F. Hood: Shall be provided to entirely enclose curtain and barrel assembly. Hood shall be fabricated of minimum 22 gauge galvanized steel formed to match brackets. Top and bottom shall be bent and reinforced for stiffness. Hood shall be fitted with UL approved and classified smoke seals

G. Barrel Assembly: Fabricated of structural quality carbon steel seamless pipe of sufficient size and diameter to house operating motor drive, support curtain assembly and limit horizontal deflection of the fire and smoke curtain assembly

H. Motor Drive Unit: Fire and smoke curtain shall be powered by an inboard motor including gearbox assembly, electromechanical distance travel limit switches all linked to an internal electromagnetic brake which allows the fire and smoke curtain to operate under normal and fire ready conditions.

1. Control Station: Provide surface mount push button control station marked open, close and stop.

I. Fail-Safe Release Device: A fail-safe release device shall be built into the motor drive unit as an integral part of the release mechanism. When power is interrupted to the release mechanism by an alarm condition, the fire and smoke curtain shall automatically self-close. In the event of power failure a time delay shall prevent the fire and smoke curtain from closing for a period of 30 minutes, unless there is an alarm condition at which point the fire and smoke curtain shall immediately self-close. Once power has been restored and the alarm condition has been cleared, the release mechanism shall automatically reset and the fire and smoke curtain shall immediately be restored to the normal operating condition.

J. Finish: After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for paint adhesion. Hood, guides and bottom bar shall finish equivalent to the (Basis of Design) McKEON Sterling Gray finish.

2.02 MANUFACTURER

A. Basis of Design: FireFighter™ Series model D200E as manufactured by MCKEON DOOR COMPANY, Bellport, NY

B. Equivalent Products / Manufacturers: Fire & smoke curtain by SMOKE GUARD SYSTEM; or approved equivalent by the Authority Having Jurisdiction prior to bid.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces and field conditions to which this work is to be performed and notify architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.
B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary

C. Coordinate and schedule work under this section with work of other sections so as not to delay job progress

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations. Perform installation using only factory approved and certified representatives of the fire and smoke curtain manufacture.

B. Install fire and smoke curtain assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true. Adjust fire and smoke curtain installation to provide uniform clearances and smooth non-binding operation.

C. Install wiring in accordance with applicable local codes and the National Electrical Code Standard. Materials shall be UL listed.

D. Test fire and smoke curtain closing sequence when activated by the building's fire alarm system. Reset fire and smoke curtain after successful test.

3.03 PROTECTION AND CLEANING

A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.

B. Remove, repair or replace materials which have been damaged in any way.

C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

END OF SECTION
SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1  GENERAL

1.01  WORK INCLUDED

A. Work under this section includes the design of the aluminum entrance and window systems and all materials, labor and equipment for the complete installation of the work as shown on the drawings and specified herein. Work includes:
1. Aluminum entrance doors and storefront system.
2. Aluminum entrance framing system for entrances and vestibule, including sidelight and transom frames as indicated.
3. Fixed Aluminum Windows.
4. Glass and glazing and hardware of the systems.
5. Anchors, fasteners, flashings, trim and accessories to complete the work.
6. Sealants required within entrance and window construction.
7. All gaskets, sealants and tapes required in final assembly of the work.
8. Installation of lock cylinders furnished under Section 08 71 10.

1.02  RELATED SECTIONS

A. Joint Sealants: Section 07 92 00.
B. Glazed Aluminum Curtainwalls: Section 08 44 13
C. Hardware: Section 08 71 10.
D. Glazing: Section 08 81 00.
E. Vapor/Air Barrier Transition Membranes: Section 07 27 26.

1.03  QUALITY ASSURANCE

A. Provide aluminum doors and framing system manufactured by a single firm specializing in the production of this type of work.

B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

C. Painted Finishes: Factory painted finish to be performed by an applicator approved by the paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of the finish.

1.04  REFERENCES

Performing High Performance Organic Coatings on Architectural Extrusions and Panels, AAMA 2605.

1.05 SUBMITTALS

A. Submit the following in accordance with the General Conditions:
1. Framing system details.
2. Door and Window details.
3. Installation instructions.
4. Itemized schedule of door hardware.
5. Finish samples showing the light and dark range limits of the anodizing colors. These finish samples will be used in the field as a check for items specified in this section. Anodized items whose color does not fall within the range indicated by these samples are unacceptable and shall not be used in the finished work.

B. Tests: Submit two copies of test reports made or witnessed by an independent testing laboratory showing the results of tests conducted on previously manufactured windows of the type used on this project. The reports shall verify conformance to thermal movement, air and water infiltration and structural properties as described herein.

C. Building Shop Drawings: Include complete evaluations of all systems; details and methods of anchorage; details of construction finishes; methods of assembly; location and installation of hardware and reinforcement for same; size, shape and thickness of materials; joints and connections; details of joining with other work.
1. Scale: Include typical unit elevation of each system at 1/2" scale and details at full scale where practical.

D. Product Data: Submit manufacturer's specifications for materials and fabrication of work, and instructions and recommendations for installation and maintenance. Include certified test reports showing compliance with requirements where a test method is indicated.

E. Samples: Submit samples of each type and color and finish required by this Section, on 12" sections of extrusions or formed shapes and on 6" squares of sheet/plate. Include two or more samples in each set. Architect reserves right to require fabrication samples showing prime members, joinery, anchorage, expansion provisions, glazing and similar details, profiles and intersections.

1.06 DELIVERY, STORAGE AND HANDLING

A. Pack, deliver, handle, store and protect materials from damage in accordance with AAMA Curtain Wall #10, "Care and Handling of Architectural Aluminum" recommendations.
1. Remove paper type wrappings when unloading.
2. Store materials inside the buildings whenever possible in clean, dry ventilated areas free of dust or corrosive fumes.
3. Stack members vertically or on edge, shim between components to provide water drainage and ventilation. Protect with adequate coverings, placed to provide adequate air circulation.
4. During installation, protect materials from lime mortar, concrete and copper run-off, weld splatter, acids, roofing materials, solvents, abrasive cleaner.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.08 WARRANTIES

A. Submit written warranty signed by manufacturer, Contractor, and installer agreeing to repair or replace work which fails in materials or workmanship within three years of the date of project acceptance. Failure of materials or workmanship shall include excessive leakage or air infiltration, excessive deflections and defects in accessories, weather seals and other components of work.

B. Finish: Provide paint manufacturer's guarantee of paint finish against failure of paint finish. Failure includes blistering, peeling, cracking, flaking, checking, excessive color change and chalking. Color change shall not exceed 5 N.B.S. units (per ASTM D523) and chalking shall not less than a rating of 8 per ASTM D4214.

1. Warranty Period: 15 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Drawings and specifications are based on products by KAWNEER CO.

B. Other Acceptable Manufacturers: Equal products by the following manufacturers are acceptable providing they meet or exceed the requirements specified herein and conform to the design intent indicated on the drawings:

1. CRL – U.S. ALUMINUM
2. EFCO
3. OLDCASTLE BUILDING ENVELOPE
4. TUBELITE DIVISION, INDAL, INC.
5. VISTAWALL

2.02 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after
surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36.
2. Cold-Rolled Sheet and Strip: ASTM A 1008.

2.03 STOREFRONT, WINDOW FRAMING AND ENTRANCE DOOR SYSTEMS

A. Type: An integrated system of extruded aluminum sections, glazing devices, sealing devices, doors and hardware and fixed windows.

B. Materials: Provide aluminum alloy and temper for each shape as recommended by manufacturer and processor to comply with requirements of performance, fabrication, and application of finish.

1. Thickness: As required to meet design requirements with a minimum of 1/8" for major sections.
2. Material and products to be manufactured regionally AND harvested, extracted, or recovered regionally within a radius of 500 miles from the project site. Minimum 25% recycled content.

C. Framing: KAWNEER 451T, framing for 1" insulating glass.

1. Type: Thermally broken, outside glazed, fixed type framing as indicated.
2. Frame
   a. Members: Main frame members designated specifically for manufacture of aluminum windows extruded from 6063-T5 aluminum alloy.
   b. Glazing: Extruded snap-in type bead; to accept 1" insulating glass
   c. Trim: Provide trim, sills, flashings, closures to complete installation.
   d. Size
      1) Sightline: Nominal 2".
      2) Depth: 4-1/2".

3. Glazing Plane: Center, unless otherwise indicated.
4. Special Framing Shapes: Provide as detailed or as required to maintain design intent as indicated on building elevations drawings and section drawings. Aluminum extruded shapes and bent aluminum sheet, minimum 0.063", finished after fabrication.
5. Vestibule Framing: KAWNEER Trifab II 451. Units to accept 1/4" glass.

D. Performance Requirements: Exterior window wall system (excluding doors) shall meet or exceed the following performance requirements.

1. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures indicated on the drawings.
2. Thermal Movement: Window framing system shall be designed to provide for expansion and contraction of component materials caused by a surface temperature range of 180°F, without causing buckling, stresses on glass, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects.
3. Air Infiltration: Air leakage shall not exceed 0.06 cfm per square foot of fixed wall area when tested in accordance; with ASTM E283 at test pressure not less than 6.24 psf.
4. Water Infiltration
   a. Provide drainage to exterior face of framing water entering at joints.
   b. No uncontrolled water penetration shall occur when tested in accordance with ASTM E331, at test pressure not less than 8.0 psf.

5. Structural Properties - Uniform Load: A static air design load of 20 psf shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

6. Thermal Properties
   a. Thermal transmittance due to conduction (Uc) shall not be greater than 0.58 BTU/hr/ft sq./degree F when tested in accordance with AAMA 1503.1.
   b. Condensation Resistance Factor Frame (CRF): Shall not be less than 61 when tested in accordance with AAMA 1502.7.

E. Glazed Aluminum Entrance Doors: Medium stile, manufacturer's standard, single acting aluminum entrances.
   1. Stiles: Nominal 3-1/2" wide.
   2. Rails
      a. Top: 3-1/2" high.
      b. Bottom: 10" high.
   3. Section Wall Thickness: .125" (major components); 0.05" (glazing moldings)
   4. Door Thickness: 1-3/4".
   5. Corners: Stiles through design, joined by concealed bolts and weld.
   6. Provide complete with snap-in glazing stops and gaskets.
   7. Sizes: As indicated. Provide single or pairs of doors as scheduled.
   8. Exterior Entrance Weatherstripping: KAWNEER "Sealair Weathering" system or equal by other approved manufacturer. Locate weatherstripping at jambs, head and meeting stiles (as applicable). Provide bottom rail with EPDM blade gasket sweep. Size sweep to close against door threshold. Sweep housing finish to match door finish.

2.04 FINISHES

A. Exposed aluminum surfaces shall receive an Architectural Class 1, anodized coating; AA-M10C21A41, minimum 0.7 mil thickness (AAMA 611).
   1. Color: As selected from paint manufacturer's complete specified line.
   3. Concealed members may be mill finished, providing they cannot be seen through the glass.

2.05 ENTRANCE DOOR HARDWARE

A. Prepare and reinforce doors and frames for hardware. Factory fit and install hardware in accordance with Section 08 71 00 and manufacturer's requirements.
B. Hardware
1. Offset Pivots: Provide top, intermediate and bottom pivots. Baked-on epoxy finish to match finish of door.
2. Closers: LCN 4041 CUSH each leaf. Spray painted to approximate framing finish.
3. Exit Device: VON DUPRIN Series 99 for wide stile doors and Series 33 for narrow and medium stile doors. Concealed vertical rod for both leaves of pairs of doors and rim device for single doors. Devices shall include the following as applicable: panic device, crash bar, vertical rods, top and bottom latch housings, roller strike, and lock mechanism. Cylinder shall be furnished and keyed in accordance with Section 08 71 00. Cylinder finish shall match exit device.
   a. Provide exit device with finish to match framing.
   b. Trim: Provide 9947TP and 9947DT for all pairs of doors; and 99TP trim for all single doors.
4. Threshold: Extruded aluminum, natural anodized finish, maximum 1/2" high, provide on all exterior doors. Provide stainless steel fasteners.

2.06 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic stainless steel or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum components. Finish exposed fasteners to match aluminum work.

B. Flashing, Trim and Accessories: Provide as required to complete the work. Finish shall match aluminum entrances and storefront finishes. Work includes:
   1. Aluminum closure panels, flashing and trim.
   2. Concealed Flashing: Dead-soft stainless steel, 26 gauge minimum, type selected by manufacturer for compatibility.
   3. All trim materials shall be finished after fabrication, unfinished exposed edges at holes and trim terminations are not acceptable.

C. Brackets and Reinforcements: Manufacturer's high strength aluminum units where feasible; otherwise, nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A123. Reinforce doors to receive hardware.

D. Bituminous Coatings: Cold applied asphalt mastic complying with SSPC PS 12, compounded for 30 mil thickness per coat.

E. Structural Sealant: Designed to carry gravity loads of glazing and capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed storefront/strip windows without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
   1. Structural Glazing Sealants: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in storefront/strip windows assembly indicated. Color: As selected by Architect from manufacturer's full range of colors.
2.07 FABRICATION

A. Provide manufacturer's standard fabrication and accessories that comply with indicated requirements. Minor dimension differences will be accepted in order to utilize manufacturer's standard products.

B. Fit and assemble the work at the shop to the greatest extent possible. Disassemble only as required for shipment and erection. Maintain true continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members. Conceal fasteners wherever possible.

C. Reinforce aluminum work as necessary at points of support or anchorage and at mechanical joints and points of attachment to meet performance requirements and for support of the system. Separate dissimilar metals with bituminous paint or preformed separators that will prevent corrosion. Separate metal surfaces at moving joints with plastic inserts or other non-abrasive concealed inserts.

D. Coordinate work of this section with other work for proper sequence of construction without delays. Verify dimensions of supporting structure and other elements that precede wall system work before fabrication of required components. Provide for erection tolerances for other work where field measurements cannot be obtained.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates supporting structure, and installation conditions. Do not proceed with aluminum entrances erection until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

A. General
   1. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded and broken members.
   2. Remove and replace members that have been damaged during installation or thereafter before time of acceptance.
   3. Do not cut or trim component parts during erection, in a manner which would damage finish, decrease strength or result in a visual imperfection or a failure in performance of the work.

B. Install components in accordance with the manufacturer's installation instructions and recommendations.

C. Install component parts level, plumb, true to line and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive shims, anchors,
fasteners, spacers and fillers.

D. Assembly and Anchorage: Anchor component parts securely in place, by bolting or other permanent mechanical attachment system, which will comply with performance requirements and permits movements as required.

E. Apply a bituminous coating or other suitable separator on concealed contact surfaces of dissimilar materials, before assembly or installation to prevent corrosive or electrolytic action.

F. Set sill members and entrance thresholds in a bed of sealant compound, or with joint fillers or gaskets to provide weathertight requirements.

G. Install glass and glazing, in accordance with Section 08 81 00 and the manufacturer's requirements.

H. Install joint sealants specified in Section 07 92 00, in accordance with the manufacturer's requirements.

I. Adjust operating hardware to function properly, without binding, and to provide tight proper fit at contact points and weatherstripping.

3.03 CLEANING AND PROTECTION

A. Protect glass from breakage immediately upon installation, by attachment of streamers to framing held away from glass. Do not apply markings of any type to surfaces of glass.

B. Remove protective coating when completion of construction activities no longer require its retention.

C. Immediately before acceptance of the work, clean the aluminum entrance systems thoroughly, inside and out. Demonstrate proper cleaning methods to Owner's maintenance personnel during final cleaning. Prepare a "Cleaning and Maintenance Manual" listing types of cleaning compounds, cleaning methods, sealants and glazing materials used for cleaning, repair and maintenance of work and turn over to Owner upon acceptance of the work.

END OF SECTION
SECTION 08 44 13
GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Work under this section includes the design and engineering of the curtain wall system and all materials, labor and equipment for the complete installation of the aluminum curtain wall system as shown on the drawings and specified herein:
1. Aluminum curtain wall framing.
2. Glass and glazing of the aluminum curtain wall system and entrance doors.
3. Anchors, fasteners, flashings, trim and accessories to complete the work.
4. Sun shade; mounted to vertical mullions.
5. Horizontal mullion extensions.
6. Aluminum faced/insulated glazing panels.

B. Provide reinforcing within curtain wall framing as required to meet design loads and span conditions.

1.02 RELATED SECTIONS

B. Joint Sealants: Section 07 92 00.
C. Glass and Glazing: Section 08 81 00.
D. Aluminum Entrance doors: Section 08 41 13.
E. Spandrel Insulation: Section 07 21 00.
F. Vapor/Air Barrier Transition Membranes: Section 07 27 26.

1.03 QUALITY ASSURANCE

A. Provide standard aluminum curtain wall framing system and aluminum doors manufactured by firms specializing in the production of this type of work that conforms to project requirements.

B. Painted Finishes: Factory painted finish to be performed by an applicator specifically approved by the paint manufacturer. The applicator shall provide written confirmation of approval by the manufacturer prior to application of the finish.

C. Coordination: Coordinate entrance doors, frames and subframes that are indicated to operate within curtain wall system. Include:
1. Aluminum finish systems. Colors selected must be an exact color match to aluminum entrance system finish, as determined by the Architect, from the same paint system manufacturer.
2. Door hardware.
D. Mockups: Build in-place, on-building mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockups of typical curtainwall area and punched openings as shown on Drawings.
2. Field testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

E. Field Testing Laboratory: Provide testing lab services in accordance with Section 01 40 00.

1.04 REFERENCES


1.05 SUBMITTALS

A. Submit the following:
1. Framing system details.
2. Installation instructions.
3. Finish samples.

B. Tests: Submit two copies of test reports made or witnessed by an independent testing laboratory showing the results of tests conducted on previously manufactured windows of the type used on this project. The reports shall verify conformance to thermal movement, air and water infiltration and structural properties as described herein.

C. Building Shop Drawings: Include complete evaluations of all systems; details and methods of anchorage; details of construction finishes; methods of assembly; location and installation of hardware and reinforcement for same; size, shape and thickness of materials; joints and connections; details of joining with other work.

1. Scale: Include typical unit elevation of each system at 1/2" scale and details at full scale where practical.
2. Calculations: Show full derivation of loads and successful resolution of loads on individual members, their connections, and fasteners to the connection to the building, showing conformance to specified criterion. Such calculations shall be done by a structural engineer licensed to practice in the State of Tennessee. Calculation submission must coincide with shop drawing submission.

D. Product Data: Submit manufacturer's specifications for materials and fabrication of work, and instructions/recommendations for installation and maintenance. Include a summary cover listing conformance to project conditions.
E. Samples: Submit samples of each type and color and finish required by this Section, on 12" sections of extrusions or formed shapes and on 6" squares of sheet/plate. Include two or more samples in each set.
   1. Architect reserves right to require fabrication samples showing prime members, joinery, anchorage, expansion provisions, glazing and similar details, profiles and intersections.

F. Field Performance Tests: Submit copies of field performance test reports specified in Article 3.03 herein. See Section 01 40 00.

1.06 DELIVERY, STORAGE AND HANDLING

A. Pack, deliver, handle, store and protect materials from damage in accordance with AAMA Curtain Wall #10, "Care and Handling of Architectural Aluminum" recommendations.
   1. Remove paper type wrappings when unloading.
   2. Store materials inside the buildings whenever possible in clean, dry, ventilated areas, free of dust or corrosive fumes.
   3. Stack members vertically or on edge, shim between components to provide water drainage and ventilation. Protect with adequate coverings, placed to provide adequate air circulation.
   4. During installation, protect materials from all construction materials, including mortar, concrete, weld splatter, cleaning acids, roofing materials, solvents, abrasive cleaners and runoff from all the above.

1.07 PERFORMANCE REQUIREMENTS – CURTAINWALL

A. Performance Requirements: Exterior curtain wall system shall have been tested to meet or exceed the following performance requirements.
   1. Wind loads: Provide curtain wall system; including glazing, panels and anchorage, capable of withstanding wind load design pressures derived from criteria indicated.
   2. Air Infiltration: Air leakage shall not exceed 0.06 cfm per square foot of fixed wall area and 0.1 cfm for each lineal foot of crack of operable elements when tested in accordance; with ASTM E283 at test pressure not less than 6.24 psi.
   3. Water Infiltration
      a. Provide drainage to exterior face of framing any water entering at joints and any condensation occurring within window construction.
      b. Static Pressure: No uncontrolled water penetration when subjected to water spray at the rate of five gallons per hour per square foot at a static pressure of 10 psf for 15 minutes when tested in accordance with ASTM E331.
      c. Dynamic Pressure: No uncontrolled water penetration when subjected to water spray at the rate of five gallons per hour per square foot with wind from an aircraft engine generating a pressure of 10 psf for 15 minutes; tested in accordance with AAMA TM-1 and AAMA 501.1.
   4. Structural Properties: No damage or failure shall occur when tested in accordance with ASTM E330. Standard test design loading shall be minimum 20 psf, positive and negative windload. A design deflection criteria of L/175 or 3/4" maximum for spans up to 13'-4", and L/240+1/4 inch.
for spans over 13'-4" shall apply to both positive and negative loads. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans or 1/16" at members shall occur.

5. Average Thermal Conductance: Provide glazed aluminum curtain-wall systems with average U-factor of not more than 0.35 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.

6. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor for the frame shall not be less than 79 using low e glass (90 % argon fill with warm edge spacer).

7. Thermal Requirements: Framing system designs to accommodate expansion and contraction movement due to surface temperature differential of 180°F without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance or other detrimental effects.

1.08 WARRANTIES

A. Furnish written guarantee certifying that all work furnished and installed will be free of defects in materials and workmanship, and remain watertight for a period of three (3) years from date of Substantial Completion. Should any defect develop during the guaranty period due to faulty materials or improper workmanship, such defects will be repaired or replaced with new work at no expense to the Owner.

B. Provide 20 year manufacturer's guarantee of paint finish against failure of paint finish from paint manufacturer. Failure includes blistering, peeling, cracking, flaking, checking, excessive color change and chalking. Color change shall not exceed 5 N.B.S. units (per ASTM D523) and chalking shall not less than a rating of 8 per ASTM D4214.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Drawings and Specifications are based on 1600 Series System 1 and 1600 Series System 2 manufactured by KAWNEER.

B. Other Manufacturers: Systems manufactured by the following are acceptable providing they meet the performance and dimensional requirements that are specified herein and conform to the design intent indicated on the drawings.

1. CRL – U.S. ALUMINUM
2. EFICO
3. OLDCASTLE BUILDING ENVELOPE
4. TUBELITE DIVISION, INDAL, INC.
5. WAUSAU

2.02 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.

2.03 CURTAIN WALL SYSTEM

A. Aluminum Framing Members: Alloys best suited to meet the performance requirements and structural characteristics as published by the Aluminum Association. Other alloys will be considered only if published literature is available by the primary producer of the material and justified by both the manufacturer and structural engineer for the curtainwall. Provide thicknesses, shapes and profiles as required to comply with performance requirements.

B. Size: 2-1/2” wide x depths indicated and required for design loads.

C. Design system for exterior glazing of vision lites.

D. Anchorage: Provide anchorage to building structure for three directional adjustments for fabrication and construction tolerances. All connections must be bolted; screws are not permitted.

E. Trim and Closures: Visible aluminum trim and closures that are not extruded, shall be fabricated from .125” thick aluminum plate finished to match other aluminum curtain wall materials, unless noted otherwise on the drawings. Provide concealed fasteners wherever possible.

2.04 ALUMINUM DOORS AND SUBFRAMES

A. Type: A system of extruded aluminum subframe sections, sealing devices, and doors and hardware integrated into the curtainwall system.
   1. Provide subframe and doors compatible with aluminum curtain wall system.
   2. See Section 08 41 13.

2.05 ACCESSORIES

A. Fasteners: 300 Series stainless steel for system joinery, zinc-plated for bolt anchors if occurring interior of system’s water barrier. No exposed fasteners without Architect’s permission. If exposed, finish exposed fasteners to match aluminum work.

B. Sill Pan Flashing: Dead-soft stainless steel, 26 gauge minimum, type selected by manufacturer for compatibility.

C. Brackets and Reinforcements: Manufacturer’s high strength aluminum units where feasible; otherwise, nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A386.

D. Sun Shade: An aluminum sunshade that is anchored directly to the vertical curtain wall mullions.
   1. Design, Size and Profiles: Design and fabricate sunshades to outside dimensions indicated and profiles indicated. Provide gages and sizes of materials as required for span and load conditions.
      a. 25 PSF wind load
      b. Mullion spacing as indicated on drawings.
2. Manufacturer/Model: Versoliel (single blade) Sunshade System by KAWNEER or equal by curtainwall manufacturers listed in paragraph 2.01.B. Airfoils will be 12" in depth; shape to be selected by architect.

E. Horizontal Mullion Extensions: KAWNEER 1600 Standard Mullion Covers. Mullion covers or extensions will be 10" in depth; shape to be selected by architect.

F. Separate dissimilar materials and metals with full face plastic shims or similar type materials.

G. Slip Joint Linings: Provide plastic sheets, spacers or bearing pads to ensure free movement between surfaces where expansion and deflection movements are intended. Provide units of sizes and thicknesses as recommended by manufacturer.

H. Structural Sealant: Designed to carry gravity loads of glazing and capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed curtain walls without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.

1. Structural Glazing Sealants: ASTM C1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtain-wall assembly indicated.
   a. Color: As selected by Architect from manufacturer's full range of colors.

2. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

I. Back-Pans: Minimum 0.040 inch painted aluminum back-pan where exposed, and 20 gauge galvanized steel where not exposed, with stiffeners as required.
   1. Finish: Where exposed, provide finish color to match framing as approved by Architect.

2.06 FABRICATION

A. Comply with dimensions and profiles indicated on drawings.

B. Provide manufacturer's standard fabrication and accessories that comply with indicated requirements. Minor dimension differences will be accepted in order to utilize manufacturer's standard products.

C. Thermal Break Construction: Fabricate curtain wall framing with a concealed low conductance thermal barrier, located in a manner which eliminates direct metal-to-metal contact. Provide manufacturer's standard construction that has been tested to demonstrate resistance to thermal conductance and condensation as specified, and has been tested to resist specified loads and differential movement.
D. Shop fabricate aluminum curtain wall assemblies. Fit and assemble the work at the shop to the greatest extent possible. Disassemble only as required for shipment and erection. Maintain true continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit and flush alignment of contacting members. Conceal fasteners.

E. Reinforce aluminum work as necessary at points of support or anchorage and at mechanical joints and points of attachment to meet performance requirements and for support of the system. Separate metal surfaces at moving joints with plastic inserts or other non-abrasive concealed inserts.

F. Factory-Assembled Frame Units
   1. Rigidly secure nonmovement joints.
   2. Prepare surfaces that are in contact with structural sealant with manufacturer’s written instructions to ensure compatibility and adhesion.
   3. Preparation includes, but is not limited to, cleaning and priming surfaces.
   4. Seal joints watertight unless noted otherwise.
   5. Install glazing to comply with requirements of Section 08 80 00.

2.07 FINISHES

A. All exposed aluminum surfaces shall receive an Architectural Class 1, anodized coating; AA-M10C21A41, minimum 0.7 mil thickness (AAMA 611).
   1. Color: As selected by Architect from paint manufacturer’s complete specified line; and to be coordinated with and match entrance door color and storefront framing color. See Section 08 41 13.
   3. Concealed members may be mill finished, providing they cannot be seen through the glass.

B. Interior Surfaces: Baked enamel finish; AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer’s written instructions for cleaning, conversion coating, and applying and baking finish.
   1. Color and Gloss: As selected by Architect from manufacturer’s full range.

C. Steel Reinforcement: Manufacturer’s standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates supporting structure and installation conditions. Do not proceed with curtain wall system erection until unsatisfactory conditions have been corrected.
B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

C. Preinstallation Conference
1. Prior to installation of curtain wall and associated work, meet at project site, or other mutually agreed location, with installer, representative of curtain wall manufacturer, installers of related work, and other entities concerned with performance, including test agencies, governing authorities, Construction Manager, Architect, and Owner.
2. Record discussions and agreements and furnish a copy to each participant.
3. Provide at least 72 hours advance notice to participants prior to convening installation conference.
4. Meeting agenda shall include:
   a. Construction
   b. Safety
   c. Installed curtain wall protection
   d. Damage to installed curtain wall
   e. Person responsible to inspection of substrate.

3.02 INSTALLATION

A. General
1. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded and broken members. Remove and replace members that have been damaged during installation or thereafter before time of acceptance.
2. Do not cut or trim component parts during erection without advanced permission of the Architect, and acceptance from structural engineer.

B. Install the curtain wall system in accordance with the manufacturer's installation instructions and recommendations.

C. Install component parts level, plumb, true to line and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive structural shims, anchors and bolts; never attach to wood blocking or through wood spacers.

D. Erection Tolerances: Install glazed aluminum curtain-wall systems to comply with the following maximum tolerances:
1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
   b. Where surfaces are separated by reveal or protruding element from ½ to 1 inch wide, limit offset from true alignment to 1/8 inch.
   c. Where surfaces are separated by reveal or protruding element of 1 inch wide or greater, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.
E. Assembly and Anchorage: Anchor component parts securely in place, by bolting, which will comply with performance requirements and permits movements as required.

F. Install curtain wall system glass and glazing, in accordance with Section 08 81 00 and the manufacturer's requirements.

3.03 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. All tests must be performed in the presence of the Architect, Construction Manager and Owner’s Representative. Provide a minimum of 72 hours notice prior to each test being performed.

C. Field Quality-Control Testing: Perform the following test on representative areas of glazed aluminum curtain walls.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to ASTM E1105 and shall not show evidence of water penetration.
   a. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion

2. Air Infiltration: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
   a. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion

3. Water Penetration: ASTM E1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.

D. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.

1. Test a minimum of two areas on each building facade.
2. Repair installation areas damaged by testing.

E. Repair or remove work where test results and inspections indicate that the work does not comply with specified requirements. Obtain authorization for remediation from Architect before accomplishing any repairs. Remediate and repeat test of that area, and test another similar area until all tests are successful.

F. Additional testing and inspecting, Contractor's expense, will be performed to determine compliance of replaced, remediated or additional work with specified requirements.

G. Prepare test and inspection reports.
3.04 CLEANING AND PROTECTION

A. Protect glass from breakage immediately upon installation. Attach streamers to framing. Do not apply markings or materials of any type to surfaces of glass.

B. Remove protective coating when completion of construction activities no longer require its retention.

C. Immediately before acceptance of the work, clean the aluminum curtain wall system thoroughly, inside and out. Demonstrate proper cleaning methods to Owner's maintenance personnel during final cleaning.

D. Prepare a "Cleaning and Maintenance Manual" listing types of cleaning compounds, cleaning methods, sealants and glazing materials used for cleaning, repair, deglazing and reglazing and maintenance of work and turn over to Owner upon acceptance of the work.

END OF SECTION
SECTION 08 71 05

ACOUSTICAL DOOR GASKETS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Furnish and install acoustical door gaskets on building standard doors.

B. Related Sections. The following work is specified elsewhere:
   1. Metal and wood doors.
   2. Door frames.
   3. Glazing

1.3 SUBMITTALS

A. Compliance: Comply with pertinent provisions of Division 1 – General Requirements.

B. Specifications: Submit Manufacturer’s specifications and other product data needed to prove compliance with all specified requirements. Product data shall include: installation instructions, details of construction, materials, dimensions, hardware preparation, acoustical door gaskets, profiles and finishes

C. Exceptions: Identify all proposed changes, differences, discrepancies and conflicts, including verbiage, terms, definitions between Contract Documents and submittals.

1.4 QUALITY ASSURANCE

A. Manufacturer’s Experience: The Manufacturer shall have successful experience in fabrication, including no less than five years’ experience in the fabrication of materials and products identical to those required in this project.

1.5 DELIVERY, STORAGE AND HANDLING

A. Comply with pertinent provisions of Division 1 – General Requirements.

B. Protect products during transit, storage and handling to prevent damage, soiling and deterioration. Comply with the requirements of the manufacturer’s instructions for storage and handling.
C. Identify each product with individual room number which corresponds with designation system used on shop drawings using temporary, removable or concealed markings.

**PART 2 PRODUCTS**

2.1 LIGHT-DUTY ACOUSTICAL DOOR GASKET “Type ADG-1”

A. Fixed head and jamb gaskets shall consist of double row of self-adhesive compression bulb gaskets along the entire length of the head and jamb.

1. Zero International Model #188S
2. or approved equal.

B. Automatic door bottoms shall consist of an extruded aluminum housing with solid neoprene gasket, which is adjusted via adjusting screws. Solid neoprene shall be used to seal the openings between the aluminum housing and the inner solid neoprene gasket assembly. The solid neoprene gasket shall be adjusted to form a uniform compressed seal against a flat, solid floor surface, such as concrete or a flat metal plate. Do not seal automatic door bottom gasket to carpet.

1. Zero International Model 365 (surface mounted to door).
2. Zero International Model 355 (mortised in metal door).
4. or approved equal.

C. Fixed meeting stile gaskets shall consist of an extruded aluminum housing or closed cell sponge neoprene held in place with a metal housing. Adjustable meeting stile gaskets shall consist of an extruded aluminum housing with solid neoprene and pile brush gaskets. Gasket shall be adjustable via adjusting screws.

**Single Door Active**

1. Zero International Model 139 or 44 (surface mounted to door).
2. or approved equal

**Both Doors Active**

1. Zero International Model 55 and Model 155 (surface mounted to door).
2. Zero International Model 56 and Model 156 (mortised to door).
3. or approved equal.

D. Threshold shall consist of 0.25-inch tall by 4-inch wide aluminum threshold.

1. Zero International Model 544.
2. or approved equal
2.2 HEAVY DUTY ACOUSTICAL DOOR GASKETS “Type ADG-2”

A. Fixed head and jamb gaskets shall consist of double row of self-adhesive compression bulb gaskets along the entire length of the head and jamb.

1. Zero International Model #188S
2. or approved equal.

B. Adjustable head and jamb gaskets shall consist of an extruded aluminum housing with a solid neoprene gasket, which is adjusted via adjusting screws. Solid neoprene shall be used to seal the openings between the aluminum housing and the inner solid neoprene gasket assembly. The solid neoprene gasket shall be adjusted to form a uniform compressed seal against the door leaf.

1. Zero International Model 870 (for use with a rabbetted door frame)
2. Zero International Model 770 (for use with a flat door frame).
3. or approved equal.

C. Automatic door bottoms shall consist of an extruded aluminum housing with solid neoprene gasket, which is adjusted via adjusting screws. Solid neoprene shall be used to seal the openings between the aluminum housing and the inner solid neoprene gasket assembly. The solid neoprene gasket shall be adjusted to form a uniform compressed seal against a flat, solid floor surface, such as concrete or a flat metal plate. Do not seal automatic door bottom gasket to carpet.

1. Zero International Model 365 (surface mounted to door).
2. Zero International Model 355 (mortised in metal door).
4. or approved equal.

D. Fixed meeting stile gaskets shall consist of an extruded aluminum housing or closed cell sponge neoprene held in place with a metal housing. Adjustable meeting stile gaskets shall consist of an extruded aluminum housing with solid neoprene and pile brush gaskets. Gasket shall be adjustable via adjusting screws.

Single Door Active

1. Zero International Model 140 (surface mounted to door).
2. or approved equal

Both Doors Active

1. Zero International Model 55 and Model 155 (surface mounted to door).
2. Zero International Model 56 and Model 156 (mortised to door).
3. or approved equal.

E. Threshold shall consist of 0.25-inch tall by 4-inch wide aluminum threshold.

4. or approved equal.
2.3 HEAVY DUTY ACOUSTICAL DOOR GASKETS “Type ADG-3”

A. Fixed head and jamb gaskets shall consist of double row of self-adhesive compression bulb gaskets along the entire length of the head and jamb.

1. Zero International Model 870 (for use with a rabbetted door frame)
2. or approved equal

a. Adjustable head and jamb gaskets shall consist of an extruded aluminum housing with a solid neoprene gasket, which is adjusted via adjusting screws. Solid neoprene shall be used to seal the openings between the aluminum housing and the inner solid neoprene gasket assembly. The solid neoprene gasket shall be adjusted to form a uniform compressed seal against the door leaf.

1. Zero International Model 870 (for use with a rabbetted door frame)
2. Zero International Model 770 (for use with a flat door frame).
3. or approved equal.

b. Automatic door bottoms shall consist of an extruded aluminum housing with solid neoprene gasket, which is adjusted via adjusting screws. Solid neoprene shall be used to seal the openings between the aluminum housing and the inner solid neoprene gasket assembly. The solid neoprene gasket shall be adjusted to form a uniform compressed seal against a flat, solid floor surface, such as concrete or a flat metal plate. Do not seal automatic door bottom gasket to carpet.

1. Zero International Model 365 (surface mounted to door).
2. or approved equal.

c. Fixed meeting stile gaskets shall consist of an extruded aluminum housing or closed cell sponge neoprene held in place with a metal housing. Adjustable meeting stile gaskets shall consist of an extruded aluminum housing with solid neoprene and pile brush gaskets. Gasket shall be adjustable via adjusting screws.

Single Door Active
1. Zero International Model 140 (surface mounted to door).
2. or approved equal

d. Threshold shall consist of 0.5-inch tall by 4-inch wide aluminum threshold with solid neoprene gasket that seals against the door bottom leaf.

1. Zero International Model 564.
2. or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install acoustical gaskets in full compliance with the manufacturers printed instructions and recommendations.
B. Acoustically gasketed doors with door frames (head and jamb) in gypsum board construction shall be fully packed with with 1.5-pcf density unfaced fiberglass or mineral wool insulation. Acoustically gasketed doors with door frames in masonry construction shall be fully grouted.

C. Inspect adjacent construction and make sure that conditions detrimental to the proper and timely execution of this work are corrected before proceeding with installation.

D. All seals should be continuous with no interference from door hardware such as closures, exit devices, panic bars, etc. Coordinate auto closer with head gasket, lockset with jamb or meeting stile gasket, knob or pull with jamb and meeting stile gasket, and latches with head and bottom gaskets. Do not cut head or jamb gaskets to accommodate auto closer or other hardware.

E. Adjust all gaskets to provide airtight seals with no visible gaps or spaces. No light leaks shall be visible at the gasket seals around the entire perimeter of the door. Once properly adjusted, the acoustical door gaskets shall provide a firm uniform compression seal around the perimeters of the doors such that it shall be difficult to slide a credit card between the gaskets and the door leafs. The gaskets shall be adjusted until it is difficult to slide a credit card between the gaskets and door leaf.

3.2 CLEANING

A. Clean all surfaces following installation.

B. Replace material having scratches, abrasions or other defects with unblemished acoustical surface finish assemblies at no cost to the owner.

3.3 PROTECTION

A. Protection of acoustical door gaskets and doors from damage by other trades after installation shall be provided by the General Contractor.

END OF SECTION
SECTION 08 71 10

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:
   1. Swinging doors.
   2. Sliding doors.
   3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:
   1. Mechanical door hardware.
   2. Electromechanical door hardware, power supplies, back-ups and surge protection.
   3. Cylinders specified for doors in other sections.

C. Related Sections:
   1. Division 06 Section “Rough Carpentry”.
   2. Division 06 Section “Finish Carpentry”.
   3. Division 08 Section “Operations and Maintenance”.
   4. Division 08 Section “Door Schedule”.
   5. Division 08 Section “Door Hardware Schedule”.
   6. Division 08 Section “Hollow Metal Doors and Frames”.
   7. Division 08 Section “Flush Wood Doors”.
   8. Division 08 Section “Stile and Rail Wood Doors”.
   9. Division 08 Section “Aluminum-Framed Entrances”.
   10. Division 28 Section “Access Control”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

   5. NFPA 80 - Fire Doors and Windows.
7. NFPA 105 - Installation of Smoke Door Assemblies.
8. UL/ULC and CSA C22.2 – Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

A. Product Data: Manufacturer’s product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:
1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

   a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
   
   b. Complete (risers, point-to-point) access control system block wiring diagrams.

2. Electrical Coordination: Coordinate with related Division 26 Electrical Sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing both standard and electrified builders hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor in good standing by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to
consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.

D. Source Limitations: Obtain each type and variety of Door Hardware specified in this Section from a single source, qualified supplier unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

E. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:

1. NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:

   a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

   b. Door Closers: Comply with the following maximum opening-force requirements indicated:

      1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
      2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

   c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.

3. NFPA 101: Comply with the following for means of egress doors:

   a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.

   b. Thresholds: Not more than 1/2 inch high.

4. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.

   a. Test Pressure: Positive pressure labeling.
F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures.

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION
A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Related Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Five years for exit hardware.
3. Twenty five years for manual surface door closers.
4. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Continuing Service: Beginning at Substantial Completion, and running concurrent with
the specified warranty period, provide continuous (6) months full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

   1. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

      a. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers’ names are abbreviated in the Door Hardware Schedule.

   2. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.

      a. Permanent cylinders, cores, and keys to be installed by Owner.

B. Substitutions: NO SUBSTITUTIONS ON NAMED PRODUCTS PER OWNER FACILITY STANDARD.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

   1. Quantity: Provide the following hinge quantity, unless otherwise indicated:

      a. Two Hinges: For doors with heights up to 60 inches.
      b. Three Hinges: For doors with heights 61 to 90 inches.
      c. Four Hinges: For doors with heights 91 to 120 inches.
      d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

   2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

      a. Widths up to 3'0": 4-1/2" Heavy weight as specified.
      b. Sizes from 3'1" to 4'0": 5" Heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
   a. Exterior Doors: Continuous hinges as specified
   b. Interior Doors: Heavyweight, steel, ball bearing or oil impregnated bearing hinges as specified

4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:
   a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
      1) Out-swinging exterior doors.
      2) Out-swinging access controlled doors.
      3) Out-swinging lockable doors.

5. Acceptable Manufacturers:
   a. McKinney Products (MK).

B. Continuous Pin in Barrel Hinges: ANSI/BHMA A156.26 certified continuous pin in barrel hinge. Hinges are non-handed, reversible and fabricated to template screw locations. Provide concealed flush mount (with or without inset), full surface, or half surface, in standard and heavy duty models, as specified in the Hardware Sets. Factory cut hinges for door size and provide with service panel where indicated at electrified openings.

1. Acceptable Manufacturers:
   a. Markar Products (MA).

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified automatic, self-latching, and manual flush bolts and surface bolts. Manual flush bolts to be furnished with top rod of sufficient length to allow bolt location approximately six feet from the floor. Furnish dust proof strikes for bottom bolts. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

1. Acceptable Manufacturers:
   a. Rockwood Manufacturing (RO).

B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Coordinators fabricated from steel with nylon-coated strike plates and built-in adjustable safety release.

1. Acceptable Manufacturers:
   a. Rockwood Manufacturing (RO).
C. Door Push Plates and Pulls: ANS/BHMA A156.6 certified door pushes and pulls of type and design specified below or in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with square corners and beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
   a. Acceptable Manufacturers:
      1) Rockwood Manufacturing (RO).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

1. Acceptable Manufacturers:

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and straight cam.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
4. Keyway: Must key into existing Sargent key system.

D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:

E. Keying System: Each type of lock and cylinders to be factory keyed. Conduct specified "Keying Conference" to define and document keying system instructions and requirements. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner. Incorporate decisions made in keying conference, and as follows:

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Group): Two (6)
3. Construction Keys (where required): Ten (10)
G. Construction Keying: Provide construction master keyed cylinders or temporary keyed construction cores where specified. Provide construction master keys in quantity as required by project Contractor. Replace construction cores with permanent cores. Furnish permanent cores for installation as directed under specified "Keying Conference".

H. Key Registration List: Provide keying transcript list to Owner's representative in the proper format for importing into key control software.

I. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Acceptable Manufacturers:
   a. Lund Equipment (LU).
   b. MMF Industries (MM).

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified mortise locksets furnished in the functions as specified in the Hardware Sets. Locksets to be manufactured with a corrosion resistant, stamped 12 gauge minimum formed steel case and be field-reversible for handing without disassembly of the lock body. Lockset trim (including knobs, levers, escutcheons, roses) to be the product of a single manufacturer. Furnish with standard 2 3/4" backset, 3/4" throw anti-friction stainless steel latchbolt, and a full 1" throw stainless steel bolt for deadbolt functions.

1. Mortise locks to be certified Security Grade 1 and include vandal resistant heavy gauge escutcheon or sectional type trim.

2. Provide mortise lock bodies functionally compatible with a rose-less lever trim option.

3. Acceptable Manufacturers:

2.6 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Curved-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
B. Standards: Comply with the following:

2. Dustproof Strikes: BHMA A156.16.

2.7 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
   a. Fire Exit Removable Mullions: Provide keyed removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions to be used only with exit devices for which they have been tested.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Flush End Caps: Provide heavy weight impact resistant flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.

5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty trim with cold forged escutcheons, beveled edges, and four threaded studs for thru-bolts.
   a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets. Provided free-wheeling type trim where indicated.
   b. Where function of exit device requires a cylinder, provide an interchangeable core type keyed cylinder (Rim or Mortise) as specified in Hardware Sets.

6. Vertical Rod Exit Devices: Provide and install interior surface and concealed vertical rod exit devices as Less Bottom Rod (LBR) unless otherwise indicated.

7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Mounting rails to be formed from smooth stainless steel, brass or bronze architectural materials no less than 0.072" thick, with push rails a minimum of 0.062" thickness. Painted or aluminum metal rails are not acceptable. Exit device latch to be investment cast stainless steel, pullman type, with deadlock feature.

1. Acceptable Manufacturers:

C. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish. Provide keyed removable feature, stabilizers, and mounting brackets as specified in the Hardware Sets. At openings designed for severe wind load conditions due to hurricanes or tornadoes, provide manufacturers approved mullion and accessories to meet applicable state and local windstorm codes.

2.8 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C and UBC 7-2 for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
   a. Where closers are indicated to have mechanical dead-stop, provide heavy duty arms and brackets with an integral positive stop.
   b. Where closers are indicated to have mechanical hold open, provide heavy duty units with an additional built-in mechanical holder assembly designed to hold open against normal wind and traffic conditions. Holder to be manually selectable to on-off position.
   c. Where closers are indicated to have a cushion-type stop, provide heavy duty arms and brackets with spring stop mechanism to cushion door when opened to maximum degree.
   d. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum...
aesthetics. Provide drop plates or other accessories as required for proper mounting.

5. Closer Covers: Provide metal closer covers finished to match other hardware on the project.

6. Closer Covers: Provide PVC free closer covers with a painted finish to match other hardware on the project.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt or security type fasteners as specified in the door Hardware Sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Acceptable Manufacturers:

C. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate. 12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.

1. Acceptable Manufacturers:
   a. Rixson (RF) – FM998 Series.

2.9 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Metal Protection Plates: ANSI/BHMA A156.6 certified metal protection plates (kick, armor, or mop), beveled on four edges (B4E), fabricated from the following.
   a. Stainless Steel: 050-inch thick, with countersunk screw holes (CSK).

4. Fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets.
5. Metal Door Edging: Door protection edging fabricated from a minimum .050-inch thick metal sheet, formed into an angle or "U" cap shapes, surface or mortised mounted onto edge of door. Provide appropriate leg overlap to account for protection plates as required. Height to be as specified in the Hardware Sets.

6. Acceptable Manufacturers:
   a. Rockwood Manufacturing (RO).

2.10 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

I. Acceptable Manufacturers:
   a. Rockwood Manufacturing (RO).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

I. Acceptable Manufacturers:
   a. Rixson Door Controls (RF).

2.11 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

I. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
I. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Hurricane and Tornado Resistance Compliance: Architectural seals to be U.L. listed for windstorm components where applicable. Provide the appropriate hurricane or tornado resistant products that have been independent third party tested, certified, and labeled to meet state and local windstorm building codes applicable to project.

G. Acceptable Manufacturers:

I. Pemko Manufacturing (PE).

H. Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

I. Acceptable Manufacturers:

a. Securitron (SU) - BPS Series.

2.12 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, 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 by referenced standards for the applicable units of hardware.

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
HARDWARE SETS

HW SET # 1.0
1 Continuous Hinge FM100 628 MR
1 Rim Exit Device ED5200 K157 630 RU
1 Cylinder AS REQUIRED 626 RU
1 Offset Pull RM201 x MTG 12XHD US32D RO
1 Door Closer DC6200 A10 x BRKTS REQUIRED 689 RU
1 Door Stop 482 US26D RO
1 Threshold 171A PE
1 Weatherstrip BY DOOR MANUFACTURER OT

HW SET # 2.0
1 Elect Continuous Hinge ETAP EL FM100 628 MR
1 Elect Rim Exit Device ED5200 K157 M92 MELR 630 RU
1 Cylinder AS REQUIRED 626 RU
1 Offset Pull RM201 x MTG 12XHD US32D RO
1 Door Closer DC6210 A11 x BRKTS REQUIRED 689 RU
1 Threshold 171A PE
1 Weatherstrip BY DOOR MANUFACTURER OT
1 ElectroLynx Harness QC-C1500P (@ JAMB) MK
1 ElectroLynx Harness QC-C003P MK
1 Wiring Diagram WD-SYSPK 00
1 Power Supply BPS-24 AS REQUIRED SU

OPERATION: DOOR TO BE CLOSED AT ALL TIMES UNLESS EXIT DEVICE PUSH BAR IS HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM.

HW SET # 3.0
2 Elect Continuous Hinge ETAP EL FM100 628 MR
1 Keyed Removable Mullion 900BKM RU
1 Elect Rim Exit Device ED5200 K157 M92 MELR 630 RU
1 Elect Rim Exit Device ED5200 EO M92 MELR 630 RU
2 Cylinder AS REQUIRED 626 RU
2 Offset Pull RM201 x MTG 12XHD US32D RO
1 Automatic Operator 6060 689 NO
1 Door Closer DC6210 A11 x BRKTS REQUIRED 689 RU
1 Threshold 171A PE
1 Weatherstrip BY DOOR MANUFACTURER OT
1 Mullion Gasketing 5110BL PE
2 ElectroLynx Harness QC-C1500P (@ JAMB) MK
2 ElectroLynx Harness QC-C003P MK
1 Wiring Diagram WD-SYSPK 00
1 Card Reader FURNISHED IN OTHER SECTION 00
2 Door Switch 506 NO
1 Power Supply BPS-24 AS REQUIRED SU

OPERATION: DOORS TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS EXIT DEVICE PUSH BARS ARE HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM. WHEN LOCKED, PRESENTATION OF A VALID CARD SIGNALS ELECTRIC LATCH
RETRACTION, DOOR SWITCH AND AUTOMATIC OPERATOR ALLOWING INGRESS.
WHEN DOGGED, DOOR SWITCH FROM EITHER SIDE OF OPENING ACTIVATES
AUTOMATIC OPERATOR ALLOWING INGRESS AND EGRESS.

HW SET # 3.1
2 Elect Continuous Hinge ETAP EL FM100 628 MR
1 Keyed Removable Mullion 900BKM RU
1 Elect Rim Exit Device ED5200 K157 M92 MELR 630 RU
1 Elect Rim Exit Device ED5200 EO M92 MELR 630 RU
2 Cylinder AS REQUIRED 626 RU
2 Offset Pull RM201 x MTG 12XHD US32D RO
1 Automatic Operator 6060 (VESTIBULE FUNCTION) 689 NO
2 Door Closer DC6210 A11 x BRKTS REQUIRED 689 RU
1 Threshold 171A PE
1 Weatherstrip BY DOOR MANUFACTURER OT
1 Mullion Gasketing 5110BL PE
2 ElectroLynx Harness QC-C1500P (@ JAMB) MK
2 ElectroLynx Harness QC-C003P MK
1 Wiring Diagram WD-SYSPK 00
1 Card Reader FURNISHED IN OTHER SECTION 00
1 Door Switch 506 (EXTERIOR) NO
1 Power Supply BPS-24 AS REQUIRED SU

OPERATION: DOORS TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS EXIT DEVICE
PUSH BARS ARE HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM.
WHEN LOCKED, PRESENTATION OF A VALID CARD SIGNALS ELECTRIC LATCH
RETRACTION, DOOR SWITCH AND AUTOMATIC OPERATOR ALLOWING INGRESS.
WHEN DOGGED, DOOR SWITCH FROM EITHER SIDE OF OPENING ACTIVATES
AUTOMATIC OPERATORS AT EXTERIOR AND INTERIOR VESTIBULE DOORS
SIMULTANEOUSLY.

HW SET # 4.0
2 Elect Continuous Hinge ETAP EL FM100 628 MR
1 Keyed Removable Mullion 900BKM RU
2 Elect Rim Exit Device ED5200 EO M92 MELR 630 RU
1 Cylinder AS REQUIRED 626 RU
2 Offset Pull RM201 x MTG 12XHD US32D RO
2 Door Closer DC6210 A11 x BRKTS REQUIRED 689 RU
1 Threshold 171A PE
1 Weatherstrip BY DOOR MANUFACTURER OT
1 Mullion Gasketing 5110BL PE
2 ElectroLynx Harness QC-C1500P (@ JAMB) MK
2 ElectroLynx Harness QC-C003P MK
1 Wiring Diagram WD-SYSPK 00
1 Power Supply BPS-24 AS REQUIRED SU

OPERATION: DOORS TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS EXIT DEVICE
PUSH BARS ARE HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM

HW SET # 5.0
2 Continuous Hinge FM100 628 MR
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Model/Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyed Removable Mullion</td>
<td>900BKM</td>
<td>RU</td>
</tr>
<tr>
<td>Rim Exit Device</td>
<td>ED5200 TH957</td>
<td>630 RU</td>
</tr>
<tr>
<td>Rim Exit Device</td>
<td>ED5200 TH950</td>
<td>630 RU</td>
</tr>
<tr>
<td>Cylinder</td>
<td>AS REQUIRED</td>
<td>626 RU</td>
</tr>
<tr>
<td>Door Closer</td>
<td>DC6210 A4</td>
<td>689 RU</td>
</tr>
<tr>
<td>Kick Plate</td>
<td>K1050 8&quot; CSK 3BE</td>
<td>US32D RO</td>
</tr>
<tr>
<td>Threshold</td>
<td>2005AT</td>
<td>PE</td>
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<tr>
<td>Set Weatherstrip</td>
<td>303AS</td>
<td>PE</td>
</tr>
<tr>
<td>Mullion Gasketing</td>
<td>5110BL</td>
<td>PE</td>
</tr>
<tr>
<td>Door Bottom Sweep</td>
<td>3452CNB</td>
<td>PE</td>
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</tbody>
</table>

**HW SET # 6.0**

- Hinge: T4A3386 x NRP
- Set Combo Flush Bolts: 2845/2945
- Dust Proof Strike: 570
- Storeroom Lock: ML2057 LWA
- Door Closer: DC6210 A4
- Kick Plate: K1050 8" CSK 3BE
- Threshold: 2005AT
- Set Weatherstrip: 303AS
- Rain Guard: 346C
- Door Bottom Sweep: 3452CNB
- Set Astragal: 18041CNB

**HW SET # 7.0**

- Hinge: TA2714
- Office Lock: ML2051 LWA
- Overhead Stop: 6ADJ-X36
- Door Seals: BY DOOR MANUFACTURER

**HW SET # 8.0**

- Hinge: TA2714
- Entrance Lock: ML2053 LWA M34
- Door Closer: DC6200 A1
- Door Stop: 406/441CU
- Door Seals: BY DOOR MANUFACTURER

**HW SET # 9.0**

- Hinge: TA2714
- Entrance Lock: ML2053 LWA M34
- Door Closer: DC6210 A4 x BRKTS REQUIRED
- Door Seals: BY DOOR MANUFACTURER

**HW SET # 10.0**

- Hinge: TA2714
- Classroom Lock: ML2055 LWA
- Door Closer: DC6200 A10 x BRKTS REQUIRED
<table>
<thead>
<tr>
<th>HW SET # 11.0</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinge</td>
<td>TA2714</td>
<td>US26D</td>
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<tr>
<td>1 Classroom Lock</td>
<td>ML2055 LWA</td>
<td>630</td>
</tr>
<tr>
<td>1 Door Closer</td>
<td>DC6210 A4 x BRKTS REQUIRED</td>
<td>690</td>
</tr>
<tr>
<td>1 Door Seals</td>
<td>BY DOOR MANUFACTURER</td>
<td>OT</td>
</tr>
<tr>
<td>HW SET # 12.0</td>
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<td></td>
</tr>
<tr>
<td>2 Continuous Hinge</td>
<td>FM100</td>
<td>628</td>
</tr>
<tr>
<td>2 Set Push Pull</td>
<td>RM251 x MTG 1XHD</td>
<td>US32D</td>
</tr>
<tr>
<td>2 Door Closer</td>
<td>DC6210 A11 x BRKTS REQUIRED</td>
<td>689</td>
</tr>
<tr>
<td>1 Door Seals</td>
<td>BY DOOR MANUFACTURER</td>
<td>OT</td>
</tr>
<tr>
<td>HW SET # 12.1</td>
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<tr>
<td>2 Continuous Hinge</td>
<td>FM100</td>
<td>628</td>
</tr>
<tr>
<td>2 Set Push Pull</td>
<td>RM251 x MTG 1XHD</td>
<td>US32D</td>
</tr>
<tr>
<td>1 Automatic Operator</td>
<td>6060 (VESTIBULE FUNCTION)</td>
<td>689</td>
</tr>
<tr>
<td>1 Door Closer</td>
<td>DC6210 A11 x BRKTS REQUIRED</td>
<td>689</td>
</tr>
<tr>
<td>1 Door Seals</td>
<td>BY DOOR MANUFACTURER</td>
<td>OT</td>
</tr>
<tr>
<td>1 Door Switch</td>
<td>506 (INTERIOR)</td>
<td>NO</td>
</tr>
<tr>
<td>OPERATION: EXTERIOR AND INTERIOR DOOR SWITCH ACTIVATES EXTERIOR AND INTERIOR VESTIBULE DOORS SIMULTANEOUSLY.</td>
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<tr>
<td>HW SET # 13.0</td>
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<td>2 Continuous Hinge</td>
<td>FM100</td>
<td>628</td>
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<tr>
<td>1 Header Bolt</td>
<td>4085</td>
<td>603</td>
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<tr>
<td>1 Deadlock</td>
<td>MS1950</td>
<td>628</td>
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<tr>
<td>1 Cylinder</td>
<td>AS REQUIRED</td>
<td>626</td>
</tr>
<tr>
<td>1 Thumbturn Cylinder</td>
<td>ADA MORTISE</td>
<td>626</td>
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<tr>
<td>1 Status Indicator</td>
<td>4089</td>
<td>130</td>
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<tr>
<td>2 Set Push Pull</td>
<td>RM251 x MTG 1XHD</td>
<td>US32D</td>
</tr>
<tr>
<td>2 Door Closer</td>
<td>DC6200 A10 x BRKTS REQUIRED</td>
<td>689</td>
</tr>
<tr>
<td>1 Door Seals</td>
<td>BY DOOR MANUFACTURER</td>
<td>OT</td>
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<tr>
<td>HW SET # 14.0</td>
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<td>2 Continuous Hinge</td>
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<td>628</td>
</tr>
<tr>
<td>1 Keyed Removable Mullion</td>
<td>900BKM</td>
<td>RU</td>
</tr>
<tr>
<td>1 Rim Exit Device</td>
<td>ED5200 K157</td>
<td>630</td>
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<tr>
<td>1 Rim Exit Device</td>
<td>ED5200 EO</td>
<td>630</td>
</tr>
<tr>
<td>2 Cylinder</td>
<td>AS REQUIRED</td>
<td>626</td>
</tr>
<tr>
<td>2 Offset Pull</td>
<td>RM201 x MTG 12XHD</td>
<td>US32D</td>
</tr>
<tr>
<td>2 Door Closer</td>
<td>DC6210 A11 x BRKTS REQUIRED</td>
<td>689</td>
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<tr>
<td>1 Door Seals</td>
<td>BY DOOR MANUFACTURER</td>
<td>OT</td>
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### HW SET # 14.1

<table>
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<tr>
<th>Item Description</th>
<th>Model/Specification</th>
<th>Quantity</th>
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<tr>
<td>2 Elect Continuous Hinge</td>
<td>ETAP EL FM100</td>
<td>2</td>
<td>MR</td>
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<td>1 Keyed Removable Mullion</td>
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<td>RU</td>
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<td>1 Elect Rim Exit Device</td>
<td>ED5200 K157 M92 MELR</td>
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<td>2 Cylinder</td>
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<td>RU</td>
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<tr>
<td>2 Offset Pull</td>
<td>RM201 x MTG 12XHD</td>
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<tr>
<td>1 Automatic Operator</td>
<td>6060</td>
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<tr>
<td>1 Door Closer</td>
<td>DC6210 A11 x BRKTS REQUIRED</td>
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<td>RU</td>
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<tr>
<td>1 Door Seals</td>
<td>BY DOOR MANUFACTURER</td>
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<td>OT</td>
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<td>2 ElectroLynx Harness</td>
<td>QC-C1500P (@ JAMB)</td>
<td>2</td>
<td>MK</td>
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<tr>
<td>2 ElectroLynx Harness</td>
<td>QC-C003P</td>
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<td>1 Wiring Diagram</td>
<td>WD-SYSPK</td>
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<td>1 Card Reader</td>
<td>FURNISHED IN OTHER SECTION</td>
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<td>2 Door Switch</td>
<td>506</td>
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<tr>
<td>1 Power Supply</td>
<td>BPS-24 AS REQUIRED</td>
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</table>

**OPERATION:** DOORS ARE TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS EXIT DEVICE PUSH BARS ARE HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM. WHEN LOCKED, PRESENTATION OF A VALID CARD SIGNALS ELECTRIC LATCH RETRACTION, DOOR SWITCH AND AUTOMATIC OPERATOR ALLOWING INGRESS. WHEN DOGGED, DOOR SWITCH FROM EITHER SIDE OF OPENING ACTIVATES AUTOMATIC OPERATOR ALLOWING INGRESS AND EGRESS.

### HW SET # 15.0

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Model/Specification</th>
<th>Quantity</th>
<th>Location</th>
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<tr>
<td>2 Elect Continuous Hinge</td>
<td>ETAP EL FM100</td>
<td>2</td>
<td>MR</td>
</tr>
<tr>
<td>1 Keyed Removable Mullion</td>
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**OPERATION:** DOORS TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS EXIT DEVICE PUSH BARS ARE HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM.

### HW SET # 16.0

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### HW SET # 16.1

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1 Kick Plate K1050 8" CSK 3BE US32D RO
1 Door Stop 482 US26D RO
1 Set Door Seals S88D PE

HW SET # 17.0
Hinge TA2714 US26D MK
1 Rim Fire Exit Device ED5200A L955 630 RU
1 Cylinder AS REQUIRED 626 RU
1 Door Closer DC6210 A4 689 RU
1 Kick Plate K1050 8" CSK 3BE US32D RO
3 Silencer 608 RO

HW SET # 18.0
Hinge T4A3786 US26D MK
1 Keyed Removable Mullion 900BKM RU
1 Rim Fire Exit Device ED5200A L955 630 RU
1 Rim Fire Exit Device ED5200A EO 630 RU
2 Cylinder AS REQUIRED 626 RU
2 Door Closer DC6210 A4 689 RU
2 Kick Plate K1050 8" CSK 3BE US32D RO
1 Set Door Seals S88D PE
1 Mullion Gasketing 5110BL PE

HW SET # 19.0
Hinge T4A3786 US26D MK
1 Keyed Removable Mullion 900BKM RU
1 Rim Exit Device ED5200 L955 630 RU
1 Rim Exit Device ED5200 L950 630 RU
2 Cylinder AS REQUIRED 626 RU
2 Door Closer DC6210 A4 689 RU
2 Kick Plate K1050 8" CSK 3BE US32D RO
2 Silencer 608 RO

HW SET # 19.1
Hinge T4A3786 US26D MK
2 Electric Hinge T4A3786 x QC US26D MK
1 Keyed Removable Mullion 900BKM RU
1 Elect Rim Fire Exit Device ED5200A TH957 M92 MELR 630 RU
1 Elect Rim Fire Exit Device ED5200A TH950 M92 MELR 630 RU
2 Cylinder AS REQUIRED 626 RU
2 Door Closer DC6210 A4 689 RU
2 Kick Plate K1050 8" CSK 3BE US32D RO
1 Set Door Seals S88D PE
1 Mullion Gasketing 5110BL PE
2 ElectroLynx Harness QC-C1500P (@ JAMB) MK
2 ElectroLynx Harness QC-C003P MK
1 Wiring Diagram WD-SYSPK 00
1 Power Supply BPS-24 AS REQUIRED SU
OPERATION: DOORS TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS EXIT DEVICE
PUSH BARS ARE HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM.
ELECTRIFIED EXIT DEVICES ARE TO BE TIED INTO THE FIRE ALARM SYSTEM.

HW SET # 20.0
4 Hinge T4A3786 US26D MK
2 Electric Hinge T4A3786 x QC US26D MK
1 Keyed Removable Mullion 900BKM RU
2 Elect Rim Fire Exit Device ED5200A TH950 M92 MELR 630 RU
1 Cylinder AS REQUIRED 626 RU
2 Door Closer DC6210 A4 689 RU
2 Kick Plate K1050 8" CSK 3BE US32D RO
1 Set Door Seals S88D PE
1 Mullion Gasketing 5110BL PE
2 ElectroLynx Harness QC-C1500P (@ JAMB) MK
2 ElectroLynx Harness QC-C003P MK
1 Wiring Diagram WD-SYSPK 00
1 Power Supply BPS-24 AS REQUIRED SU

OPERATION: DOORS TO BE CLOSED AND LOCKED AT ALL TIMES UNLESS EXIT DEVICE
PUSH BARS ARE HELD IN THE DOGGED POSITION BY THE ACCESS CONTROL SYSTEM.
ELECTRIFIED EXIT DEVICES ARE TO BE TIED INTO THE FIRE ALARM SYSTEM.

HW SET # 21.0
Hinge TA2714 US26D MK
1 Privacy Set w/Indicator ML2060 LWA M34 M19V 630 RU
1 Door Closer DC6200 689 RU
1 Kick Plate K1050 8" CSK 3BE US32D RO
1 Door Stop 406/441CU 32D/26D RO
1 Set Door Seals/Silencers S88D/608 AS REQUIRED PE

HW SET # 22.0
Hinge TA2714 US26D MK
1 Office Lock ML2051 LWA 630 RU
1 Door Stop 406/441CU 32D/26D RO
3 Silencer 608 RO

HW SET # 23.0
Hinge TA2714 US26D MK
1 Entrance Lock ML2053 LWA M34 630 RU
1 Door Stop 406/441CU 32D/26D RO
3 Silencer 608 RO

HW SET # 24.0
Hinge TA2714 US26D MK
1 Entrance Lock ML2053 LWA M34 630 RU
1 Door Closer DC6200 A1 689 RU
1 Kick Plate K1050 8" CSK 3BE US32D RO
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<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Model</th>
<th>Finish</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinge</td>
<td>TA2714</td>
<td></td>
<td>US26D</td>
<td>MK</td>
<td></td>
</tr>
<tr>
<td>1 Push Plate</td>
<td>70F</td>
<td>1</td>
<td>US32D</td>
<td>RO</td>
<td></td>
</tr>
<tr>
<td>1 Pull Plate</td>
<td>111 x 70C</td>
<td></td>
<td>US32D</td>
<td>RO</td>
<td></td>
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<tr>
<td>1 Door Closer</td>
<td>DC6200</td>
<td>1</td>
<td>689</td>
<td>RU</td>
<td></td>
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<tr>
<td>1 Kick Plate</td>
<td>K1050 8&quot; CSK 3BE</td>
<td>1</td>
<td>US32D</td>
<td>RO</td>
<td></td>
</tr>
<tr>
<td>1 Door Stop</td>
<td>482</td>
<td>3</td>
<td>US26D</td>
<td>RO</td>
<td></td>
</tr>
<tr>
<td>3 Silencer</td>
<td>608</td>
<td></td>
<td></td>
<td>RO</td>
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</tr>
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</table>

**HW SET # 41.0**

Note: Vertical Coiling Door - All Hardware Furnished in Other Section by Door Manufacturer.

**HW SET # 42.0**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Model</th>
<th>Finish</th>
<th>Manufacturer</th>
</tr>
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<tr>
<td>Double Acting Hinge</td>
<td>1001 6&quot; x 4-1/2&quot;</td>
<td>2</td>
<td>US26D</td>
<td>MK</td>
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<tr>
<td>2 Push Plate</td>
<td>70F</td>
<td></td>
<td>US32D</td>
<td>RO</td>
<td></td>
</tr>
<tr>
<td>2 Door Stop</td>
<td>482</td>
<td></td>
<td>US26D</td>
<td>RO</td>
<td></td>
</tr>
</tbody>
</table>

**Manufacturers Abbreviations:**

1. MK - McKinney
2. MR - Markar
3. RO - Rockwood
4. AD - Adams Rite
5. RU - Corbin Russwin
6. OT - OTHER
7. RF - Rixson
8. NO - Norton
9. PE - Pemko
10. SU - Securitron

**END OF SECTION 08 71 10**
PART 1   GENERAL

1.01  DESCRIPTION

A. Work Included
1. Automatic door operators, controls and accessories.
   a. Typical Units: Overhead, surface mounted.
2. Doors specified under Section 08 41 13.
3. Coordination
   a. Coordinate with finish hardware for compatibility of systems.
   b. Coordinate required voltages for electric items with Division 26.
   c. Coordinate with Section 08 41 13, Aluminum Entrances, to maintain single source responsibility for automatic operators and doors.
4. Include necessary materials, devices and labor for a complete installation.
5. Electrical work limited to internal system wiring and wiring to activating devices and on/off switches.

1.02  RELATED SECTIONS

A. Sealants: Section 07 92 00.
B. Aluminum Entrances: Section 08 41 13.
C. Glass: Section 08 81 00.
D. Electrical Work: Division 26.
   1. Electrical conduit.
   2. Power source.
   3. Final connection.
   4. Designated electric service.

1.03  REFERENCES

A. American National Standards Institute (ANSI)
   1. A156.10: Standard for Power Operated Pedestrian Doors
B. Underwriters’ Laboratories (UL)
   1. UL325: Electric Door, Drapery, Gate, Louver and Window Operators and Systems.

1.04  SYSTEM DESCRIPTION

A. Automatic Door Operators
   1. Location/Type: Overhead, surface mount, heavy duty, electrically operated
   2. Function: Power assisted opening and closing of door; timing of sequence and hold-open period adjustable.
3. Action: See drawings for direction of swing, hand, etc.
4. Controls: Pressure sensitive floor mounted control mat and push button.

B. Performance Requirements
1. Emergency Exit Doors: Comply with requirements for doors serving as exit components in means of egress, as certified by the manufacturer for the condition shown.
2. Emergency Break Away: Meet requirements of ANSI A156.10.
3. Service Life: Operators to be capable of operating without failure of any component, for not less than 300,000 open and close cycles and wind velocities or equivalent inward differential pressures of 20 mph, with normal maintenance as defined in manufacturer's standard operating manual.
4. Time Delay Setting: Operators adjustable to meet Owner's requirements.
5. Load-Bearing Strength (Wind Resistance): Manufacturer's stock system, adapted to application indicated, tested in accordance with ASTM E330 to withstand at least the following loadings:
   a. Uniform pressure of 20 psf inward and outward.

1.05 ELECTRIC COORDINATION

A. Power Supplies: Power supplies provided by Division 26 for all electrically operated hardware including the electric door operators.

B. The following electric devices are provided by Division 26:
   1. Conduit, relays, transformers.
   2. Junction boxes.

C. Voltages and Operation Requirements
   1. Operator: 120 VAC.
   2. Verify all voltages with Division 16 upon Contract award.

1.06 SUBMITTALS

A. Submit in accordance with the requirements of the General Conditions and Section 01 33 23.

B. Shop Drawings: Include complete elevations of the system; details and methods of anchorage; details of construction; finishes; methods of assembly; location and installation of hardware and reinforcement for same; size, shape and thickness of materials; joints and connections; details of joining other work. Show locations of all components.

C. Product Data: Complete product description. Include all electrical requirements and complete information required for electrical coordination.

D. Maintenance Data: Furnish written instructions to Owner describing recommended materials and methods for proper maintenance of opener system.
   1. Provide adjusting wrenches and other tools necessary for door adjustment and maintenance.
   2. Tag tools for positive identification and deliver to Owner prior to acceptance of work.
E. Maintenance Agreement
1. Installer shall provide continuing maintenance proposal to Owner for his consideration, in the form of a standard yearly maintenance agreement, starting on date construction contract maintenance requirements are concluded. State services, obligations and terms for agreement period, and for renewal options. Charges for this agreement shall not be part of the base contract price.

1.07 QUALITY ASSURANCE

A. Subcontract: Subcontract automatic door work to aluminum entrance contractor for proper coordination and single source responsibility where systems abut or connect to one another.

B. Standards: Provide automatic door operators complying with ANSI A156.10 and UL Standard 325.

C. Qualifications
   1. Manufacturer: Provide units produced by a firm with not less than 5 years successful experience in the fabrication of automatic door equipment of the type required for this project.
   2. Installer: Engage an installer who is an authorized representative of the automatic door equipment manufacturer for both the installation and the maintenance of the type of units required for this project.
      a. Minimum Experience: Not less than 3 years experience in the installation and service of automatic door equipment of same MFR.
      b. Maintenance Proximity: Not more than 1 hour normal travel time from Installer's place of business to project site.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Store materials at job site so as to prevent damage to members or assemblies, and protect from corrosion or deterioration.

1.09 WARRANTY

A. Contractor(s): Provide a 2 year guarantee on all systems.
   1. Warrant systems free of defects due to faulty materials and workmanship.
   2. Include repair and replacement of defective materials and components at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide conforming products from one of the following:
   1. BESAM
   2. STANLEY
   3. DOR-O-MATIC
   4. GYRO TECH
2.02 MATERIALS

A. Exposed Metal
   1. Aluminum Extrusions and Aluminum Sheet
      a. Compatible with specified finish.
   2. Provide aluminum alloy and temper for each shape, as recommended by manufacuter and processor to comply with the requirements of performance, fabrication, application of finish, and control of color.

B. Aluminum Thickness
   1. Section thickness to meet design requirements.
   2. Moldings, Trim and Glass Stops: 0.05 inch minimum.

C. Concealed Metals: Manufacturer's standard, suitable for application.

D. Steel Reinforcements and Brackets: Manufacturer's standard units with 2.0 ounce hot-dip galvanized coating, ASTM A653. Applied after fabrication.

E. Fasteners: Aluminum, non-magnetic stainless steel, or other noncorrosive metal compatible with the items being fastened. For exposed fasteners, provide Phillips flat-head screws with finish matching the item fastened.

F. Sealants and Gaskets: Manufacturer's standard.

G. Bituminous Coatings: Cold applied asphalt mastic, SSPC-PAINT 12.

2.03 AUTOMATIC DOOR OPENER

A. Specification based on electric swing door system by BESAM, Model 450, overhead, surface mounted. See Part 1, Performance Requirements.

B. Operator Location: Controls and connecting hardware to mount above door frame; provide with removable aluminum access cover in front.
   1. Housing: Nominal 6" x 6" with finished end caps; See Materials hereinbefore. Minimum aluminum thickness 0.146 inch.

C. Operator Function: Manufacturer's standard electrical unit, powered in the opening cycle, spring return in the closing cycle and with speed control to provide checking in both cycles.
   1. Provide for manual operation when power is off, and provide emergency release for manual swing-out action of doors indicated to function as exits.
   2. Equip units with hold-open switch, arranged to hold door open without the continued use of power.

D. Operator Action: As indicated by door swing on drawings (swing-in, swing-out, double swing, pairs, etc.).

E. Electrical Control: Self-contained unit including necessary transformers, relays, rectifiers, and other electronic components for proper operation and switching of power operator.
   1. Relays: Plug-in type for individual replacement.
2. Connecting Harnesses: Provide with interlocking plugs.
3. Provide control with adjustable time delay module of 0-60 seconds.

F. Hardware
1. Manufacturer's standard arm and track device or direct connection to center pivots.
2. Keyed Switch: Manufacturer's standard key operated on/off switch; cylinder furnished under Section 08 71 00, Finish Hardware.

2.04 ACTUATING CONTROLS

A. Floor Mat Control Panels: Provide units of sizes indicated, but not less than that required by reference standards; complete with extruded aluminum mat frame, concealed anchorage; manufacturer's standard synthetic rubber or flexible plastic mat, safety ribbed surface pattern, standard color as selected; containing pressure switches for low voltage control wiring, and intended floor single-acting swing door control, with "Opening" section and "Safety" section switches.
   1. Provide 1/2" thick mat.
   2. Recessed Mounting: Provide recessed type frame.

B. Push Button: Provide 6" diameter stainless steel push button switch with handicapped insignia. Locate interior control button on wall as indicated.

2.05 HARDWARE

A. Provide hardware necessary for complete installation.

B. Automatic door opener supplier to coordinate all door preparation for hardware scheduled under Section 08 41 13, Aluminum Entrances.

2.06 ACCESSORIES

A. Marking: Provide caution decals on automatic doors in conformance with ANSI A156.10.

B. Miscellaneous: As required for complete installation.

2.07 FABRICATION

A. General
   1. Sizes and Profiles: Required sizes for door and frame units, including profile requirements, as specified and as indicated on drawings.
   2. Welding: Comply with AWS recommendations to avoid discoloration at welds; grind exposed welds smooth and restore mechanical finish.
   3. Conceal fasteners where possible.
   4. Maintain continuity of line and accurate relation of planes and angles. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members.
   5. Reinforce the work as necessary for performance requirements, and for support to the structure. Separate dissimilar metals with bituminous paint or preformed separators. Separate metal surfaces at moving joints with
non-metallic separators to prevent "freeze-up" of joints.

6. Weatherstripping: Where exterior door stiles or head rails do not close against fixed stops equipped with weatherstripping, provide weatherstripping, retained in an adjustable strip in a mortise centered in the edge of the door.

B. Aluminum Door and Sidelight Framing: Provided under Section 08 41 13, Aluminum Entrances. See Part 1, Description, for coordination with other products.

**PART 3  EXECUTION**

3.01 EXAMINATION

A. Examine substrates to which work of this Section applies. No work shall be installed until corrections to substrates have been performed by trades involved.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations and in compliance with referenced standards. Members shall be level, square, plumb, at proper elevations and in alignment with other work. Attach and secure to structure as required to assure stability of system.

B. Provide wiring from activating devices, controls, and remote on/off switches in conduit provided under Division 26.

C. All units to be free and smoothly operating without binding or rough spots; adjust as required and/or replace improperly functioning units.

D. After repeated operation of completed installation equivalent to three days use by normal traffic (100 to 300 cycles), readjust door operators and controls for optimum operating conditions and safety. Lubricate operating equipment and clean exposed surfaces.

E. Provide protective measures and other precautions required to ensure that automatic entrance doors will be without damage or deterioration, other than normal weathering, at time of substantial completion.

**END OF SECTION**
SECTION 08 81 00
GLASS AND GLAZING

PART 1  GENERAL

1.01  SCOPE

A. Work Included: Provide glass and glazing for all exterior and interior openings as indicated on the drawings and specified herein. Work also includes the following:
   1. Unframed mirrors.

B. Work Not Included: Glass and glazing not provided under this Section are Framed Mirrors: Section 10 28 13.

1.02  RELATED SECTIONS

A. Division 8: Glazed doors and windows.

1.03  PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thicknesses indicated or specified are minimums and are for detailing purposes only. Confirm glass thickness by analyzing project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet, as a minimum, the following criteria:
   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E1300, according to the following requirements:
      b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical under wind action. Load Duration: 60 seconds or less.
      b. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1", whichever is less.
         1) For monolithic glass lites, heat treated to resist wind loads.
         2) For insulating glass.
      c. Minimum Glass Thickness for Exterior Lites" ¼".

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering
calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120°F, ambient; 180°F, material surfaces.

1.04 REFERENCED STANDARDS

A. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard, current edition in force.
5. IGMA: Insulated Glass Manufacturers Alliance.

B. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations listed below, except where more stringent requirements are indicated herein.
2. Insulated Glass Manufacturers Alliance (IGMA)
a. TM-3000 "Vertical Glazing Guidelines"

1.05 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this project and who employs glass installers for this project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Manufacturer/Fabricator Qualifications: Certified by primary glass manufacturer.

C. Fire-Rated Door Assemblies: Provide assemblies complying with NFPA 80 listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

D. Fire-Rated Window Assemblies: Provide assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing per NFPA 257.

E. Safety Glass Standards: Category II materials complying with testing requirements in 16 CFR 1201 & ANSI Z97.1. Permanently mark glazing with certification label of the SGCC or other certification agency acceptable to authorities having jurisdiction.

F. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or on at least one component lite of unit with appropriate certification label of Insulating Glass Certification Council (IGCC).

G. Allowable Tolerances: Thicknesses of glass specified are nominal; provide glass manufactured to tolerances listed in GANA Manual.
H. Fire- Rated Glass: Each lite shall bear permanent, non-removable label of UL certifying it for use in tested and rated fire protective assemblies.

1.06 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each type of glass, glazing sealants and accessories required. Indicate structural, physical and environmental characteristics, size limitations, special handling requirements, etc.

B. Submit insulating glass manufacturer's certification indicating units meet or exceed specified requirements.

C. Submit laminated glass manufacturer's certification indicating units meet or exceed specified requirements.

D. Shop Drawings: Required data for shop drawings on glazing may be incorporated with shop drawings for framing members. Show thicknesses of glass; proposed "bites" in frames, sizes and locations of blocks, clips, beads, stops edge treatments; note quality, type and strength of each lite.

E. Samples: Submit and obtain approval of samples before proceeding with glass fabrication. Minimum two 12" x 12" samples of each glass type required, except clear monolithic glass. Submit color samples of exposed sealants and/or gaskets.

F. Qualifications: For manufacturer/fabricator and Installer.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle glazing materials in accordance with manufacturer's recommendations to prevent damage and deterioration.

B. Various items to receive glazing as specified elsewhere may be factory-glazed or site-glazed at Contractor's option.

C. Deliver glazing compounds and sealants in manufacturer's unopened labeled containers.

D. Deliver glass with manufacturer's labels intact. Do not remove labels until glass has been installed.

1.08 PROJECT CONDITIONS

A. Field verify measurements and conditions of installations.

B. Examine all details. Provide proper fitting for details indicated.

C. Do not perform work under adverse weather or job site conditions. Install liquid sealants when temperatures are within lower or middle third of temperature range recommendations by manufacturer.

D. Protect work from damage during and after installation until project acceptance.
1.09 WARRANTY

A. Contractor to guarantee work under this Section against defects of materials, fabrication and installation. Guarantee period is one year, except where specified otherwise. Defects include, but are not necessarily limited to:

1. Weather tightness: Two (2) year warranty.

B. Insulating Glass: Submit manufacturer's written warranty that for ten (10) years from date of substantial completion, a replacement will be provided (furnished and installed) for any unit which develops edge separation, thermal stress cracks, or other defects which materially obstruct vision through the glass or affect thermal and physical integrity of insulating glass units, except warranty shall not cover glass breakage from other than natural causes. Defective units shall be replaced at no additional cost to the Owner.

C. Coated Glass: Submit manufacturer's written warranty that for ten (10) years from date of substantial completion, a replacement will be provided for defective units. Defects are defined as peeling, cracking or deterioration in coating due to normal conditions and not due to handling or installation contrary to glass manufacturer's published instructions. Defective units shall be replaced at no additional cost to the Owner.

D. Mirror: Submit manufacturer's ten (10) year warranty against silver spoilage. A replacement will be provided for mirrors that develop visible defects. Defective units shall be replaced at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Acceptable Manufacturers: Specifications herein are based on glass and materials manufactured or fabricated by the following companies. Not all firms listed manufacture or fabricate all the items specified herein. However, to ensure consistent quality of appearance and performance, provide each type or kind of glass or material from a single source. Manufacturers for specialty products are listed within the specification to establish a particular type, color, pattern, etc. Equal products by the manufacturers listed are acceptable providing they meet the type, color, pattern, etc. as approved by the Architect.

1. Primary Coated Glass Manufacturers
   a. GUARDIAN INDUSTRIES
   b. Vitro (PPG)
   c. AGC FLOAT GLASS NORTH AMERICA

2. Fabricators: Certified or approved in writing by primary coated glass manufacturer.

2.02 PRIMARY FLOAT GLASS

A. Conformance: Type I, Class 1 for clear glass, Class 2-tinted heat-absorbing and light-reducing; Class 3 for tinted, light-reducing glass, Quality q^3, conforming to ASTM C1036.
B. Thickness: 1/4”, unless otherwise indicated.

C. Color: Clear. When used in insulating units, provide color specified under each insulating unit.

2.03 HEAT TREATED FLOAT GLASS

A. Conformance: Condition A, Kind FT and Kind HS, Type I, Class 1 for clear glass, Class 2-tinted heat-absorbing and light-reducing; Class 3 for tinted, light-reducing glass, conforming to ASTM C1048.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
   2. Roll Wave Maximum Distortion Tolerance: 0.003 inch target with 0.005 inch maximum peak to valley measurement.

B. Thickness: 1/4”, unless otherwise indicated.

C. Color: Clear. When used in insulating units, provide color specified under each insulating unit.

D. Locations: Safety glazing locations as designated and required by applicable code(s).

2.04 COATED FLOAT GLASS

A. General: Provide coated glass complying with this article and in schedules at the end of Part 3.

B. Low E, Sputter Coated Float Glass: Float glass with metallic-oxide or metallic nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), complying with requirements specified in schedules at end of Part 3.

C. Coated Spandrel Float Glass:
   2. Conformance: Condition B, Kind FT [Kind HS], Type I, Class 1, conforming to ASTM C1048.
   3. Thickness: 1/4”, unless otherwise indicated.
   4. Color: As scheduled, or if not scheduled, as selected by Architect

2.05 WIRE GLASS: USE PROHIBITED.

2.06 INSULATING GLASS

A. Sealed Insulating Glass: General: Provide preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E2190 for performance classification indicated as
well as with other requirements specified for glass characteristics, air space, sealing system, sealant, spacer material, corner design and desiccant.

1. For properties of individual glass making up units, refer to requirements specified in schedule at the end of Part 3 as applicable to types, kinds, classes and conditions.

2. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites to comply with glass design requirements. Provide Kind FT (fully tempered) where safety glass is indicated or required.

B. Edge Construction: Double sealed with a primary seal of polyisobutylene and a secondary seal of silicone. Delete low-E coating prior to fabrication of insulating units according to coated glass manufacturer’s instructions.

1. Spacer to have mill or clear anodized finish.

2.07 MISCELLANEOUS GLASS TYPES

A. Unframed Mirror

1. Description: Clear float glass conforming with ASTM C1036, Type 1, Class 1, Quality q², with full silver coating, copper coating, protective back coating

2. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

3. Thickness: 1/4”.

4. Size: As indicated on schedule.

5. Adhesive: Type as recommended by mirror manufacturer produced specifically for setting mirrors by spot application on all types of substrates encountered. PALMER PRODUCTS CORPORATION “Mirro-Mastic”, SOVEREIGN SPECIALTY CHEMICAL “Nail Power Mirror Mastic, ROYAL ADHESIVES & SEALANTS “Gunther Pro”.

B. Fire-Rated Glass

1. 20 Minute - For use in 20 minute rated doors only. Superlite I manufactured by SAFTI FIRST, PyroEdge-20 by AGC GLASS COMPANY, SGG Pyroswiss US by VETROTECH SAINT GOBAIN or Fireglass 20 by TECHNICAL GLASS PRODUCTS. ¼” thick tempered glass with a 20 minute fire-rating.

2. 45 Minute - For use in 45 minute door and window applications. Superlite II-XL manufactured by SAFTI FIRST, Pyrobel by AGC GLASS COMPANY, SGG Swissflam-45 by VETROTECH SAINT GOBAIN or Pyrostop by PILKINGTON. ¾” thick unit comprised of inboard and outboard tempered lites protecting a fire resistive interlayer.

3. 60 or 90 minute Doors - For use in 60 or 90 minute door applications, must comply with CPSC Category I and limited to 100 square inches in size. Superlite X-90 manufactured by SAFTI FIRST, Pyran Platinum L by SCHOTT, SGG Keralite FR-L by VETROTECH SAINT GOBAIN or Firelite Plus by TECHNICAL GLASS PRODUCTS. ¾” thick safety rated glass.

4. All fire-rated glazing to have Logo: Each piece of fire-rated glazing shall be labeled with a permanent logo including name of product, name of manufacturer, testing laboratory, fire rating period, and safety glazing standards.
C. Obscure Tempered Glass (Patterned)
   1. Reference: ASTM C1036, Type II, Class 1, Form 3, Quality q8, Finish f1, Pattern p3.
   2. Thickness: ¼ inch.
   3. Amount of pattern or frost as approved by Architect.

2.08 ACID ETCHED GLASS

A. Reference: ASTM C1048, heat treated HS, kind FT coated and uncoated Thickness: ¼ inch. DILLMEIER, GUARDIAN and WALKER GLASS.

B. Amount of etch look as selected by Architect from manufacturers full range. Selection to be in the 50% range.

2.09 GLAZING MATERIALS AND ACCESSORIES

A. Glazing Sealants and Compounds
   1. General: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule #1168, AND all sealants used as fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51.
   2. Comply with manufacturer's recommendations for selection of hardness. Select materials and variations or modifications for compatibility with surfaces contacted in the installation.
   3. Exterior Glazing: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
      a. Glazing Sealant: One-part neutral-curing silicone glazing sealant, ASTM C 920 Class A, Type S, Grade NS, Class 100/50, Use NT; for high movement joints at metal-to-metal and glass to metal.
         1) Dow Corning Corporation; 790
         2) GE Advanced Materials - Silicones; SilPruf LM SCS2700
         3) Pecora Corporation; 890
         4) Tremco Incorporated; Spectrem 1
      b. Glazing Sealant: One-part neutral-curing silicone glazing sealant, ASTM C 920, Type S, Grade NS, Class 50, Use NT; for general applications in glazing installation subject to high movement including perimeter; use non-staining formula at absorbent perimeter applications.
         1) DOW CORNING CORPORATION; 795 or 756 SMS
         2) GE ADVANCED MATERIALS - SILICONES; SilPruf NB SCS9000 or SilPruf SCS2000
         3) PECORA CORPORATION; 864
         4) TREMCO INCORPORATED; Spectrem 2
      c. Glazing Sealant: One-part neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT;
for general applications in glazing installation including perimeter; use non-staining formula at absorbent perimeter applications.

1) DOW CORNING CORPORATION; 791
2) GE ADVANCED MATERIALS - SILICONES; UltraGlaze SSG4000 or UltraGlaze SSG4000AC
3) TREMCO INCORPORATED; Proglaze SSG or Tremsil 600

d. Structural Glazing Sealant: ASTM C1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in glazing assembly indicated.

1) DOW CORNING CORPORATION; 995.
2) GE ADVANCED MATERIALS - SILICONES; UltraGlaze SSG4000.
3) PECORA CORPORATION; 896.
4) TREMCO INCORPORATED; Proglaze SG.

4. Interior Glazing: Compound of polymerized butyl rubber and inert fillers, with or without polyisobutylene modification, solvent based, 95% solids, formed and coiled on release paper, tack-free in 24 hours, paintable, non-staining.

B. Miscellaneous Glazing Materials

1. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
2. Setting Blocks: Neoprene or EPDM, 80-90 durometer hardness, with proven compatibility with sealants used.
3. Spacers: EPDM, 40-50 durometer hardness with proven compatibility with sealants used.
4. Compressible Filler (Rod): Closed cell or waterproof jacketed rod stock of synthetic rubber or plastic form, compatible space with sealants used, flexible and resilient, with 5-10 psi compression strength for 25% deflection.

2.10 FABRICATION

A. General: Fabricate glass and other glazing products in sizes required to glaze openings indicated, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

B. Glass Cutting: Cut glass to accurate sizes and shapes as indicated on drawings. Allow edge clearances and tolerances in accordance with GANA recommendations.

1. Edges: Provide factory-cutting and factory-formed edges for all butt-glazed, heat tempered and insulating glass. Provide ground edges for all drilled holes, notches and other fabrication or finishing techniques.

2. Butt-Glazed Systems: All work in accordance with manufacturer's recommendations.
   a. Edges Exposed to Air: Polished finish.
C. Heat Strengthened and Tempered Glass
   1. Heat Strengthened: Heat treated to strengthen glass in bending to not less than 2.0 times annealed strength for the strengthened glass.
   2. Tempered: Heat treated to strengthen glass in bending to not less than 4 to 5 times annealed glass strength for the strengthened glass.
   3. Cut glass to required size before tempering. Comply with Glass Tempering Association recommendations.
   4. Provide tongless tempered glass. When size limitations require tong edges, support each piece during tempering process so that tong marks will be concealed in the glazed system.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates, substructure and installation conditions. Do not proceed with glazing work until unsatisfactory conditions have been corrected.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PROTECTION AND PREPARATION

A. Protect glass from edge damage during handling and installation. Remove and legally dispose damaged glass off of the project site. Damaged glass is defined as glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and/or appearance.

B. Do not cut, seam, nip or abrade tempered glass.

C. Inspect each piece of glass immediately before installation and eliminate any which have observable edge damage or face imperfections.

D. Unify appearance of each series of lights by setting each piece to match other pieces, as nearly as possible. Inspect each piece and set with pattern, draw, and bow oriented in same direction as other pieces.

E. Clean glazing channels and other framing members to receive glass immediately before glazing. Remove loose coatings. Apply primer to joint surfaces receiving sealants when recommended by sealant manufacturer.

3.03 INSTALLATION - GENERAL

A. Comply with combined recommendations and technical reports of manufacturer's of glass and glazing materials used with GANA "Glazing Manual", except when more stringent requirements are indicated.

B. Install insulating units to comply with recommendations by IGMA, except as otherwise specifically indicated or recommended by glass and sealant manufacturers.
C. Glazing channel dimensions shown are intended to provide for necessary bite on glass, minimum edge clearance and adequate sealant thickness, with reasonable tolerance. Adjust as required by job conditions at time of installation.

D. Install setting blocks in sill rabbets, properly sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Install primers, sealants, tapes, and gaskets in accordance with manufacturer's recommendations. Set glass without springing and install securely to prevent rattling or breakage.

F. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the sealant or gasket on the opposite side, provide adequate anchorage to ensure gasket will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs, or by proved adhesives, including embedment of gasket tail in cured heal bead.

1. Miter cut and bond gasket ends together at corners where gaskets will not pull away from corners and result in voids or leaks in the glazing system.

G. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

3.04 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes edge-to-edge, but not necessarily in one continuous length. Do not stretch tapes to make them fit openings.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.05 GASKET GLAZING (DRY)
A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gaskets by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.06 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealant to provide a substantial wash away from glass.

3.07 FIELD QUALITY CONTROL

A. Watertight and airtight installation of exterior glass and glazing required. Each installation shall withstand normal temperature changes, wind loading, impact loading (for operating doors) without failure including loss or breakage of glass, failure of sealants of gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.

B. Repair glazing installation at leaks or, if leakage is excessive, replace glazing sealants and gaskets as directed.

3.08 PROTECTION AND CLEANING

A. Protect glass from breakage immediately upon installation by attachment of streamers to framing held away from glass. Do not apply markers of any type to surfaces of glass. Remove non-permanent labels and clean surfaces.

B. Maintain glass in a reasonable clean condition during construction so that it will not be damaged by corrosive action, and will not contribute (by wash off) to the deterioration of glazing materials and other work. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents and vandalism.
C. Wash and polish on both faces not more than four days before acceptance of the work. Comply with glass manufacturer's recommendations for final cleaning.

3.09 GLAZING SCHEDULE

A. Insulating Glass – IG-1 (Vision) and IG-1A (Spandrel)

B. Glass Type IG-1: Low-E-coated, CrystalBlue insulating glass.
   1. Overall Unit Thickness: 1 inch.
   2. Outdoor Lite: CrystalBlue heat-strengthened float glass, except fully tempered float glass where safety glass is indicated.
      a. Minimum Thickness of Outdoor Glass Lite: 6 mm.
      b. Low-E Coating: Sputtered on second surface.
   3. Interspace Content: ½” Air.
   4. Indoor Lite: Clear heat-strengthened float glass, except fully tempered float glass where safety glass is indicated.
      a. Minimum Thickness of Indoor Glass Lite: 6 mm.
   5. Winter Nighttime U-Value: 0.29
   7. Solar Heat Gain Coefficient: 0.29 maximum.
   8. Outdoor Visible Light Reflectance: 7 percent maximum
   9. Safety glazing label where required.

C. Glass Type IG-1A: Low-E-coated, CrystalBlue insulating spandrel glass.
   1. Overall Unit Thickness: 1 inch.
   2. Outdoor Lite: CrystalBlue heat-strengthened float glass, except fully tempered float glass where safety glass is indicated.
      a. Minimum Thickness of Outdoor Glass Lite: 6 mm.
      b. Low-E Coating: Sputtered on second surface.
   3. Interspace Content: ½” Air.
   4. Indoor Lite: Clear heat-strengthened float glass.
      a. Minimum Thickness of Indoor Glass Lite: 6 mm.
      b. Opaque Coating: Ceramic coating on fourth surface
      c. Basis of Design: Guardian, SunGuard Spandrel HT Warm Gray – architect to make final approval from submittal samples.
   5. Winter Nighttime U-Value: 0.29
   6. Safety glazing label where required

END OF SECTION
SECTION 08 83 00
MIRRORS

PART 1  GENERAL

1.01  SUMMARY
   
   A. This Section includes the following types of silvered flat glass mirrors.
      1. Annealed monolithic glass mirrors.
      2. Tempered monolithic glass mirrors.

1.02  RELATED SECTIONS
   
   A. Glass and Glazing: Section 08 81 00.
   
   B. Section 10 28 13: Toilet Accessories (Framed Mirrors).

1.03  DEFINITIONS
   
   A. Deterioration of Mirrors: Defects developed from normal use are attributable to
      the manufacturing process and not to causes other than glass breakage and
      practices for maintaining and cleaning mirrors contrary to manufacturer's written
      instructions. Defects include discoloration, black spots, clouding of the silver film.

1.04  PERFORMANCE REQUIREMENTS
   
   A. Provide mirrors that will not fail under normal usage. Failure includes breakage,
      deterioration attributable to defective manufacture, fabrication, and installation.

1.05  SUBMITTALS
   
   A. Shop Drawings: Include mirror elevations indicating vertical joint layout, edge
      details, mirror hardware, and attachments to other work.
   
   B. Samples: For each type of mirror product required, provide mirrors, 12 inches
      square, including edge and frame treatment on 2 adjoining edges.
   
   C. Product Certificates: For each type of mirror and mastic signed by manufacturer.
   
   D. Qualification Data: For Installer.
   
   E. Mirror Mastic Compatibility Test Reports: From mirror manufacturer indicating
      that mirror mastic was tested for compatibility and adhesion with mirror backing
      film and substrates on which mirrors are installed.
   
   F. Warranty: Special warranty specified in this Section.

1.06  QUALITY ASSURANCE
   
   A. Installer Qualifications: An experienced installer who has completed mirror
glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in mirror installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under NGA's Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Source Limitations for Mirrors: Obtain mirrors from one source for each type of mirror indicated.

C. Source Limitations for Mirror Glazing Accessories: Obtain mirror glazing accessories from one source for each type of accessory indicated.

D. Glazing Publications: Comply with the following published recommendations:
   1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
   2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

E. Reference Standards
      a. ASTM C1503: Standard Spec. for Silvered Flat Glass Mirror
      b. ASTM C1036: Standard Specification for Flat Glass
      c. ASTM C1048: Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass

F. Safety Glazing Products: For tempered mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.

G. Safety Backed Mirrors: For annealed mirrors applying a sheet of adhesive backed polyethylene material to the back per CPSC 16 CFR 1201 and ANSI Z97.1 standards.

H. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing film and various substrates on which mirrors are installed.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors according to mirror manufacturer’s written instructions and as needed to prevent damage to mirrors from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer’s written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors, protected from moisture including condensation.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.
1.09 WARRANTY

A. Special Warranty: Manufacturer's standard form, made out to Owner and signed by mirror manufacturer agreeing to replace mirrors that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below:
   1. Warranty Period: Five (5) years from date of Contract Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide the following:
   1. ARCH ALUMINUM & GLASS CO., INC.
   2. GARDNER GLASS PRODUCTS.
   3. GUARDIAN INDUSTRIES CORP.
   4. LENOIR MIRROR COMPANY.
   5. VIRGINIA MIRROR COMPANY, INC.

2.02 SILVERED FLAT GLASS MIRROR MATERIALS

A. Tempered Clear Glass Mirrors: Comply with ASTM C1503, Mirror Glazing Quality, for blemish requirements in annealed float glass before silver coating is applied, for coating requirements, and with other requirements not affected by tempering process; and comply with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied.
   1. Nominal Thickness: ¼".

B. Annealed Clear Glass Mirrors: Comply with ASTM C1503, Mirror Glazing Quality; clear float glass conforming with ASTM C1036, Type 1, Class 1, Quality q².
   1. Nominal Thickness: ¼”.

2.03 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Type A Shore durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for protecting against silver deterioration at mirrored glass edges.

C. Mirror Mastic: An adhesive setting compound, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. GUNTHER MIRROR MASTICS.
      b. PALMER PRODUCTS CORPORATION.
      c. FRANKLIN INTERNATIONAL; TITEBOND
   2. Adhesive shall have a VOC content of not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Top and Bottom Aluminum J-Channels: Aluminum extrusions with a return deep
enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.

1. Bottom: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.04 inch.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) EPCO Model 2010.
      2) C. R. LAURENCE Standard J-Channel
      3) SOMMER and MACA INDUSTRIES Aluminum Shallow Nose "J" Moulding Lower Bar.

2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively and thickness of not less than 0.04 inch.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) EPCO Model 2013
      2) C. R. LAURENCE Deep J-Channel
      3) SOMMER and MACA INDUSTRIES Aluminum Deep Nose "J" Moulding Upper Bar.

4. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

2.04 FABRICATION

A. Mirror Sizes: To suit Project conditions, and before tempering, cut mirrors to final sizes and shapes. See drawings for sizes. At wall-to-wall conditions, field verify dimensions prior to fabricating mirrors.

B. Cutouts: Fabricate cutouts before tempering for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

C. Mirror Edge Treatment: Beveled polished edge of width shown.
   1. Seal edges of mirrors after edge treatment to prevent chemical or atmospheric penetration of glass coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance.
   1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
   2. Proceed with mirror installation only after unsatisfactory conditions have been corrected and surfaces are dry.
3.02 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating surfaces with mastic manufacturer's special bond coating where applicable.

3.03 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Provide a minimum air space of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. For wall-mounted mirrors, install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

1. Top and Bottom Aluminum J-Channels: Provide setting blocks 1/8 inch thick by 4 inches long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than 1/4 inch wide by 3/8 inch long at bottom channel.

2. Install mastic as follows:
   a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
   b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
   c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch between back of mirrors and mounting surface.

3.04 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

END OF SECTION
SECTION 08 91 19

FIXED LOUVERS

PART 1  GENERAL

1.01  SCOPE

A. Provide wall louvers as indicated. All louvers on exterior of building to be provided under this Section.

1.02  RELATED SECTIONS

A. Sealant: Section 07 92 00.

1.03  QUALITY ASSURANCE

A. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard.
   2. SMACNA: Sheet Metal & Air Conditioning Contractors National Association

B. Performance Requirements: Provide units whose performance ratings have been determined in compliance with AMCA Standard 500 and 511.

C. Water Penetration and Free Area: Meet AMCA Standard for louvers specified.

D. Wind Load: Design louvers and supports for 20 pounds per square foot wind load.

E. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details, installation procedures, unless otherwise indicated

F. Field Measurements: Verify size, location and placement of louver units prior to fabrication wherever possible.

G. Shop Assembly: Coordinate field measurements with fabrication, shop assembly

H. Factory painted finish to be performed by an applicator specifically approved by paint manufacturer. The applicator shall provide written notification of approval by paint manufacturer prior to application of the finish.

1.04  SUBMITTALS

A. Product Data: Submit manufacturer's specifications; certified test data, where applicable; and installation instructions for required products, including finishes. Finish type and color to be determined by location of use.
B. Shop Drawings: Submit plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.

C. Samples Aluminum Fluoropolymer Finish (per 2.06.A): Submit three samples, on metal of same gage and alloy to be used in the work, 6” square, of each required.

D. Samples Aluminum Anodized Finish (per 2.06.B): Submit finish samples showing the light and dark range limits of the anodizing color. These finish samples will be used in the field as a check for items specified in this Section. Anodized items whose color does not fall within the range indicated by these samples are unacceptable and shall not be used in the finished work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aluminum Sheet: ASTM B209, Alloy 3003 or 5005 with temper as required for forming or as recommended by metal producer to provide required finish.

B. Aluminum Extrusions: ASTM B 221. Alloy 6063-T52.

C. Fasteners: Stainless Steel, 300 series.

D. Anchors and Inserts: Use non-ferrous metal anchors, inserts for exterior installation

E. Bituminous Paint: Acid and alkali resistant solvent type black bituminous mastic.

2.02 FABRICATION, GENERAL

A. Provide louvers and accessories of design, materials, sizes, depth, arrangement and metal thicknesses indicated, or if not indicated, as required for optimum performance with respect to airflow; water penetration; strength; durability and uniform appearance as suited to applications shown and intended use.

B. Fabricate frames including integral sills to suit adjacent construction with adequate tolerances for installation including application of sealant in joints between louvers and adjoining work, where applicable.

C. Include supports, anchorages and accessories required to achieve a complete assembly, properly installed.

D. Provide sill extensions and loose sills made of same material as louvers, where indicated or required, for drainage to exterior and to prevent water penetrating to interior.

E. Join frame members to one another and to stationary louver blades by field bolted connections made necessary by size of louvers. Maintain equal blade spacing including separation between blades and frames at head and sill to produce a uniform appearance.
F. Provide hinged louver section where indicated. Hinged panel to appear as frameless from building exterior. Louver blades on hinged section to align with fixed panels at jambs.

1. Hinge: Minimum .093" thick aluminum; 3” continuous type ‘¼” diameter pin. Finish to match louver blades. Provide with 6” stainless steel screws at maximum 6” on center.

2. Lock: Provide aluminum plates, shaped and located as detailed on the drawings. Padlock provided by University.

3. Finish: Finish all exposed surfaces of hinged louver section to match louver blades.

2.03 STATIONARY EXTRUDED ALUMINUM WALL LOUVERS

A. Horizontal Blade Louvers: Size and depth indicated, with blades of profile, slope and spacing indicated, or if not indicated, to meet performance requirements.

1. Extrusion Thickness: Not less than .081” for blades and frames.

2. Furnish units complying with following performance requirements.
   a. Free Area: Not less than 45%; unless otherwise indicated.
   b. Water Penetration: Not more than 0.01 oz. per square foot of free area at an minimum intake airflow of 1000 fpm free area velocity.

B. Manufacturer and Type: Provide louver vane profile to match AIROLITE K6774 manufactured by AIROLITE; AIRLINE; ARROW; CONSTRUCTION SPECIALTIES; INDUSTRIAL LOUVERS; AMERICAN WARMING AND VENTALATING; RUSKIN; RELIABLE or PENN AIRSTREAM.

2.04 LOUVER SCREENS

A. Provide screens for exterior louvers.

B. Fabricate screen frames of the same metal and finish as the louver units to which secured, unless otherwise indicated.

C. Provide frames of U-shaped metal for permanently securing screen mesh.

D. Size: 1/2” sq. mesh, 0.063” anodized aluminum wire.

E. Locate screens on inside face of louvers. Secure screens to louver frames with machine screws, spaced at each corner and at 12” o.c. between.

2.05 BLANK-OFF PANELS

A. Blank-Off Panels: Laminated panels consisting of rigid extruded polystyrene or polyurethane insulation core and .032 aluminum facing sheets.

1. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer’s standard extruded-aluminum-channel frames, not less than 0.080-inch nominal thickness, with corners mitered and with same finish as panels.

2. Seal perimeter joints between panel faces and louver frames with gaskets or sealant.

3. Finish: Provide with finish to match louvers.
2.06 METAL FINISHES

A. Aluminum Finishes: Fluoropolymer baked enamel finish with Kynar 500 (70%) resins by ELF ATOCHEM OF NORTH AMERICA INC.; "Trinar" by AKZO; "Duranar" by PPG; "Fluropon" by VALSPAR. Total dry film thickness not less than 1.0 mils, or coatings meet or exceed the requirements of AAMA 2605.
   1. Color: As selected from paint manufacturer's complete specified line.

B. Aluminum Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, unless otherwise indicated. Apply finishes in factory after products are assembled. Protect finishes on exposed surfaces with protective covering, prior to shipment. Remove all scratches and blemishes from exposed surfaces visible after completing finishing process.
   1. Finish: All exposed aluminum surfaces shall receive an Architectural Class 1, clear anodized coating; AA-M12C22A41, minimum 0.7 mil thickness.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions and directions for the installation of anchorages which are to be embedded in concrete or masonry construction. Coordinate the delivery of such items to the project site.

3.03 INSTALLATION

A. Locate and place louver units plumb, level and in proper alignment with adjacent work.

B. Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealant and joint fillers as indicated.

D. Repair damaged finishes. Restore finishes so that there is no evidence of corrective work. Return items which cannot be refinished in the field to the shop, make the required alterations, and refinish the entire unit, or provide new units, as directed by Architect.
E. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry or dissimilar metals.

F. Provide concealed gaskets and flashing and install as the work progresses to make the installations weathertight.

G. Refer to Section 07 92 00 for sealant in connection with installation of louvers.

3.04 CLEANING

A. Clean louver surfaces in accordance with manufacturer's instructions. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces in accordance with manufacturer's instructions.

C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

END OF SECTION
SECTION 09 21 16

GYPSUM BOARD SYSTEMS

PART 1  GENERAL

1.01  SCOPE

A. Provide gypsum board systems consisting of wall board and framing as indicated and specified. Work includes:
1. Gypsum drywall wall systems.
2. Suspended drywall ceilings / soffits including suspension framing system.
3. Fire-rated gypsum drywall construction where indicated.
4. Exterior gypsum board sheathing.
5. Exterior soffits and ceilings.
6. Edge trim, corner beads, control joints, accent reveals, fasteners, joint treatment materials and other accessories required for complete installation.
7. Includes installation of acoustical insulation specified in Section 07 21 00.
8. Installation of metal access doors, including those provided by Plumbing and HVAC Contractors. See Section 08 31 13 and Divisions 22 and 23.

1.02  RELATED SECTIONS

A. Tile Backer Board: Section 09 30 00.
B. Wood Veneer Paneling: Section 06 20 00.
C. Acoustical Insulation: Section 07 21 00.

1.03  QUALITY ASSURANCE

B. Metal Framing System: Comply with ASTM C754 "Installation of Steel Framing Members to Receive Screw Attached Gypsum", and as specified.
C. Reference Standards: Wherever the following abbreviations are used herein they shall refer to the corresponding standard:
2. GA: Gypsum Association.
D. Fire-Rated Construction: Comply with fire resistance ratings indicated on drawings and required by governing authorities and codes. Provide materials, accessories and application procedures that have been listed by Underwriters Laboratories or tested in accordance with ASTM E119 for the type of construction shown.
E. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to the tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by independent testing agency.
F. Guarantee: Submit written guarantee stating that cracks, delaminations or other imperfections in the drywall work which may develop within a period of 2 years from date of acceptance will be repaired at no cost to the Owner.

1.04 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each gypsum board system component.

B. Submit manufacturer's certification that fire-rated assemblies proposed meet project requirements, including evidence of approved test reports acceptable to governing building code enforcing authorities, that assemblies when installed with proposed materials, will meet or exceed fire ratings required.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened labeled containers.

B. Store, protect and handle materials in accordance with manufacturer's recommendations to prevent damage, soiling and deterioration. Protect cold-formed metal framing from corrosion, deformation and other damage during delivery, storage and handing per requirements of AISI’s “Code of Standard Practice”. Protect adjoining surfaces against damage and soiling.

1.06 JOB CONDITIONS

A. Coordinate installation sequencing with work of other trades.

1. Verify completion of other work, including that of other trades, which will be concealed by gypsum drywall construction before installation of wallboard.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Gypsum Board: U.S. GYPSUM CO.; GEORGIA-PACIFIC CORP.; NATIONAL GYPSUM COMPANY; CONTINENTAL BUILDING PRODUCTS; CERTAINTEED

B. Studs, Framing and Furring: CLARK DIETRICH BUILDING SYSTEMS; MARINO/WARE; STATE BUILDING PRODUCTS; gypsum board manufacturers listed above. Others as listed for specific products.

2.02 STEEL STUDS

A. Type: Screw type "C" shape, roll formed sheet steel members conforming to requirements of ASTM C645.

1. Material: ASTM A653 steel with minimum yield strength of 33 ksi.


3. Gage and Width – 3-5/8” to 6” Studs

   a. 22 gage x 3-5/8": Up to and including 14'-6" high.

   b. 20 gage x 3-5/8"
1) Over 14'-6" up to and including 16'-5" high
2) At wall mounted cabinet locations
3) At walls receiving ceramic tile
   c. 20 gage x 4": Over 16'-5" up to and including 17'-6" high
   d. 20 gage x 6": Over 17'-6" up to and including 24'-0".
   e. 16 gage at door jambs, heavy equipment locations, and interior partitions receiving masonry veneer.
   f. Provide other gages or widths as indicated on drawings.

4. Gage and Width – 1-5/8" to 2-1/2" Studs
   a. 22 gage x 1-5/8": Maximum height 8'-4"
   b. 20 gage x 1-5/8": Maximum height 9'-8"
   c. 22 gage x 2-1/2": Maximum height 11'-3"
   a. 20 gage x 2-1/2": Maximum height 12'-10"

5. Flange Width: Nominal 1-1/4".

B. Runners and Tracks: Designed and sized to receive studs. Gage to match studs except deflection tracks.
   1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; 20 gage thickness and in width to accommodate depth of studs. Provide one of the following:
      a. #53 FlexTrack, 20 gage typical, by SUPERIOR Metal Trim Products
      b. 20 gage top track with 2" minimum legs and 20 gage Spazzer 9200 Stud Spacer Bar by CLARK DIETRICH BUILDING SYSTEMS
      c. Slip Track (Slp Trk) by BRADY CONSTRUCTION INOVATIONS
      d. The System by METAL-LITE
      e. The Three Legged Dog by FLEX-ABILITY CONCEPTS.
      f. A double slip track, 20 gage, can be used in lieu of the deflection tracks specified above. Legs of tracks shall be minimum 2".

   2. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining uniformity of fire-resistance-rated assembly indicated; 20 gage thickness and in width to accommodate depth of studs. Provide one of the following:
      a. Fire Trak System by FIRE TRAK CORPORATION.
      b. Flame Safe FlowTrak System by GRACE Construction Products.
      C. The system by METAL-LITE INC.

C. Backing Plates (Blocking): Steel sheet for blocking; width to fit framing spacing; height to be 6" unless otherwise indicated; base metal thickness: 0.0598" min.

D. Shaftwall Framing
   1. Provide "C-H" studs, "E" studs and "J" runners of sizes required for indicated heights and fire ratings.
      a. Unless otherwise shown, provide 4" deep studs, 22 gage up to 13'-0" high, 20 gage up to 14'-6" high.
      b. J-Runner at elevator entrances to be not less than 20 gage with long leg 3" wide.
   2. Track/runners to be of same gage as studs except minimum to be 24 gage.
   3. Roll-formed sheet steel members conforming to requirements of ASTM A653, minimum yield strength 33 ksi except C-H studs 40 ksi. Finish coating to be hot-dipped galvanized conforming to minimum, G-60 coating.
E. Special Corner Plates: 20 gage galvanized sheet metal break metal; 5" x 5" x continuous length; one-piece. Provide at corner where studs cannot fill corners (i.e. 60 degrees corners, etc.).

2.03 CEILING/SOFFIT SUSPENSION SYSTEM

A. Provide the following materials unless otherwise indicated on the drawings. Metals used in exterior or areas subjected to moisture to be hot-dipped galvanized in accordance with ASTM A653 or A123 as applicable.

1. Main Runners: Cold-rolled steel channels; not less than 16 gage; G-90 galvanized finish for exterior and moist areas, black asphaltum painted for other areas. Spacing as required, but not to exceed 48" o.c.
   a. 1-1/2" deep where structural support framing is at 48" o.c. or less.
   b. 2" deep where structural support framing is between 48" - 66" o.c.

2. Cross Furring
   a. Cold-rolled steel channels, not less than 16-gage; 3/4" size; same finish as main runners.
   c. 2-1/2" x 20-gage, G-60 galvanized steel studs. Provide for multiple layer applications, and 12" long nested studs at suspension points.

   a. Tie Wire: Minimum 16-gage.

B. Optional Framing: At contractor's option, proprietary furring system may be used in lieu of black iron system for dry interior conditions without fire-rated requirements.

1. Description: System consisting of furring runners, furring tees, cross tees and hanger wires, designed and manufactured specifically for suspending gypsum board ceiling.
   a. Non-fire rated.
   b. Electrogalvanized, cold-rolled steel, 0.020" thick.
   c. Double web members; 1-1/2" high with 1-3/8" capped face.

2. Manufacturer: 640 System by CHICAGO METALLIC CORP.; Drywall Suspension System by USG, WORTHINGTON STEEL COMPANY, Watercheck CONTINENTAL BUILDING PRODUCTS.


2.04 METAL FURRING

A. Type: Galvanized steel, hat-section channel, unless otherwise indicated; 7/8" furring depth by 1-1/4" face width. Provide Z-shape furring where indicated or required for walls in conjunction with thermal insulation. Thickness to match insulation


2.05 GYPSUM BOARD

A. General: Comply with ASTM C1396.
B. Fire Rated Gypsum Wallboard: Type “C” or “X” (special fire retardant) to meet fire ratings for construction shown; tapered edges. Thickness 5/8” unless otherwise indicated. Use at all locations indicated as meeting a specific fire resistance rating.
1. Provide 5/8”, Type X board at locations not indicating a specific type board.

C. Moisture and Mold Resistant Gypsum Wallboard
1. ASTM C1396 (Section 5), Type X.
2. Edges: Tapered.
3. Thickness: 5/8 inch, unless otherwise indicated.
4. Acceptable products: Mold Tough and Mold Tough Firecode (Type X) by USG; XP and XP Fire-Shield by NATIONAL; ToughRock and ToughRock Type X by GEORGIA-PACIFIC; Mold Defense and Mold Defense Type X by CONTINENTAL BUILDING PRODUCTS or equal by other gypsum board manufacturers listed in 2.01A.
5. Water Absorption: ASTM C473, the average water absorption for panels is not greater than 5 percent by weight after two-hour immersion.
7. Use on non-ceramic tiled walls, ceilings and soffits in toilet rooms, shower rooms and drying rooms; on ceramic tiled non-wet walls in toilet rooms; walls and partitions above ceilings

D. Moisture and Mold Resistant, Glass-Mat Gypsum Wallboard:
1. ASTM C1396 (Section 5) and applicable sections ASTM C1658.
2. Type X. Edges: Tapered.
4. Acceptable products: Basis of design is e²XP Interior Extreme by National Gypsum. Other acceptable product include DensArmor Plus Firecode (Type X) by GEORGIA-PACIFIC or equal by other gypsum board manufacturers listed in 2.01A.
5. Water Absorption: ASTM C473, the average water absorption for panels is not greater than 5 percent by weight after two-hour immersion.
7. Use on non-ceramic tiled walls, ceilings and soffits in toilet rooms, shower rooms and drying rooms; on ceramic tiled non-wet walls in toilet rooms; walls and partitions above ceilings

1. Thickness: ½” exterior and 5/8” interior; unless otherwise indicated.
2. Roof Parapets: Where used as roofing substrate, provide high density, water repellent treated core with fiberglass mat and specifically designed for roofing membrane adhesion. Dens-Deck Prime Roof Board by GEORGIA-PACIFIC, or equal by above manufacturers.
F. Exterior Ceiling and Soffit Board: Tapered edges, 5/8" thickness unless otherwise indicated. Water resistant gypsum core and treated paper facing to withstand effects of moisture penetration. ASTM C931. Use for only horizontal out of weather applications (exterior soffits and ceilings).

G. Impact Resistant Gypsum Wallboard: ASTM C1396 and ASTM C1629, manufactured to produce greater resistance to surface indentation and through-penetration than standard gypsum panels; long edges tapered; where indicated.
   2. Minimum Physical Properties:
      b. Type X.
      c. Mold Resistance: minimum score of 10 per ASTM D3273
   3. Manufacturers: Mold Tough VHI by USG, Hi-Impact XP by NATIONAL GYPSUM COMPANY, Dens-Armor Impact by GEORGIA PACIFIC, Protecta HIR 300 by CONTINENTAL BUILDING PRODUCTS or equal by other gypsum board manufacturers listed in 2.01A.

H. Mold Resistant Gypsum Shaftliner Board: ASTM C1396, Type X, 1" thick gypsum core with mold resistant core and faces and chamfered edges.

I. Tile Backer Board: See Section 09 30 00.

J. Curved Walls - Interior: Provide ¼" Flexible Board where required. Meet all indicated fire ratings. Provide multiple plies to achieve thicknesses indicated. Stagger joints of adjacent plies.

2.06 ACCESSORIES

A. Fasteners: Drywall screws and metal framing screws per manufacturer's instructions and recommendations for type and size, based on construction and conditions involved.
   1. Steel Drill Screws: ASTM C1002.
   2. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

B. Trim: ASTM C1047.
   1. Manufacturers
      a. Metal: BEADEX MANUFACTURING; CLARK DIETRICH BUILDING SYSTEMS; listed gypsum board manufacturers
      b. Vinyl: VINYL TECH; VINYL CORP.; TRIM TEX
   2. Corner Beads - Outside, Square Corners: 1-1/4 inch x 1-1/4 inch heavy gauge galvanized steel or vinyl, perforated.
   3. Corner Beads - Outside, Non-square Corners: BEADEX B-1 Splay Flexible Corner or equal. Concealed metal; two galvanized continuous strips laminated with paper trim; for application without mechanical fasteners.
   4. Curved Edge Cornerbead: Notched or flexible edge.
   5. Exposed Edges (Casing Beads): L-bead or LC-bead; exposed long flange receives joint compound. Size to suit wallboard. J-shaped bead that does not receive joint compound is not permitted.
6. Expansion (Control) Joints: Tape protected 1/4" wide x nominal 7/16" deep control slot.

C. Joint Treatment Materials: ASTM C475.
   1. Joint Tape. Width to adequately cover joint.
      c. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
   2. Joint Taping Compound: Designed for bonding tape to wallboard and coating corner beads and fasteners.
      a. Exterior Exposure: Type as recommended by board manufacturer.
   3. Joint Topping Compound: Designed to sand smooth and feather well for finished surface. Type as recommended by board manufacturer.
      a. Exterior Exposure: Type as recommended by board manufacturer.

D. Additional Item: All additional accessories to complete work including nails and anchors to secure frames to walls and floors.

E. Reveal Trim Beads: Aluminum, Softforms STR-050-050 by PITTCON, FRY or GORDON.

F. Acoustic Materials
   1. Insulation: See Section 07 21 00; Sealant: See Section 07 92 00.

PART 3 EXECUTION

3.01 PREPARATION

A. Maintain uniform building temperature range not less than 55 degrees F., for 24 hours before, during, after gypsum panel installation and joint finishing treatment.

B. Provide adequate lighting and ventilation during installation and joint finishing.

3.02 INSPECTION

A. Examine substrates and installation conditions. Do not proceed with gypsum wallboard work until unsatisfactory conditions have been corrected.
   1. Protrusions of framing, twisted framing members, or unaligned members must be repaired before installation of wallboard is started.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.03 FRAMING INSTALLATION

A. Comply with the requirements of ASTM C754 "Installation of Steel Framing Members to Receive Screw Attached Gypsum", and as specified.

B. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except
where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Rated Stud Deflection Assembly: Install in accordance with manufacturer's instructions to provide required fire ratings. Ensure that anchoring devices, back-up material, clip supports and other materials are as used in referenced fire tests.

3. Securely attach runner to floor with expansion anchors or equivalent.

C. Install all framing plumb and square with spacing as indicated.

D. Provide supplementary framing, blocking and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings or similar construction. Comply with details indicated, recommendations of gypsum board manufacturer or if none available with United States Gypsum Company's "Gypsum Construction Handbook".

E. Bridging

1. Up to 10 ft. Wall Height: 1 row.
2. 10 ft. and Over Wall Height: 2 rows of bridging.

F. Provide a minimum of two (2) screws per connection.

G. Curved Partitions

1. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
2. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

H. Shaftwall Framing

1. Install "J" runners, "C-H" studs, "E" studs and 1" gypsum liner panels in accordance with manufacturer's recommendations and drawings.
2. Include additional bracing and blocking as required support of recessed or applied items.
3. Provide all openings in shaftwall in a manner consistent with shaftwall system manufacturer's published details with approval by the Architect and as required to maintain fire rating integrity of assembly.

3.04 FURRING INSTALLATION

A. Wall Application

1. Attach to masonry with expansion anchors or at mortar joints with concrete nails or expansion anchors.
2. Spacing shall be 16 in. o.c., unless otherwise indicated.
3. Run vertically or horizontally for maximum efficiency.

B. Ceiling Application: Install suspension system for ceilings and soffits, both interior and exterior, in accordance with manufacturer's instructions, recommendations and
as follows:

1. Locate furring runners at 48” on center with hanger wires at 48” on center. Attach hanger wires to structural framing members specifically for this purpose. Attach hanger wires to framing wires using attachment devices whose suitability has been demonstrated by standard construction practice or by certified test data.

2. Connect furring runners with furring tees spaced at 24” on center. Locate additional tees or hanger support as required for surface mounted and recessed ceiling and soffit items such as light fixtures, diffusers, etc. Add additional hanger wires as required to support all items at each corner.

3. Provide wall track wherever suspension meets a vertical surface.

4. Brace suspension system for exterior ceilings and soffits to structure above to resist wind up-lift using metal channels or metal studs. Install after system is completely suspended to level plane.

5. Do not support ceiling system from ductwork, electrical conduit, heating or plumbing lines, and vice versa. Each utility system and the ceiling system shall be a separate installation and each shall be independently supported from the building structure.

   a. If an interference occurs, provide trapeze type hangers or other suitable supports for each system. Locate hangers where they will not interfere with access to mixing boxes, fire dampers, valves and other appurtenances requiring servicing.

   b. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.05 GYPSUM BOARD INSTALLATION


B. General: Do not proceed with gypsum board installation until blocking, framing, bracing and other supports for subsequently applied work have been installed, reviewed and accepted by the Architect. Do not install gypsum board until work concealed by gypsum board has been installed.

C. Application

1. Install gypsum board face side out. Do not install imperfect, damaged or damp boards.

2. Butt boards together for a light contact at edges and ends with not more than 1/16” open space between boards. Do not force into place.

3. Locate either edges or end joints over supports. Position boards so that both tapered edge joints abut. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

4. Attach gypsum board to framing and blocking as required for additional support at openings and cutouts.

5. Floating Construction: Install gypsum board with "floating" internal corner construction, unless isolation of the intersecting board is indicated.

6. In addition to compliance with the standards, comply with specific
requirements indicated for each type of arrangement of gypsum wallboard system shown. Space fasteners in accordance with manufacturer's recommendations and complying with referenced standards.

a. Walls and Partitions: Apply sheets horizontally or vertically. Provide maximum sheet lengths to minimize end joints with edges or ends over supports. In two layer applications, stagger joints of second layer from joints of first layer.

b. Cut and install panels to eliminate vertical joints in corners of door frames to ceiling.

c. Make cutouts to fit within wall plate, register and grille flanged. All cutouts made by knife or saw.

d. Make angles and corners clean, true, plumb and square; walls plumb, flat and straight and ceilings flat and level.

e. Ceilings: Apply gypsum board on ceilings, before application on walls and partitions. Install in direction and manner to minimize end joints. Stagger end joints over supports. In two layer applications, stagger joints of second layer from joints of first layer.

D. Direct-Glue Application

1. Apply gypsum vertically with closely butted joints within 10 minutes after application of mastic adhesive, sooner if recommended by manufacturer. Apply firm pressure over entire board to effect a bond and to level board. Use slight sliding movement to position board. Shim drywall 1/4" off floor.

2. Apply mastic adhesive in amounts and at locations on board as recommended by adhesive manufacturer. Provide temporary fasteners or bracing as recommended until adhesive sets.

E. Exterior Ceiling and Soffit Board

1. Install exterior ceiling and soffit board perpendicular to supports, stagger end joints over supports, use maximum lengths possible to minimize joints.

2. Install with 1/4 inch open space where boards abut other work.

3. Space screws 4” o.c. around perimeter of board and 8” o.c. on intermediate framing members and on diagonal braces. Locate fasteners minimum 3/8 inches from edges and ends of sheathing panels. Drive fasteners to bear tight against and flush with sheathing surface. Do not countersink.

4. Provide trim at all perimeter edges.

5. Apply sealant around sheathing perimeter at interface with other materials.

3.06 . EXTERIOR SHEATHING AND SOFFIT BOARD

A. Comply with GA-253 and with manufacturer's written instructions.

1. Install exterior sheathing board perpendicular to supports, stagger end joints over supports, use maximum lengths possible to minimize joints.

2. Install with 1/4 inch open space where boards abut other work.

3. Space screws 4” o.c. around perimeter of board and 8” o.c. on intermediate framing members and on diagonal braces. Locate fasteners minimum 3/8 inches from edges and ends of sheathing panels. Drive fasteners to bear tight against and flush with sheathing surface. Do not countersink.

4. Apply sealant around sheathing perimeter at interface with other materials.

5. Board Joints: Provide seam sealing tape or joint sealant at Contractor's option, as follows:
a. Seam Sealing Tape
   1) Apply primer to joints and fasteners, allow to dry.
   2) Seal joints using tape specified herein or other similar type method recommended by board manufacturers for application indicated. Apply at time of sheathing, to sealed, dry, dust-free joints. Apply seam sealing tape along all edges, overlapping at intersections by width of tape.
   3) Apply sealant to exposed fasteners with a trowel so fasteners are completely covered.
   4) Seal other penetrations and openings.
   5) Coordinate sheathing and placement of through-wall flashing. Tape top of through-wall sealant to sheathing to provide a water-tight joint.

b. Sealant
   1) Apply minimum 3/8" bead of sealant to joints and trowel to provide a layer approximately 2" wide by 1/16" thick spanning the joint. Apply enough to each fastener to cover completely when troweled flat. Use backer rod for openings larger than 1/8".
   2) Apply sealant to exposed fasteners with a trowel so fasteners are completely covered.
   3) Seal other penetrations and openings.
   4) Coordinate sheathing and placement of through-wall flashing. Tape top of through-wall flashing to sheathing to provide a water-tight joint.

3.07 INSTALLATION OF SOUND RATED PARTITIONS

A. Provide sound-rated construction where indicated.

B. Acoustic Insulation: Install single layer of acoustic batt insulation in designated partitions after one side of gypsum board is installed, filling width and height of partition completely. Attach to gypsum board with adhesive spots to prevent subsequent displacement.

C. Extend partition stud system through acoustical ceilings to substrate. Apply gypsum board base panels full height, both sides of partition.

D. Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

E. Seal partition perimeters. Provide continuous beads of acoustical sealant at juncture of both faces of runners or plates with floor and ceiling construction and wherever work abuts dissimilar materials. Seal prior to installation of sound attenuation insulation and gypsum board panels.

F. Provide continuous beads of sealant at juncture of gypsum board and abutting
surface. Install gypsum board with 1/8" relief for sealant. Sealants to be contained within depth of gypsum board, not as a fillet.

G. At openings and cutouts, fill open spaces between edges of gypsum board and fixtures, cabinets, ducts, and other flush or penetrating items, with continuous bead of acoustical sealant.

H. If sound-rated partitions intersect non-sound-rated partitions, extend sound construction to completely close-off sound flanking paths through non-rated construction. Seal joints between face layers at vertical interior angles of intersecting partitions.

I. Exercise particular care at walls surrounding toilet areas and walls and ceilings surrounding mechanical spaces to provide properly constructed sound-rated gypsum board partition and ceiling systems.

J. Verify that electrical boxes are not located back-to-back; back-to-back boxes to be offset at least one stud space. Do not close off non-complying conditions before notifying and receiving direction from Architect.

3.08 TRIM AND ACCESSORIES

A. Install corner beads at external corners of gypsum wallboard and sheathing work. Use longest practical lengths.

B. Install edge trim wherever edge of gypsum board or sheathing would be exposed or semi-exposed.
   1. Provide beaded trim to receive joint compound at all wallboard work.
   2. Provide L-type trim where work is abutted to other work and Kerf-type where work is kerfed to receive kerf leg.
   3. Provide U-type trim where edge is exposed, revealed, gasketed or sealant filled, including expansion joints.

C. Attach to framing with steel screws. Clinch attachment to wallboard not acceptable.

D. Control Joints
   1. Install control joints to isolate gypsum board surfaces as recommended by ASTM C840. Verify locations with Architect prior to installation. Generally locate joints as follows when:
      a. Partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
      b. Ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration.
      c. Construction changes within the plane of the partition or ceiling.
      d. Partition or furring run exceeds 30'.
      e. Ceiling dimensions exceed 50' in either direction with perimeter relief; 30' without relief.
      f. Exterior ceilings and soffits exceed 20' in either direction; align with window mullions, when applicable.
      g. Wings of "L", "U", and "T"-shaped ceiling areas are joined.
      h. Expansion or control joints occur in the base exterior wall.
i. **Differential Deflection Conditions**: All locations where partitions are supported by two or more structural members and subject to differential deflection by live or dead loading:
   1) **Typical Framing Floor to Structure**: Provide "Ceiling Deflection Track".
   2) **Framing over One Floor (stairs, shafts, etc.)**: Provide control joints where studs are interrupted by structure.

j. **Partition terminations at window mullions**.
   1) Neoprene joint tape / caulking installed in Section 07 92 00.
   2) Aluminum mullion closures provided under Section 08 41 13

2. **Provide framing immediately on both sides of joint and back with 2"+/- gypsum board strips as required to maintain fire resistance rating.**

### 3.09 FINISHING

A. **Comply with manufacturer’s instructions for mixing, handling and application of materials.** Apply treatment at joints both directions, at flanges of trim accessories, penetrations of gypsum board (electrical boxes, piping and similar work), fastener heads, surface defects and elsewhere indicated. Apply in manner that will result in each item being concealed when applied decoration has been completed.

B. **Prefill open joints of more than 1/16" with special chemical-hardening type bedding compound, before bedding joint tape.**

C. **Apply joint tape at joints between boards, except where trim accessories indicated**

D. **Do not use topping compound for bedding joint tape.**

E. **Apply joint compound for the final coat of joint treatment, unless specifically recommended by the manufacturer for that use.**

F. **Walls Above Acoustical Ceiling Systems**: Tape and fill joints with two coats of joint compound, sanding not required.

G. **Leave all exposed surfaces smooth and even, ready for painting.**

H. **Provide where indicated on the drawings levels of finish as specified in ASTM C840, "Recommended Specification on Levels of Gypsum Board Finish".**

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**Finishes / Uses in accordance with GA-214 Levels of Finish.**

Coordinate the drywall level of finish with the proposed interior finish as outlined in the Finish Schedule. Unless otherwise indicated on drawings, use Level 2 if building interior is to remain unfinished for more than thirty (30) calendar days from proposed interior build-out. Verify with Owner / Landlord and Tenant(s) regarding extent of work and required finish on demising walls, renovated surfaces and other sheathing during shell construction:

**Level 0**: No taping, finishing or accessories. **Use in** temporary construction; or where final wall finish has not been determined in scope of work.

**Level 1**: All joints / interior angles are taped set in joint compound; drywall surface to be free of excess compound. Accessories are optional dependent upon potential for public view. **Use in** areas of non-public
view and in above ceiling areas such as plenums. May be considered a “fire-tape” level if approved by local Authority Having Jurisdiction.

**Level 2:** All joints / interior angles are taped set in joint compound; drywall surface to be free of excess compound. Accessories, fastener heads and tape to be covered with a coat of compound. Use for M/R tile substrate; and where surface appearance is not a primary concern, such as garages, storage areas, or where drywall may be a substrate for a future finish.

**Level 3:** All joints / interior angles are taped set in joint compound, with a one coat cover; drywall surface to be free of excess compound. Accessories and fastener heads to have two coats of compound. Smooth all coats free of tool marks and ridges. Prepare surface with drywall primer prior to the application of the design finish. Use for walls exposed to view where heavy/medium texture finishes are applied prior to painting, or where heavy-grade wallcovering applied.

**Level 4:** All joints / interior angles are taped set in joint compound, with a one coat cover over angles & two coat cover for joints; drywall surface to be free of excess compound. Accessories and fastener heads to have three coats of compound. Smooth all coats free of tool marks and ridges. Prepare surface with drywall primer prior to application of design finish. Use for walls exposed to view where flat paints, light textures / wallcoverings & eggshell / satin paints are used: and some drywall ceiling applications.

**Level 5:** All joints / interior angles are taped set in joint compound, with a one coat cover over angles & a two coat cover for joints; drywall surface to be free of excess compound. Accessories and fastener heads to have three coats of compound. Smooth all coats free of tool marks and ridges. A final skim coat is to be applied over the entire surface. Prepare surface with drywall primer prior to the application of the design finish. Use for walls exposed to view where gloss, semi-gloss enamel or non-textured flat paints are specified; or, where severe lighting conditions occur.

3.10 **ADJUST AND CLEAN**

A. Remove any screw which does not engage into a framing member or spins freely.

B. When paper face is punctured, drive new screw approximately 1-1/2" from defective fastener and remove fastener. Fill damaged surface with compound.

C. Ridging: do not repair ridging until condition has fully developed: approximately 6 months after installation or one heating season. Sand ridges to reinforcing tape without cutting through tape. Fill concave areas on both sides of ridge with topping compound. After fill is dry, blend in topping compound over repaired area.

D. Fill cracks with compound and finish smooth and flush.

E. Remove and replace panels that are wet, moisture damaged, and mold damaged. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape. Indications that panels
are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.11 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide all labor, materials, services, equipment and appliances required in conjunction with the design, fabrication and installation of glass fiber reinforced gypsum (GRG) interior shapes as indicated on the drawings and specified herein, including but not limited to:

1. Primary cast elements.
2. Supporting members.
3. Bedding and sanding at joints.
4. All factory applied accessories.
5. All field installed accessories.

B. Shapes include, but are not necessarily limited to, the following:

1. Column covers.
2. Trim and molding.

C. Provide anchors, clips, adhesives and finishing accessories and perform all work required to leave GRG shapes ready for finish painting.

1.02  RELATED SECTIONS

A. Gypsum Drywall: Section 09 21 16.

B. Painting: Section 09 91 00.

C. Miscellaneous Steel Supports: Section 05 50 00.

1.03  SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, weights, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Submit for all items. Include:

1. Plans, elevations, sections, and attachment details.
2. Detail fabrication and assembly of glass-fiber-reinforced gypsum shapes.

C. Samples: Submit representative sample of each type shape showing thickness, finish, texture and attachment spline (joint detail).

1. Linear Shape: Minimum 24" length x full width of shape
1.04 QUALITY ASSURANCE

A. Manufacturer: Successfully completed a minimum of 5 projects of type, scope and quality required by this project within the past 5 years.

B. Installer: 3 years successful experience in installation of systems similar to those required by project and acceptable to system manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

A. Comply with ASTM C1467.

1.06 FIELD CONDITIONS

A. Environmental Conditions
   1. Comply with ASTM C1467.
   2. Do not deliver or install glass-fiber-reinforced gypsum shapes until building is enclosed, wet work is complete, and HVAC system is operating and continuously maintaining temperature and relative humidity at levels intended for building occupants.

B. Conditioning: Acclimatize shapes to ambient temperature and humidity of spaces in which they will be installed. Remove packaging and move units into installation spaces not less than 48 hours before installing them.

C. Field Measurements: Where glass-fiber-reinforced gypsum shapes are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid Work delays.

PART 2 PRODUCTS

2.01 SHAPES

A. Material: High density gypsum, reinforced with multi-directional chopped glass fibers. ASTM C1381.

B. Material Characteristics and Fabrication Tolerances: ASTM C1355.

C. Profile, Diameter, Rise and Radius (As Applicable): As indicated on drawings.
   1. Columns: Provide base and capitals as indicated on drawings.

2.02 ACCESSORIES AND AUXILIARY MATERIALS

A. Adhesives: As recommended in glass-fiber-reinforced plaster fabrication manufacturer's written instructions

B. Fasteners, Clips and Mounting Hardware: Types as recommended by GRG manufacturer for substrate conditions.
C. Joint Treatment Materials: ASTM C475; see Section 09 21 16.

D. Joint Sealants: See Section 07 92 00.

2.03 FABRICATION

A. Comply with ASTM C1381

B. Molds: Rigid and constructed of materials and in a manner that will result in smooth finished products conforming to profiles, textures and dimensions indicated.

C. Fabricate units in lengths and sizes that will minimize number of joints between abutting units.

D. Embedments: As standard with glass-fiber-reinforced plaster fabrication manufacturer and as required for reinforcement and for anchorage to substrates and framing.
   1. Incorporate embedments into units to develop the full strength of glass-fiber-reinforced plaster fabrications.
   2. Cover embedments with not less than 3/16-inch thickness of glass-fiber-reinforced plaster composite.

E. Connection Hardware: Designed and fabricated to support and connect glass-fiber-reinforced gypsum shapes to hangers, support framing, and substrates.

F. Finish: Smooth for field paint finish: See Section 09 91 00.

2.04 MANUFACTURER

A. Subject to compliance with requirements, provide products manufactured by one of the following:
   1. FORMGLAS INC.
   2. PLASTRGLAS, INC.
   3. DECO FORM

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Comply with ASTM C1467 and manufacturer's written instructions and recommendations.
B. Install items level, plumb, true, and aligned with adjacent materials. Use concealed shims where required for alignment.

C. Install control joints between glass-fiber-reinforced gypsum shapes where indicated or recommended by manufacturer.

D. Joint Finishing: ASTM C840. Use joint-treatment materials to finish glass-fiber-reinforced gypsum shapes to produce surfaces ready to receive primers and paint finishes specified in Section 09 91 00, Painting. See Section 09 21 16 for joint finishing requirements.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED
  
  A. Extent of tile work is shown on drawings and schedules, and as specified herein.

  B. Types of tile work required including the following:
     1. Quarry tile floor and base.
     2. Ceramic wall tile, floor tile and base.

  C. Section also includes:
     2. Metal edge/transition strips installed as part of tile installations.

1.02  RELATED SECTIONS
  
  A. Sealant: Section 07 92 00.

  B. Concrete slab preparation: Section 01 73 00.

1.03  QUALITY ASSURANCE
  
  A. Manufacturer: Provide tile of each type produced by a single manufacturer. Provide materials obtained from one source for each type and color of tile, grout, and setting materials.

  B. Installer: A firm with not less than 5 years experience in installing tile in applications similar to those required for this work.

  C. Ceramic Tile Manufacturing Standard: TCA 137.1. Furnish tile complying with Standard Grade requirements unless indicated otherwise.

  D. Proprietary Materials: Handle, store, mix and apply proprietary setting and grouting materials in compliance with manufacturer’s instructions.

  E. Installer to verify locations of all flexible joints required by the provisions of this section, by the recommendations of TCA, and by the recommendations of the related manufacturers. See Article 3.06.
     1. Joint locations may or may not be indicated on the drawings.

1.04  PERFORMANCE REQUIREMENTS
  
  A. Dynamic Coefficient of Friction: For tile installed on walkway surfaces subject to traffic while wet, provide products with a dynamic coefficient of friction not less than 0.42 as determined by testing identical products per ANSI A137.1.
1.05 SUBMITTALS

A. Product Data: Submit manufacturer's technical information and installation instructions for materials required. Include certifications and other data to show compliance with these specifications.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples: Submit manufacturer's color charts consisting of actual tiles or sections of tiles showing full range of colors available, for each type of tile specified. Include samples of grout and accessories requiring color selection. Submit full size sample for each type of trim, accessory and color. Submit samples of metal edge strip.

D. Certification: Furnish Master Grade Certificate for each type of tile, signed by manufacturer and Installer.

1.06 PRODUCT HANDLING

A. Deliver packaged materials and store in original containers with seals unbroken and labels intact until time of use, in accordance with manufacturer's instructions.

1.07 JOB CONDITIONS

A. Maintain environmental conditions and protect work during and after installation in accordance with referenced standards and MFR's printed recommendations.

PART 2 PRODUCTS

2.01 QUARRY TILE

A. Quarry Floor Tile: 1/2" thick, cushion-edged standard grade quarry tile conforming to ANSI 137.1. Colors as selected by Architect from MFR's full range of colors.
   1. Sizes: As indicated.
   2. Base: Where quarry tile base is scheduled provide 6" high, 1/2" thick quarry tile cove base with rounded bullnose top. Base pieces to be 6" long to match tile. Provide inside and outside corners and trim pieces as required. Color to match floor quarry tile.
   3. Manufacturer: Provide quarry tile and base as manufactured by one of the following subject to the above requirements:
      a. AMERICAN OLEAN TILE.
      b. DAL-TILE CORPORATION.
      c. SUMMITVILLE TILES, INC.

2.02 CERAMIC TILE

A. Ceramic Wall Tile, Floor Tile and Base: Standard grade, impervious porcelain ceramic tile conforming to ANSI 137.1. Provide trim pieces as required.
   1. Basis of Design: Manufacturer, Styles, Colors and equivalent products indicated on the drawings.
2.03 MORTAR, GROUT AND ACCESSORIES

A. See Tile Installation Systems in Part 3 of this Section. Setting mortar and grout to be from same manufacturer.

B. General - All Adhesives, Grouts and Epoxies: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the current VOC content requirements.

C. Modified Dry Set Cement Mortar - Thin Set: Factory mixed mortar of Portland cement/sand, field gauged with undiluted latex admixture. Conform to ANSI A118.4, Latex-Portland Cement Mortar. Provide type suitable for “medium-set” for tiles with a dimension larger than 15”.
   1. Provide one of the following:
      a. BOSTIK, Durabond D-50 or D-60.
      b. MAPEI, Ultraflex 3.
      d. LATICRETE, 255 MultiMax.

D. Dry-Set Mortar - Thin Set: Mixture of Portland cement with sand and latex, water imparting additive. Conform to ANSI A118.1, Standard Dry-Set Cement Mortar.
   1. May be used in lieu of Modified Dry Set Cement Mortar for ceramic floor and wall tile.

E. Portland Cement Setting Mortar - Thick Set (ANSI 108.2): Provide waterproof membrane beneath floor setting beds. Provide cleavage membrane at floors without waterproofing membrane. Reinforce floor setting beds. Provide bed of a thickness as required to bring the tile to the required finish elevation as shown on the drawings. Provide materials as follows:
   1. Underbed: Mix 1 part Portland cement to 5 parts loose damp sand by volume
      b. Sand: ASTM C144.
      c. Water: Clean, potable and free of deleterious substances.
   2. Membrane Waterproofing: See Membrane Waterproofing herein
   4. Underbed Reinforcement: ASTM A185, 2” x 2” x 16 gage, galvanized welded wire fabric.

F. Grout - Ceramic Tile (ANSI A118.7): Integrally colored, sanded (unless otherwise indicated), polymer modified cement type, factory prepared (premixed) grout. Color as selected by Architect.
   1. Provide one of the following:
      a. BOSTIC, Ceramic Tile Grout with BOSTIK 425 Acrylic-Latex Admixture
      b. TEC (H.B. FULLER), TEC Power Grout.
      c. MAPEI, Ultracolor.
      d. LATICRETE, Permacolor Grout.
   2. Colors: As selected by Architect.
   3. Provide unsanded grout for glass tile and tile joints less than 1/8” wide.

1. Bond Coat: Two-component epoxy grout complying with ANSI A118.3. See manufacturers under "Grout for Floors and Base."

2. Grout for Floors and Base: Multi-component epoxy grout complying with ANSI A118.3. Color as selected by Architect. Provide one of the following:
   a. BOSTIC, U-poxy/AAR II.
   b. MAPEI, Kerapoxy.
   c. LATICRETE, Latapoxy SP-100.
   d. TEC (H.B. FULLER).

H. Membrane Waterproofing: Manufacturer’s standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

   a. Products: Provide one of the following:
      1) BONSAL AMERICAN; B 6000 Waterproof Membrane with Glass Fabric
      2) BOSTIK, INC.; Hydroment Blacktop 90210.
      3) LATICRETE INTERNATIONAL, INC.; Laticrete 9235 Waterproof Membrane.
      4) MAPEI CORPORATION; Mapelastic HPG with MAPEI Fiberglass Mesh.

2. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer
   a. Products: Provide one of the following:
      1) BONSAL AMERICAN; B 6000 Waterproof Membrane.
      2) BOSTIK, INC.; Hydroment Gold.
      3) LATICRETE INTERNATIONAL, INC.; Latapoxy 24hr HydroProofing.
      4) MAPEI CORPORATION; Mapelastic HPG.
      5) TEC (H. B. FULLER COMPANY); HydraFlex - Waterproofing Crack Isolation Membrane

   1. Products: Provide one of the following:
      a. MAPEI CORPORATION; Mapelastic SM.
      b. NATIONAL APPLIED CONSTRUCTION PRODUCTS, INC.; Strataflex.
      c. POLYGUARD; Tileguard.

J. Metal Edge Trim: L-shape, height to match tile and setting-bed thickness; stainless steel, ASTM A666, 300 Series. SCHLUTER, CERAMIC TOOL COMPANY, BLANKE

K. Grout Sealer: Low VOC, penetrating type as recommended by grout manufacturer that does not change color or appearance of grout.
1. Provide cadmium plated screws, type as recommended by board manufacturer.
2. Joint Treatment Tape: 2" wide, 10x10 glass mesh type or similar type as recommended by board manufacturer.

B. Manufacturer: Wonder Board by MODULARS, INC.; Util-A-Crete by FIN PAN; Durock Interior Tile Backer Board by U.S. GYPSUM; Dens-Shield by GEORGIA PACIFIC.

**PART 3  EXECUTION**

3.01  INSPECTION

A. Examine surfaces to receive tile, setting beds and accessories before tile installation for the following:
   1. Defects or conditions adversely affecting quality and execution of the installation.
   2. Deviations beyond allowable tolerances of surfaces to receive tile.
   3. Do not proceed with installation work until unsatisfactory conditions are corrected.

B. Conditions of surfaces to receive tile.
   1. Surfaces to be firm, dry, clean, and free of oily or waxy films or curing compounds.
   2. Grounds, anchors, plugs, hangers, bucks, electrical, plumbing and HVAC work in or behind tile to be installed prior to proceeding with tile work.

3.02  PREPARATION

A. Prepare surfaces to receive tile as required to achieve proper bond and as recommended by the Tile Council of America.
   1. See Section 01 73 00 for additional floor preparation requirements.

B. Fill cracks, low areas and pits in concrete with self-leveling fill of type recommended by tile manufacturer for substrate conditions encountered.

C. Lightly grind concrete subfloors with a terrazzo grinder to remove trowel marks, slab curl at saw cut joints or other surface irregularities or high spots which will telegraph to the flooring surface.

D. Sawcut or grind transition areas to install tile flush with adjacent finished floor materials.

E. Clean surfaces in a manner suitable for proper installation. Verify that slabs are free of curing membranes, oil, grease, wax, dust and other materials deleterious to tile installation.

F. Primers or other preparations required or recommended in accordance with manufacturer's instructions.

3.03  TILE BACKERBOARD
A. Location: Provide tile backerboard on metal stud walls as a substrate for ceramic tile products specified herein which are located on toilet room wet walls.

B. Install in strict accordance with manufacturer's recommendations and ANSI A108.11, Interior Installation of Cementitious Backer Units.
   1. Butt ends and edges of adjacent panels.
   2. Attach with screws spaced at 6 inch centers on perimeter and field.
      a. Maintain minimum 1/2 inch from screws to panel edge.
      b. At wainscot or similar location where tile terminates in same plane of wall, shim tile backerboard flush with adjacent wall board. Provide shims continuous along face of studs.
   3. Locate control and expansion joints in same locations as substrate and where required by wall tile.
   4. Apply glass mesh tape, or type recommended by board manufacturer, over joints. Embed tape in setting material indicated for specified tile finish.

3.04 INTERIOR WALL TILE INSTALLATION - SYSTEMS

A. Prepare surfaces, fit, set or bond, grout, and clean in accordance with Tile Council of America, "Handbook for Ceramic Tile Installation", 2011 Edition; and as follows:

B. Thin Set - Stud Walls - Over Tile Backerboard: TCA W244, dry-set mortar bond coat or latex Portland cement bond coat and grout.
   1. Tile: ANSI A108.5.
   3. Backerboard
      a. Joint Preparation: Fill joints completely with setting mortar and embed 2 inch wide coated fiberglass tape into skim coat of same mortar.
      b. Apply setting mortar in one layer, troweling skim coat with trowel's flat edge and then texturing with appropriate notched trowel. Troweling equipment must be appropriate for type of tile work and in good condition.

   1. Tile: ANSI A108.5.

D. Thin Set - Solid Back-Up Walls (concrete, CMU, etc.): TCA W202, dry-set mortar bond coat or latex Portland cement bond coat and grout.
   1. Tile: ANSI A108.5.

E. Thick Set - Solid Back-Up Walls (concrete, CMU, etc.) - Dry and Wet Areas: TCA W221, Portland cement mortar bed, metal lath, [waterproof membrane], dry-set mortar bond coat or latex Portland cement bond coat and grout.
   3. Install mortar bed to thickness indicated on drawings.

3.05 INTERIOR FLOOR TILE INSTALLATION - SYSTEMS
A. Prepare surfaces, fit, set or bond, grout, and clean in accordance with Tile Council of America, "Handbook for Ceramic Tile Installation", 2011 Edition; and as follows:

B. Thick Set with Waterproof Membrane: TCA design F121; waterproof membrane, Portland cement mortar bed, reinforcing, bond coat and grout.
   1. Tile: ANSI A108.1A.
   3. Mortar Bed Thickness: As indicated (min. 1-1/4"; max. 2").
   4. Wet areas; shower areas; drying areas; pool decks; other areas indicated

   1. Install in strict conformance with waterproofing membrane manufacturer's written instructions and recommendations.
   2. Tile: ANSI A108.5.
   4. Wet areas; shower areas; drying areas; other areas indicated

D. Thin Set: TCA design F113, latex Portland cement mortar and grout or dry-set mortar and grout.
   1. Tile: ANSI A108.5.

E. Epoxy Mortar and Grout: TCA design F131; epoxy mortar and grout. ANSI A108.6.
   1. Quarry tile; kitchen areas; other areas indicated.

F. Thin Set, Adhesive: TCA F116; organic adhesive and grout.

3.06 TILE INSTALLATION - PROCEDURES

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
   1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
      a. Floors in wet areas
      b. Swimming pool decks
      c. Kitchen areas
      d. Floor tiles 8” x 8” and larger
      e. Rib-backed floor tiles

B. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim,
finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars or covers overlap tile.

D. Placement Methods: Install tile using the hereinbefore specified setting beds and grouts.

E. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting.
1. Avoid tile layout with less than half width tiles at room/area perimeters, unless otherwise indicated on the floor layout drawings. Notify Construction Manager if layout not achievable per layout indicated on the drawings. Do not continue in room/area in question until approved by the Associate.
2. Provide uniform joint widths, unless otherwise shown.
   a. Ceramic Mosaic Tile: 1/16 inch.
   b. Quarry Tile: 1/4 inch
   c. Large format Floor Tile: 1/8 inch.
   d. Glazed Wall Tile: 1/16 inch.


3.07 FLEXIBLE JOINTS

A. Locate flexible joints (expansion, control and isolation joints) prior to tile installation. See Quality Assurance in Part 1 herein.

B. Provide flexible joints as specified herein, unless more stringent requirements are indicated on drawings. Provide as specified, regardless if not indicated on drawings.

C. Joint to be continuous from face of tile to bottom of setting bed or leveling bed. Reinforcing to be discontinued at joint. Install continuous joint filler material in joint from setting or leveling bed to a point below face of tile adequate for proper placement of backing rod and sealant.

D. Joint Design: TCA design EJ171 as applicable. See Section 07 92 00 for sealant. Provide at the following locations:
1. Horizontal Surfaces
   a. Directly over expansion joints.
   b. Over anti-fracture membrane which is applied over structural slab cold joints, construction joints and control joints.
   b. Where tile work abuts restraining surfaces such as perimeter walls, curbs, columns, pipes, etc.
   c. Floor areas exceeding 12 feet in any direction for exterior work and 24 feet in any direction for interior work.
   d. Other locations where indicated.
2. Vertical Surfaces
a. Directly over joints in wall substrate including cold joints, construction joints, control joints and expansion joints.

b. At changes in substrate material.

c. Where tile work abuts restraining surfaces such as perimeter walls, curbs, columns, pipes, etc.

d. Where indicated.

E. Curing: Cure tile floor, base, and wall installations in accordance with manufacturer's recommendations, TCA recommendations, and in accordance with ANSI requirements.

F. Metal Edge Strips: Provide metal edge strips at openings without thresholds, and where exposed edges of tile floors meet other materials.

1. Except as otherwise indicated, where trim is located across door openings, locate trim on the door side in line with the edge of the door stop, terminating at the rabbet.

3.08 REPAIR, CLEAN AND PROTECT

A. Repair, or remove and replace chipped, damaged or otherwise defective work to the satisfaction of the Architect.

B. Cleaning: Upon completion of placement and grouting, clean all tile surfaces so that they are free of foreign matter.

1. Use methods and materials as recommended by tile manufacturer.

2. Replace tiles that cannot be satisfactorily cleaned.

C. Grout Sealer: Apply silicone grout sealer to grout joints according to grout sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer from joints and from tile faces by wiping with soft cloth.

D. Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent damage and wear.

1. Prohibit foot and wheel traffic from using tiled floors for at least 3 days after grouting is completed.

2. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION
SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.01 WORK INCLUDED
A. Provide acoustical lay-in panel ceiling system as shown and specified.

1.02 RELATED SECTIONS
A. Gypsum Board Ceiling: Section 09 21 16.

1.03 QUALITY ASSURANCE
A. Workmanship: Comply with Ceilings & Interior Systems Contractors Association (CISCA) “Ceiling Systems Handbook”.
B. Installation: Performed by an experienced authorized installer approved by acoustical material manufacturer.
C. Fire Hazard Classification: Provide acoustical materials which have been UL tested, listed and labeled Class 0-25, when tested in accordance with ASTM E84, Class A flame spread rating in accordance with ASTM E1264 requirements.
D. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standards.
E. Coordination Between Trades: Quality assurance includes the cooperation with HVAC, Plumbing and Electrical Contractors in regards to ceiling grid layout.
   1. Procedures for submitting coordination drawings for ceiling work is included in Section 01 33 23 - Shop Drawings, Product Data and Samples.

1.04 SUBMITTALS
A. Product Data
   1. Submit manufacturer’s product data and installation instructions for each type of acoustical material and suspension system required.
   2. Submit manufacturer’s written instructions for recommended maintenance practices for each type of acoustical ceiling system required. Include recommendations for cleaning and refinishing acoustical units and precautions against materials and methods that may be detrimental to finishes and acoustical performances.
B. Samples: Submit 12” square acoustical panel samples for each type of acoustical unit required. Provide 12” long suspension system and edge molding samples.
C. Certification: Submit manufacturer's certification of acoustical units fire hazard classification rating and performance requirements.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unopened protective packaging, with manufacturer's labels indicating brand name, pattern size, thickness and fire rating as applicable, legible and intact.

B. Store materials in original protective packaging to prevent soiling, physical damage or wetting.

C. Store cartons open at each end to stabilize moisture content and temperature.

D. Do not begin installation until sufficient materials to complete a room are received.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.07 EXTRA MATERIALS

A. Maintenance Stock: Under this Section furnish to the Owner prior to final acceptance, extra maintenance stock of acoustical materials, consisting of a minimum of one percent of area of each size, type, thickness installed on the job, and 4% if the area is under 5,000 sq. ft. This extra stock is for the Owner's use after completion of the Project and is not to be used for repair or replacement required during the construction period. Properly package, seal, and identify extra stock material.

PART 2 PRODUCTS

2.01 SUSPENSION SYSTEM

A. Exposed "Tee" Grid System

1. Description: Cold-rolled electrogalvanized steel, factory applied white finish paint to match ceiling tile.
   a. 15/16" exposed face; DONN (USG INTERIORS) Model DX; ROCKFON Chicago Metallic 200 Snap Grid System; ARMSTRONG Prelude.
   b. 9/16" exposed face; ARMSTRONG Suprafine; DONN (USG INTERIORS) Fineline; ROCKFON Chicago Metallic Tempra 4000.

2. Description: Comply with ASTM C635. Provide systems adequate to support light fixtures, ceiling diffusers, and other normal accessories. Maximum deflection 1/360 of the span. All components of system from one manufacturer, die cut, and interlocking.
b. Type of System: Direct Hung.
c. Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1 direct hung.
d. Hanger Wires: ASTM A641 galvanized carbon steel, soft temper, pre-stretched not less than 12 gauge.
e. Carrying Channels: 1-1/2" steel channels, hot-rolled or cold-rolled, not less than 0.475 lbs per linear foot, standard finish.
f. Members: Provide manufacturer's standard exposed runners, cross runners and accessories of type and profiles indicated, with exposed cross runners coped to lay flush with main runners.
g. Hold Down Clips: Manufacturer's standard; provide in areas where indicated on drawings.

3. Edge Moldings: Hemmed edge wall angles, cold-rolled electrogalvanized steel, factory applied finish to match grid system.

B. Perimeter Trim: Provide extruded aluminum trim at ceiling areas indicated. Depth as indicated. Provide curved shapes as indicated. Finish to match ceiling grid as selected by Architect. ARMSTRONG Axiom #AX12STR (Nominal 12" deep x ¾" wide); DONN (USG INTERIORS) Compasso; ROCKFON Infinity.

2.02 ACOUSTICAL UNITS

A. Acceptable Manufacturers: The following models listed are by ARMSTRONG. Equal products by CERTAINTEED or U.S. GYPSUM are acceptable.

B. Type ACT-1: Optima Open Plan #3251, 24" x 24" x 1", square tegular edge, NRC .95, AC 190, light reflectance LR-.90, with white, washable finish; 9/16" grid.

C. Type ACT-2: Optima Tegular Fine Fissured #3161, 24" x 72" x ¾", square tegular edge, NRC .90, CAC 26, light reflectance LR-.90, with white, washable finish; 15/16" grid.

D. Type ACT-3: Ceramaguard Fine Fissured #607, 24" x 24" x 5/8", square lay-in, NRC .55, CAC 38, light reflectance LR-.82, with white, washable finish; 15/16" grid.

E. Type ACT-4: Optima Tegular #3256, 48" x 48" x 1", square tegular edge, NRC .95, AC 190, light reflectance LR-.90, with white, washable finish; 9/16" grid.

F. Type W-1: WoodWorks Linear #6460W1 veneered planks, 6" unperforated; NRC .40. Pattern and color to be Natural Variations Walnut.

G. Type W-2: Metal Works, Linear Exterior #7160, 6" unperforated. Pattern and color to be Effects Walnut

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates, structure and installation conditions. Do not proceed with acoustical ceiling systems work until unsatisfactory conditions have been corrected.
B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling.
   1. Avoid use of less than half widths units at borders.

B. Coordinate with ceiling layout on drawings.

C. Notify Architect of discrepancies between ceiling layout on drawings and ceiling layout proposed. Do not proceed until approved by Architect.

3.03 INSTALLATION

A. Suspension System: Comply with ASTM C636 requirements and be water or laser leveled, maximum deflection of 1/360 of span and maximum surface leveling tolerance 1/8" in 12'-0".

B. Rough Suspension
   1. Hangers: Ceiling suspension systems shall not be supported from ductwork, electrical conduit, heating or plumbing lines or any other utility lines. Each utility and the ceiling suspension system shall be a separate installation and each shall be independently supported from the building structure. Where interferences occur, employ trapeze hangers or supports to avoid interferences with appurtenances requiring servicing. Support all four corners of suspension systems at fluorescent light fixtures.
   2. Wall Molding
      a. Provide edge trim molding at perimeter of acoustical ceiling installation and intermediate vertical surfaces. Use maximum lengths. Miter trim corners to provide tight, accurate joint. Connect moldings securely to substrate surfaces.
      b. Connect moldings to substrate at intervals not over 16" on center and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0".
   3. Hold-Down Clips: Provide at rated ceiling assemblies.
   4. Retention Clips: Provide on all tiles in areas listed on drawings.

C. Acoustical Units
   1. Install acoustical lay-in panels level, in uniform plane, with joints accurately cut to ensure a snug and square fit. All panel faces and edges to be free from damage or soiling.
      a. Fit border units accurately at borders and penetrations.
      b. Recreate tegular and decorative edges at wall cuts and other cuts.
      c. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and perimeter moldings.
      d. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
e. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.

2. Coordinate suspension systems grid layout with electrical lighting fixture lay-out and installation.

3.04 CLEANING

A. After installation, clean soiled or discolored surfaces of acoustical units and exposed suspension members. Comply with manufacturer's recommendations for cleaning and touch-up of minor finish damage.

B. Adjust all sags and twists which develop in ceiling systems. Remove and replace units which are improperly installed and damaged units which cannot be successfully cleaned and repaired to eliminate evidence of damage.

END OF SECTION
SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide resilient flooring as shown and specified. Work includes:
   1. Vinyl composition tile flooring.
   2. Rubber tile flooring.
   3. Sheet vinyl flooring.
   4. Base.
   5. Stair treads and landing tiles.
   6. Luxury vinyl tile
   7. Adhesives and accessories to complete the work.

1.02 QUALITY ASSURANCE

A. Provide each type of resilient flooring and base material produced by one manufacturer, including recommended adhesives and leveling compounds.

B. Provide each type resilient flooring and base material from same production run. Colors shall be uniform throughout.

C. 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.

D. Reference Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard.
   2. FS: Federal Specifications as established by the U.S. Government, General Services Administration.
   4. ADA: Americans with Disabilities Act Accessibility Guidelines.

E. Slip Retardant Performance: Unless a greater performance is specified under a specific product, all floor materials must have a minimum static coefficient of friction of 0.6.

1.03 SUBMITTALS

A. Submit manufacturer’s product data and installation instructions for each type of resilient flooring, base and accessory required.

B. Samples
   1. Tiles: Submit full sized samples of each type, color and pattern required to illustrate the full range of color variations.
   2. Base: Provide 6” lengths of each type and color.
3. Sheet Flooring: Manufacturer's standard sample size, but not less than 6" x 9" of each type, color and pattern required to illustrate the full range of color variations.
   a. Heat Welding Bead: Manufacturer's standard sample size, but not less than 9" long of each color.
4. Stair Treads: 6" lengths of each type and color.

C. Shop Drawings: Show locations of each type and color of tile and tile pattern.

D. Submit MFR's certification that resilient flooring furnished complies with required fire test performance and has been tested and meets indicated requirements.

E. Submit manufacturer's written instructions for recommended maintenance practices for each type of resilient flooring, base and accessory material required.

F. Extra Stock: Furnish extra materials in the following quantities:
   1. Tiles and Base: Furnish 2% of the total quantity (but not less than 2 full sealed cartons) of each type, pattern and color. Provide 5% of colors with less than 5000 square feet. Properly package and identify each material.
   2. Sheet Goods: Furnish 10 linear feet in roll form for each 500 linear feet or fraction thereof, of each product, color and pattern. Package each roll with protective covering and identification labels describing contents.
   3. Stair Accessories: Furnish 5% of the total quantity of each type, pattern and color. Properly package and identify each material.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened labeled containers.

B. Store, protect, and handle resilient flooring materials in accordance with manufacturer's recommendations to prevent damage, soiling and deterioration.

C. Store materials in areas to receive resilient flooring for a minimum of 48 hours before installation.

1.06 PROJECT CONDITIONS

A. Maintain uniform room temperature range not less than 70 degrees F., in areas to receive resilient flooring for minimum 48 hours before installation and 48 hours after installation.

B. Provide adequate lighting and ventilation during installation and clean-up.

C. Protect adjoining surfaces from damage and soiling.

PART 2 PRODUCTS

2.01 RESILIENT FLOORING MATERIALS

A. Vinyl Composition Tile: ASTM F1066, Class 1 or 2 as applicable, 12" x 12" x 1/8",
manufactured without asbestos.

1. Colors, Patterns and Manufacturers
   a. Basis of Design: Colors and types indicated on the drawings.

2. Products from equivalent manufacturers will be considered if the materials meet the requirements of the Basis of Design and the product color/size is an acceptable match approved by the Architect prior to bid. Any product / MFR approved prior to bid will be included in an addendum. Any pattern or color match deemed unacceptable will warrant rejection of product / MFR. No substitutions will be considered after bid opening.

B. Rubber Tile: Smooth rubber tile flooring complying with ASTM F1344.
   1. Basis of Design as indicated on the drawings.
   2. Products from equivalent manufacturers will be considered if the materials meet the requirements of the Basis of Design and the product color/size is an acceptable match approved by the Architect prior to bid. Any product / MFR approved prior to bid will be included in an addendum. Any pattern or color match deemed unacceptable will warrant rejection of product / MFR. No substitutions will be considered after bid opening.

C. Sheet Vinyl
   1. Type: Commercial quality flooring composed of solid vinyl wear layer and a backing of filled fibrous composition.
   2. Style and Manufacturer as indicated on the drawings.
   3. Products from equivalent manufacturers will be considered if the materials meet the requirements of the Basis of Design and the product color/size is an acceptable match approved by the Architect prior to bid. Any product / MFR approved prior to bid will be included in an addendum. Any pattern or color match deemed unacceptable will warrant rejection of product / MFR. No substitutions will be considered after bid opening.
   4. Solid vinyl wear layer designs/pattern and color shall extend uniformly throughout the wear thickness.
   5. Seams: heat welded.
   6. Smoke Development: 450 or less (ASTM E662).
   7. Critical Radiant Flux: 0.45 watts/cm² or more (ASTM E648).
   9. Thickness: 7mm (2mm product over 5mm rubber backing).

D. Luxury Vinyl Tile Flooring
   1. Type: Meets Reference Specification ASTM F1700, Type B, Class III
   2. Thickness: as indicated on drawings.
   3. Sizes: As indicated.
   4. Properties:
      a. Static Load: ASTM F970 Meets Requirements
      b. Indentation – Residual (75 Lbs): Meets Requirements
      c. Coefficient Of Friction: ASTM D2047 0.65 (Dry)
      d. Fire Rating: ASTM E648 Class I
      e. Smoke Density ASTM E662: Meets Requirements
   5. Colors, Patterns and Manufacturers as indicated on the drawings.

2.02 BASE
A. Rubber Base: Complying with ASTM F1861, Type TP, Group 1, 4” high, 1/8” gage. Provide long length rolls and job formed corners. Standard top set cove (Style B) at resilient and other hard surface flooring and straight toeless (Style A) at all carpeted floors. Colors and Manufacturers as indicated on the drawings. Products from equivalent manufacturers will be considered if the materials meet the requirements of the Basis of Design and the product color/size is an acceptable match approved by the Architect prior to bid. Any product / MFR approved prior to bid will be included in an addendum. Any pattern or color match deemed unacceptable will warrant rejection of product / MFR. No substitutions will be considered after bid opening.

B. Rubber Base, Millwork Type: Thermoplastic rubber formulation designed specifically to meet the performance and dimensional tolerance requirements of ASTM F1861, Type TP, Group 1 (solid) Standard Specification for Resilient Wall Base. Base shall contain a minimum of 90 percent recycled material.
1. Hardness - ASTMD 2240: 85 Shore A
2. Corners: Field miter cut.
3. Colors and Manufacturers: Colors and types indicated on the drawings.
4. Products from equivalent manufacturers will be considered if the materials meet the requirements of the Basis of Design and the product color/size is an acceptable match approved by the Architect prior to bid. Any product / MFR approved prior to bid will be included in an addendum. Any pattern or color match deemed unacceptable will warrant rejection of product / MFR. No substitutions will be considered after bid opening.

2.03 STAIR ACCESSORY MATERIALS

A. Stair Treads and Risers: Homogeneous, rubber treads with integrated risers complying with ASTM F2169, Standard Specification for Resilient Stair Treads; Type TS (vulcanized thermoset rubber).
1. Manufacturer and Model as indicated on drawings.
2. Landing Tiles: Match floor tread, material, color and pattern.

B. Rubber Floor Tiles: ASTM F1344: Standard Specification for Rubber Floor Tile (sections 7.1-7.6, 8.4-8.6). Manufactured in a single homogeneous layer; as indicated on drawings.

C. Stair Nosings
1. Material: Homogeneous composition of polyvinyl chloride (PVC), high quality additives, and colorants to meet the performance requirements of ASTM F2169 Standard Specification for Resilient Stair Treads, Type TV, Class 1 and 2, Group 1 and 2.
2. Model and Manufacturer as indicated on drawings.

D. Products from equivalent manufacturers will be considered if the materials meet the requirements of the Basis of Design and the product color/size is an acceptable match approved by the Architect prior to bid. Any product / MFR approved prior to bid will be included in an addendum. Any pattern or color match deemed unacceptable will warrant rejection of product / MFR. No substitutions will be considered after bid opening.
2.04 ACCESSORIES

B. Leveling Compound: Non-staining latex modified, Portland cement based type, compatible with flooring, as provided or recommended by the flooring MFR.

C. Adhesives: Waterproof, stabilized type as recommended by the resilient flooring and base manufacturer to suit material and substrate conditions.
   1. All VOC limits are defined in grams per liter, less water and less exempt compounds (determined by U.S. EPA Reference Test Method 24). The VOC limits are as follows:
      a. Water-based contact cement: 250 g/L
      b. Water-based construction adhesive: 100 g/L

D. Resilient Edge/Transition Strips: Provide rubber or stainless steel transition strips by the following manufacturers.
      a. ROPPE, #56
      b. JOHNSONITE/TARKETT, CTA-XX-H
      c. VPI FLOORING, ACC12
   2. Resilient-to-Concrete: Stainless steel
      a. SCHLUTER Reno U; stainless steel
      b. GREAT LAKES TILE PRODUCTS; Reducer.
      c. BLANKE CORP.; Reducer Trim.
   3. Where transition types are required for conditions other than those listed above, provide rubber type from the manufacturers listed to create a smooth transition or termination.

E. Cleaning and Polishing Materials: Polish and neutral cleaner as recommended by the floor material manufacturer.

F. Existing Adhesive Remover: Non-toxic type; similar to De-Sol-It by ORANGE-SOL or equal by NAPIER ENVIRONMENTAL TECHNOLOGIES, INC., or CITRUS KING.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine substrates and installation condition. Do not proceed with resilient flooring work until unsatisfactory conditions have been corrected.

B. Subfloor surfaces shall be smooth, level, at the required finish elevation, and within the tolerances specified in Section 03 30 00.

C. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Prepare substrates according to floor manufacturer's written instructions to ensure adhesion of resilient products.
B. Concrete Substrates: 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 incompatible with
      adhesives and that contain soap, wax, oil, or silicone, using mechanical
      methods recommended by floor tile manufacturer. Do not use solvents.
   3. Perform tests recommended by flooring manufacturer. Proceed with
      installation only after satisfying MFR’s recommendations for test results.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and
   patching compound; remove bumps and ridges to produce a uniform and smooth
   substrate.

D. Do not install flooring until it is the same temperature as the space where it is to
   be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be
   covered by flooring.

3.03 INSTALLATION

A. Install resilient flooring and accessories with adhesive in strict compliance with the
   manufacturer’s recommendations. Butt tightly to vertical surfaces, thresholds,
   nosings and edgings. Scribe around obstructions and to produce neat joints, laid
   tight, even and straight. Extend flooring into toe spaces, door reveals and into
   closets and similar openings.

B. Tile Flooring
   1. Lay tile flooring with joints tight, in true alignment and parallel to walls of
      rooms and corridors.
   2. Lay tile symmetrically about centerlines of space, without pattern or
      borders. Adjust layout to avoid use of cut widths less than one-half tile at
      room perimeter.
   3. Match tile for color by using manufactured and packaged sequence.
   4. Broken, cracked, or deformed tiles are not acceptable.
   5. Immediately after installation, thoroughly roll tile with a 150 lb. sectional
      roller until a firm, uniform bond has been obtained.

C. Base
   1. Install at walls, column, casework and other permanent fixtures as
      scheduled. Install in as long of lengths as practicable. Tightly bond base to
      backing throughout length of each piece, with continuous contact at
      horizontal and vertical surfaces.
   2. Provide terminal base ends beveled and toes rounded.
   3. On masonry surfaces or other irregular surface, fill voids along top edge of
      resilient wall base with MFR’s recommended adhesive filler material

D. Sheet Flooring
   1. Install sheet flooring in accordance with latest edition of manufacturers' 
      instructions.
   2. Spread only enough adhesive to permit installation of sheet flooring before
initial set.

3. Install flooring wall to wall before installation of floor-set cabinets, casework and similar moveable items.

4. Extend flooring into door recesses, closets, and similar openings as indicated on drawings.

5. Where adjacent floor finish is dissimilar, terminate sheet flooring at centerline of doors.

6. Scribe, cut, and fit to walls, columns, cabinets, pipes, built-in-furniture and cabinets to produce tight joints. Lay flooring to provide a minimum number of seams. Avoid cross seams, filler pieces, and strips.

7. Sheet flooring shall be installed over covers for telephone conduits, electrical conduits and other similar items which occur within the finished floor areas.

8. Sheet flooring MUST be cut sharp and clean around these covers so that the covers can be removed when required.

9. Sheet flooring must be applied to covers in a solid application of adhesive.

E. Edge Strips: Place tightly butted to flooring and secure with adhesive. Install at edges of flooring which would otherwise be exposed.

F. Stair Treads and Accessories
1. Tightly fit tread nose against face of stair riser or nosing. Fill open spaces at the nosing between the stair and the rubber tread with manufacturer's approved caulk or similar material.
2. Roll surfaces until a firm bond is obtained.

3.04 CLEANING AND PROTECTION

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

B. After flooring has set, clean thoroughly. Remove excess adhesive or other surface blemishes from flooring, using neutral type cleaners as recommended by the flooring manufacturer.

C. Perform initial maintenance according to latest edition of manufacturer's maintenance manual and the following:

1. Vinyl composition Tile: Clean, apply polish, and buff with type of polish, number of coats and buffing procedures in accordance with manufacturer's instructions.

D. Protect installed flooring from damage and staining with heavy duty non-staining Kraft paper or other covering at all traffic lanes. Protect completed work from traffic and damage until final acceptance.

END OF SECTION
SECTION 09 66 18
PRECAST TERRAZZO

PART 1  GENERAL

1.01  WORK INCLUDED
A. Provide precast terrazzo stair treads and landings.

1.02  RELATED SECTIONS
A. Steel Stair Stringers and Support Angles: Division 5 structural sections.
B. Handrail and Railings: Section 05 73 00.

1.03  SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:
   1. Abrasive strips.
   2. Stair treads and landings.
   3. Precast terrazzo jointing and edge configurations.
   4. Coordinate Shop Drawings with steel stair support Shop Drawings submitted under Division 5 structural sections.
C. Samples: Submit three, 6" x 6" samples of available precast colors for selection by Architect.

1.04  QUALITY ASSURANCE
A. Manufacturer: Minimum 5 years experience in manufacturing precast terrazzo base; member of National Terrazzo Manufacturing Association (NTMA).
B. Installer: Minimum 3 years experience installing precast terrazzo components and a contractor member of National Terrazzo Manufacturing Association (NTMA).

1.05  DELIVERY, STORAGE AND HANDLING
A. Deliver and handle precast in a manner to prevent damage. Conform to requirements of manufacturer.
B. Store precast inside in clean, dry location. Do not deliver treads to site until stair framing is installed, ready to receive treads and risers.
PART 2 PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150, Type 1. Provide cement color as required to produce finished precast terrazzo color as selected and approved by Architect.

B. Sand: ASTM C33, fine aggregates.

C. Marble Chips: Blend of range of sizes and colors conforming to NTMA Standards.
   1. Colors: As selected by Architect.

D. Reinforcement and Hardware
   1. To conform with NTMA and Manufacturer's design.
   2. Reinforce precast with deformed rods or wire mesh or both as recommended by precast terrazzo manufacturer.

E. Cleaner: Liquid neutral chemical cleaner, with pH factor between 7 and 8, of formulation recommended by sealer manufacture for type of precast terrazzo used and complying with NTMA requirements.

F. Sealer: Colorless, slip and stain-resistant penetrating sealer with pH factor between 7 and 8, that does not affect color or physical properties of precast terrazzo surface. Flash point (ASTM D56): 80 degrees F, Minimum.

G. Metal Divider and Stop Strips
   2. Exposed Portion: Zinc.
   3. Width: 1/8".

H. Thin-Set Materials: See Section 09 30 00, Latex-Portland Cement Setting Mortar - Thin Set; ANSI A118.4.

I. Joint Sealant: Section 07 92 00; polyurethane sealant.

2.02 MIX

A. Manufacturer's standard proportions. Provide reinforcing as required to meet loading requirements.

2.03 FABRICATION

A. Size and Profile: As indicated on drawings.
   1. Sizing Tolerances: All units to have a 1/16" tolerance in dimension.

B. Provide weld plates or threaded inserts cast into treads. Coordinate placement with location and design of stair support steel.

C. Performance Requirements
   1. Compressive Strength 4000 p.s.i.
   2. Flexural Strength 600 p.s.i.
D. Slip Resistance: Provide three (3) silicon carbide and epoxy abrasive strips integral with tread, 1/2" wide x 4" less than width of treads. Color as selected by Architect.

E. Riser: Anchor to treads with epoxy adhesive or similar type adhesive as recommended by precast manufacturer.

F. Finish - Precast Surfaces and Edges
   1. All exposed edges to be ground and polished with a minimum of 1/16" bevel.
   2. All finished surfaces to be ground and polished, free of holes and to have overall uniformity in matrix and aggregate.
   3. All precast terrazzo finished surfaces to be sealed with a sealer approved by manufacturer.

2.04 MANUFACTURER
   A. Subject to requirements, precast terrazzo provided by WAUSAU TILE INC., PRECAST TERRAZZO ENTERPRISES or ROMOCO is acceptable.

PART 3 EXECUTION

3.01 INSPECTION
   A. Examine areas to receive precast terrazzo for:
      1. Defects in substrate that affect proper execution of terrazzo work.
      2. Deviations beyond terrazzo fabricators allowable tolerances for substrate work.
   B. Do not start installation until defects have been corrected.

3.02 INSTALLATION
   A. General: Comply with manufacturer’s installation recommendations and instructions.
   B. Stair Components – Thin Set
      1. Substrate of concrete or steel must be within tolerance of 1/8” in all dimensions.
      2. Steel or concrete surface to receive precast is to be primed with concrete bonding agent.
      3. Latex modified thin set mortar is used in a full bed method over concrete or steel substrate.
      5. Set treads units level and plumb to meet finished nosing layout marks.
   C. Stair Components – Mechanical Fasteners: Anchor to steel stair supports with threaded fasteners or weld to weld plates as applicable.
D. Base
   1. Set accurately to wall lines in setting bed. See Section 09 30 00 for setting materials.
   2. Fill joints between precast base sections and clean off all excess grout.

3.03 SEALING OF PRECAST COMPONENT JOINTS

A. Clean all joints thoroughly, removing all debris.

B. Wipe all joints with joint sealant manufacturer's recommended cleaner prior to application.

C. Use urethane sealant, color matched to precast per Architect’s selection.

D. Clean up after joint sealant application per sealant manufacturer's recommendation.

3.04 FINAL CLEANING AND SURFACE SEALING OF PRECAST COMPONENTS

A. Clean treads with pH balanced soap.

B. Check all surfaces and joint sealants, making necessary repairs.

C. Finish: Seal all precast terrazzo finished surfaces with a sealer approved by manufacturer.

3.05 PROTECTION

A. Protect terrazzo stair components from damage and wear during construction operations. Where temporary cover is required for this purpose, comply with manufacturer's recommendations for protective materials and the method of their application. Remove temporary covering just prior to cleaning for final inspection.
PART 1  GENERAL

1.01  WORK INCLUDED

A. Carpet, installation and all glue, edge guards and accessories necessary for the installation.

B. Work includes preparation of subsurfaces, cleaning, and protection of finished carpet.

1.02  QUALITY ASSURANCE

A. Installer: Firm with not less than 5 years of carpeting experience similar to work of this Section.
   1. Work not in compliance with the manufacturer's recommended standards and procedures shall be promptly corrected at the Contractor's expense.

B. Manufacturer: Firm (carpet mill) with not less than 5 years of production experience with similar types specified in this section; and whose published product data clearly indicates compliance of product with requirements of this Section.

C. General Standard: "Carpet Specifiers Handbook" by The Carpet and Rug Institute; for definitions of terminology not otherwise defined herein, and for general recommendations and information.

D. Fire Performance Characteristics: Provide carpet that is identical to that tested for the following fire performance requirements, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
   2. Critical Radiant Flux - ASTM E684: Not less than 0.45 watts per square centimeter.
   3. Smoke Density - ASTM E84: 450 or less.

1.03  REFERENCE STANDARDS

A. Carpet: Comply with the local building authority and IBC for flame spread and smoke contribution requirements and tested in accordance with ASTM E84.

1.04  SUBMITTALS

A. Samples
   1. Tiles: Submit full size tiles (samples) of each color and pattern selected.
   2. Accessories: 12" long sample of each type exposed edge stripping and accessory item.
B. Product Data: Provide for all items. Include, product data covering carpet construction, physical characteristics, durability, resistance to fading, and flame resistance characteristics.

C. Shop Drawings
   1. Tiles: Submit drawings showing layout. Indicate pile or pattern direction and locations and types of edge strips.

D. Certifications: Contractor shall provide the following:
   1. Manufacturer: Before carpet materials are ordered, submit 4 copies of test results from a recognized laboratory and 4 copies of a notarized statement, signed by an officer of the manufacturer, confirming that the carpet products proposed for use are those which have passed the required tests indicated under "Performance Standards" for the carpet and comply with the requirements of State and local fire authorities.
   2. Installer: Submit 4 copies attesting that materials actually installed were the same as those certified as meeting specified requirements.

E. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

F. Documentation of manufacturer’s take-back program for carpet. Include:
   1. Appropriate contact information.
   2. Overview of procedures.
      a. Indicate manufacturer’s commitment to reclaim materials for recycling and/or reuse.
   3. Limitations and conditions, if any, applicable to the project.

1.05 PRODUCT DELIVERY AND STORAGE

A. Deliver carpeting materials in original mill protective wrapping, and store inside protected from weather, moisture and soiling.

B. Investigate and resolve access restrictions, including elevator capacity, entrances and accessibility, to assure proper delivery and installation of materials.

C. Protect materials against damage of any kind. Damaged products, including soiled fabrics, will be rejected.

1.06 MAINTENANCE

A. Manufacturers: Provide three (3) copies of maintenance schedules, describing programmed maintenance procedures, including general maintenance, preventative maintenance, spot removal, traffic lane maintenance and overall cleaning.

B. Operational Service: Provide manufacturer’s take-back program service for carpet installed in project. Service shall reclaim materials for recycling and/or reuse. Service shall not landfill or burn reclaimed materials.

1.07 WARRANTY
A. Special Project Warranty: Submit a written warranty, executed by the Contractor, Installer and the Manufacturer, agreeing to repair or replace carpeting which fails in materials or workmanship within the specified warranty period. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

1. Warranty period is two years after date of substantial completion.

B. Carpet manufacturer’s material wear warranty: Ten years.

1.08 EXTRA MATERIALS

A. Tiles: Provide quantity of full tiles for each type of material equal to 5 percent of amount installed.

B. Deliver extra carpet materials to Owner’s designated storage space, properly packaged with protective covering and identified with labels describing contents.

PART 2 PRODUCTS

2.01 CARPET

A. Manufacturers, Styles and Colors as indicated on the drawings.

2.02 WALK-OFF CARPET TILE MAT

A. Manufacturers, Styles and Colors as indicated on the drawings.

2.03 ACCESSORIES

A. Carpet Edge Guard: Non-metallic type. Extruded or molded vinyl or rubber of size and profile indicated. Color as selected by Architect.

B. Adhesive: Non-toxic, waterproof, white latex base cement formulated for the installation of the manufactured materials. Type as recommended by carpet MFR.

C. Seaming Cement: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and buttering cut edges at backing to form secure seams and prevent pile loss at seams.

D. Miscellaneous Materials: As recommended by manufacturer of carpet and other carpeting accessory products; selected by installer to meet project circumstances and requirements.

E. Leveling Materials and Crack Fill: Non-staining latex cementitious type, compatible with carpet adhesive, as recommended by the flooring manufacturer.

F. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.
PART 3 EXECUTION

3.01 PREPARATION

A. Installer must examine substrates for moisture content and other conditions under which carpeting is to be installed, and notify Contractor in writing of conditions detrimental to proper completion of the work.
   1. Do not proceed until unsatisfactory conditions have been corrected.

B. Comply with CRI 2011 and with carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.

C. Concrete Substrates
   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 flooring manufacturer. Do not use solvents.
   3. Perform tests recommended by flooring manufacturer. Proceed with installation only after satisfying manufacturer's recommendations for test results.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Broom or vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

F. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.

3.02 INSTALLATION

A. Install in accordance with recommendations of the manufacturers of materials and Carpet and Rug Institute's methods specified in CRI 2011. Carpet manufacturer's current installation instructions shall be kept at job site and be followed explicitly.
   1. Comply with manufacturer's recommendations for installation of carpet; maintain uniformity of carpet direction and lay of pile, unless otherwise indicated.

B. Use modular carpet from the same dye lot in each room.

C. Lay carpet in accordance with the final shop drawings. No reversing of carpet direction shall be permitted.

D. Install modular carpet by trimming, cutting and prefitting units. Then apply adhesive in strict accordance with manufacturer's instructions, and place the carpet
modules with the pile inclination in the direction as recommended by the manufacturer, or as otherwise indicated on the final layout drawings.

1. Application shall be full spread. Sprayed on adhesive is not permitted.
2. Install using a notched trowel.]

E. Trim protruding ends of open loops so slightly below surrounding pile height.

F. Use edge molding where carpet terminates under doors and along edge of carpet where it abuts another floor material. Fasten edge moldings securely to the floor with glue manufactured for this specific purpose.

G. Roll entire area lightly to eliminate air pockets and ensure uniform bond.

3.03 CLEANING AND PROTECTION

A. Protect installed carpet to comply with CRI 2011 and carpet manufacturer recommendations.

B. Remove debris, sorting pieces to be saved from scraps to be disposed. Keep premises free and clear of waste material in connection with carpet work.

C. Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed.

D. Advise Contractor of protection methods and materials needed to ensure that carpeting will be without deterioration or damage at time of substantial completion.

E. Provide adequate protection for adjacent equipment, furnishings and materials.

F. When entering, passing through, or working in any space in the building that contains finished materials, maintain proper protection for floors, walls, ceilings, fixtures, etc. Repair or replace damaged adjoining work as directed by the Architect at no additional cost to the Owner.

END OF SECTION
SECTION 09 72 16
VINYL COATED FABRIC WALL COVERINGS

PART 1  GENERAL

1.01 DESCRIPTION

A. Provide wall coverings of the types specified herein in locations indicated.

B. Provide accessory materials required for proper installation of wall coverings, such as primers, sealers and adhesives.

1.02 QUALITY ASSURANCE

A. Test panels at job site.

1. Install test panels for full-width and corner applications of wall covering material in areas designated by Architect. Include pattern matching where applicable.

2. Test panels will be actual location for the wall covering involved and if acceptable to Architect, they may remain in place. Replace test panels that are not acceptable to Architect until satisfactory installation is achieved.

3. Accepted test areas will be used as standard of acceptable workmanship for similar work.

B. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: As follows, per ASTM E 84:
2. Flame-Spread Index: 25 or less.
3. Smoke-Developed Index: 50 or less.

1.03 SUBMITTALS

A. Samples

1. Furnish 2 samples of each type and color/pattern selection of wall covering materials specified. Each sample shall be full width by 36” long.

2. Include full description of samples submitted, including fire hazard classification and other properties.

B. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement, seams and termination points.

C. Maintenance Instructions: For type of approved wall covering to be used, furnish 2 copies of manufacturer’s printed instructions for maintenance and cleaning. Deliver to the Owner as directed by Architect.
1.04 DELIVERY, STORAGE AND HANDLING

A. Protect from damage at all times, with particular care in protecting against edge damage, crushing and staining.

B. Deliver materials in original package as container of manufacturer, clearly labeled to identify manufacturer, brand name, quality or grade, and fire hazard classification.

C. Store materials in original undamaged containers or packages, in manner recommended by manufacturer. Maintain temperature in storage area above 40 degrees Fahrenheit for at least 24 hours before installation.

1.05 JOB CONDITIONS

A. Maintain a constant minimum temperature of 65 degrees Fahrenheit at areas of installation for at least 48 hours before, during and after the application of materials.

PART 2 PRODUCTS

2.01 WALL COVERING MATERIALS

A. Manufacturers, Pattern and Colors
   1. Basis of Design: As indicated on the drawings.
   2. Other Acceptable Manufacturers: Wall covering manufactured by other manufacturers will be considered if materials meet the requirements of the Basis of Design and the color is an acceptable match as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. An unacceptable pattern or color match is reason for disapproval of product and manufacturer. No substitutions will be considered after bid opening.

B. Types: As indicated on Drawings.

C. Conformance: Exceeds Fed. Spec. CCC-W-408A, Type II.

D. U.L. Rating (Maximums).
   2. Fuel Contributed: 5.
   3. Smoke Developed: 5.]

2.02 ACCESSORY MATERIALS

A. Adhesives, Primers and Sealers: As required for installation of wall covering materials. For each type wall covering, furnish wall covering manufacturer's recommended materials manufactured expressly for use with the selected wall covering and compatible with wall surface involved. Provide materials that are mildew-resistant and non-staining to the wall covering.

   1. Adhesive shall have VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
PART 3 EXECUTION

3.01 INSPECTION

A. Examine the surfaces and conditions under which wall covering is to be installed. Report any unsatisfactory conditions, and do not proceed until such unsatisfactory conditions, if any, are corrected. Commencement of work signifies acceptance.

B. Verify that normal temperature and humidity conditions during installation approximate the interior conditions that will exist when building is occupied.

3.02 PREPARATION

A. Remove hardware, wall plates, accessories and similar items as applicable to allow wall covering to be installed. Upon completion replace all items.

B. Prime and size seal, substrates in accordance with the wall covering manufacturer's recommendations for the type of substrate material to be covered. Sand rough spots if necessary and clean as required.

3.03 INSTALLATION

A. Apply all materials by skilled workmen in strict accordance with manufacturer's instructions for wall covering used.

B. Place wall covering panels consecutively in the order they are cut from rolls, including filling of spaces above or below openings as required.

C. Match adjacent panel strips as required, consistent with pattern selected. Install seams vertically and plumb, and at least 6" away from corners. Place wall covering continuously over corners, and assure seams at edges of panels are vertical and plumb.

D. Trim selvages as required to ensure color uniformity and pattern match at seams.

E. Remove excess adhesive along finished seams as recommended by manufacturer.

F. Have finished installation smooth, clean and free from wrinkles, gaps or overlaps. No horizontal seams permitted.

G. Do not soil or deface wall covering. If cleaning is required, use only materials and methods recommended by manufacturer of wall covering used.

END OF SECTION
SECTION 09 77 26

PRESENTATION (DRY ERASE) WALLCOVERING

PART 1  GENERAL

1.01  SUMMARY
   A. Section Includes  Dry erase wallcovering and Accessories.

1.02  RELATED SECTIONS
   A. Wood Trim: Section 06 20 00.
   B. Painting: Preparation and priming of substrate surfaces. Section 09 91 00.

1.03  REFERENCES
   A. American Society for Testing and Materials (ASTM):
      2.  D751: Methods of Testing Coated Fabrics.
   B. Underwriters Laboratory, Inc.: UL 723 - Test for Surface Burning Characteristics of Building Materials
   C. Gypsum Association: GA-14-M-97 - Recommended Levels of Gypsum Board

1.04  SUBMITTALS
   A. Submit manufacturer’s product data and installation instructions for dry erase wallcovering, adhesive and accessories.
   B. Submit manufacturer's written installation instructions.
   C. Submit manufacturer's written instructions for recommended maintenance of dry erase wallcovering required. Include precautions against cleaning materials and methods that may be detrimental to finishes and performance.
   D. Samples: Submit 7-inch by 9-inch sample of dry erase material.

1.05  QUALITY ASSURANCE
   A. Applicator: Skilled commercial wallcovering applicators with no less than three years of documented experience installing dry erase wallcovering of the types and extent required.
   B. Fire Hazard Classification: Provide materials that comply with NFPA Class A fire rating when tested in accordance with ASTM E84 using GRC Board as substrate. Identify components with markings from testing and inspection organization.
C. Field Samples: Prepare field samples for Architect’s review and establish requirements for seaming and finish trim.
   1. Install sample panel of each type presentation wallcovering specified in area designated by Architect.
   2. Maintain corrected and approved samples to serve as a standard of performance for the project.
   3. Approved field sample may become part of the completed project.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver presentation wallcoverings to the project site in unbroken and undamaged original factory wrappings and clearly labeled with the manufacturer's identification label, quality or grade, and lot number.

B. Store materials in a clean, dry storage area with temperature maintained above 55 degrees F with normal humidity.

C. Store material in a flat position to prevent damage to roll ends. Do not cross stack material. Support material off the floor in a manner to prevent sagging and warping.

1.07 PROJECT CONDITIONS

A. Do not apply presentation wallcoverings when surface and ambient temperatures are outside the temperature ranges required by the wallcovering manufacturer.

B. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 55 degrees F unless required otherwise by manufacturer's instructions.

C. Apply adhesive when substrate surface temperature and ambient temperature is above 55 degrees F and relative humidity is below 40 percent.

D. Maintain constant recommended temperature and humidity for at least 72 hours prior to and throughout the installation period, and for 72 hours after wallcovering installation completion.

E. Provide not less than an 80 foot-candles per square foot lighting level measured mid-height at substrate surfaces.

1.08 WARRANTY

A. Submit manufacturer's limited five-year written warranty against manufacturing defects.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Drawings and specifications are based on Walltalkers Wallcoverings manufactured by RJF INTERNATIONAL CORPORATION.
B. Other Manufacturers: Products from other manufacturers will be considered if materials meet the requirements specified as approved by the Architect prior to bid opening. These additionally approved manufacturers will be included by Addendum. No substitutions will be considered after bid opening.

2.02 MATERIALS

A. Composition: Provide polyester scrim backing, pigmented vinyl capped with Teflon dry erase film.

B. Model: Walltalkers just•rite: Moderate gloss vinyl surface for dry erase markers. JR48; 21 ounce per square yard, woven backing.

C. Size: 48-inch width by continuous length as indicated on the drawings.

2.03 ACCESSORIES

A. Adhesives: Heavy-duty clear premixed vinyl adhesive or clay based adhesive.

B. Substrate Primer/Sealer: White pigmented acrylic base primer/sealer specifically formulated for use with vinyl wallcoverings.

C. Wood Trim: See Section 06 20 00. Oak wood trim; stain color as selected by Architect.

D. Presentation Starter Kits: Provide one Walltalkers starter kit containing eight dry erase markers, two erasers, 10 cleaning towels, and one 8 ounce bottle liquid surface cleaning solution for each room installed with dry erase wallcovering.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and installation conditions to ensure surface conditions meet or exceed a Level 4 finish, GA-214-M-97, Recommended Levels of Gypsum Board Finish.

B. Test substrates with a suitable moisture meter and verify that moisture content does not exceed 4 percent.

C. Verify substrate surfaces are clean, dry, smooth, structurally sound and free from surface defects and imperfections that would show through the finished surface.

D. Evaluate all painted surfaces for the possibility of pigment bleed-through.

E. Notify the contractor and architect in writing of any conditions detrimental to the proper and timely completion of the installation.

F. Beginning of installation means acceptance of surface conditions.

3.02 INSTALLATION
A. Acclimate wallcovering in the area of installation a minimum of 24 hours before installation.

B. Examine all materials for color, quantity and quality as specified for the correct location prior to cutting.

C. Read and follow the instructions in the manufacturer's installation sheet contained in each roll of the dry erase wallcovering.

D. Install each roll in sequence starting from the highest to the lowest number and each strip in the same sequence as cut from the roll.

E. Install dry erase wallcovering panels in exact order as they are cut from bolt. Reverse hang alternate strips. Do not crease the wallcovering.

F. To allow air bubble movement and removal of double cut waste at the seams of self-adhesive wall covering, pre-wet surface with solution of ½ capful of mild detergent to 2 gallons clean water.

G. Using a soft natural sponge or lint free towel, lightly dampen the surface to be covered. Dampen seam areas more.

H. Smooth wall covering to the hanging surface using a wallcovering smoother, wrapped with a soft cloth, or hands using a downward and outward motion to eliminate air bubbles, wrinkles, gaps and overlaps.

I. Stop installation of material that is questionable in appearance and notify the manufacturer's representative for an inspection.

3.02 CLEAN-UP

A. Upon completion of installation, wash the wall covering with an ammonia or alcohol-based cleaner or mild soap rinse thoroughly with water prior to using.

B. Upon completion of the work, remove surplus materials, rubbish and debris resulting from the wallcovering installation. Leave areas in neat clean and orderly condition.

END OF SECTION
PART 1 GENERAL

1.01 SUMMARY
A. Section Includes resilient cork/linoleum tackable wallcovering and accessories.

1.02 RELATED SECTIONS
A. Painting: Preparation and priming of substrate surfaces. Section 09 91 00.

1.03 REFERENCES
A. American Society for Testing and Materials (ASTM):
   2. D751: Methods of Testing Coated Fabrics.
B. Underwriters Laboratory, Inc.: UL 723 - Test for Surface Burning Characteristics of Building Materials
C. Gypsum Association: GA-14-M-97 - Recommended Levels of Gypsum Board

1.04 SUBMITTALS
A. Submit manufacturer’s product data and installation instructions for wallcovering, adhesive and accessories.
B. Submit manufacturer's written installation instructions.
C. Submit manufacturer's written instructions for recommended maintenance of wallcovering required.
   1. Include precautions against cleaning materials and methods that may be detrimental to finishes and performance.
D. Samples: Submit 7-inch by 9-inch sample of tackable wallcovering material.

1.05 QUALITY ASSURANCE
A. Applicator: Skilled commercial wallcovering applicators with no less than three years of documented experience installing tackable wallcovering of the types and extent required.
B. Fire Hazard Classification: Provide materials that comply with NFPA Class A fire rating when tested in accordance with ASTM E84 using GRC Board as substrate. Identify components with markings from testing and inspection organization.
C. Field Samples: Prepare field samples for Architect’s review and establish requirements for seaming and finish trim.
1. Install sample panel of each type presentation wallcovering specified in area designated by Architect.
2. Maintain corrected and approved samples to serve as a standard of performance for the project.
3. Approved field sample may become part of the completed project.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver presentation wallcoverings to the project site in unbroken and undamaged original factory wrappings and clearly labeled with the manufacturer's identification label, quality or grade, and lot number.

B. Store materials in a clean, dry storage area with temperature maintained above 55 degrees F with normal humidity.

C. Store material in a flat position to prevent damage to roll ends. Do not cross stack material. Support material off the floor in a manner to prevent sagging and warping.

1.07 PROJECT CONDITIONS

A. Do not apply presentation wallcoverings when surface and ambient temperatures are outside the temperature ranges required by the wallcovering manufacturer.

B. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperatures above 55 degrees F unless required otherwise by manufacturer's instructions.

C. Apply adhesive when substrate surface temperature and ambient temperature is above 55 degrees F and relative humidity is below 40 percent.

D. Maintain constant recommended temperature and humidity for at least 72 hours prior to and throughout the installation period, and for 72 hours after wallcovering installation completion.

E. Provide not less than an 80 foot-candles per square foot lighting level measured mid-height at substrate surfaces.

1.08 WARRANTY

A. Submit manufacturer's limited five-year written warranty against manufacturing defects.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Subject to requirements, Walltalkers Tac•Wall Wallcoverings manufactured by RJF INTERNATIONAL CORPORATION, Tack-A-Cork manufactured by MARKA WALL, FORBO Tackable Cork Surface or ALPHASORB are acceptable.

2.02 MATERIALS

A. Uni-color, resilient, homogeneous, tackable linoleum surface consisting of
linseed oil, granulated cork, rosin binders, and dry pigments calendared onto natural burlap backing. Color shall extend through thickness of material.

B. Size: 48-inch width by continuous length as indicated on the drawings.

C. Thickness: ¼".

2.03 ACCESSORIES

A. Adhesives: Heavy-duty clear premixed vinyl adhesive or clay based adhesive. VOC compliant.

B. Substrate Primer/Sealer: White pigmented acrylic base primer/sealer specifically formulated for use with vinyl wallcoverings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions in which tackable wallcoverings will be installed.
   1. Complete finishing operations, including painting, before beginning installation of tackable wallcovering materials.
   2. Wall surfaces to receive wallcovering materials shall be dry and free from dirt, grease, loose paint, and scale.
   3. Do not proceed with installations until satisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Preparation: Remove hardware, accessories, plates, and similar items to allow tackable wallcovering to be installed.
   2. Painted surface: Remove loose paint or scale. Sand surface of enamel or gloss paint and wipe clean with damp cloth.
   3. Ensure gypsum wallboard surfaces scheduled to receive wallcovering are properly primed with a quality acrylic wallcovering primer under Section 09 91 00.

B. Prime substrate as recommended by manufacturer.

3.03 INSTALLATION

A. Comply with manufacturer's printed installation instructions.

B. Cut sheets to size including 2 to 3 inches of overage. Allow sheets to lay flat for at least 24 hours prior to the application. Mark roll direction and sequence on the backside of each sheet. Hang sheets in sequence as cut from the roll, do not reverse sheets.

C. Permanent HVAC system should be set to 68˚ F for at least 72 hours prior to, during, and after the installation.

D. Back roll each sheet prior to the installation to release curl memory.
E. For seamed applications, using a seam and strip cutter remove the factory edge of one sheet. Using the same tool, overlap and trace cut the mating edge of the second sheet. Repeat this step for as many sheets as required for the job.

F. Scribe, cut, and fit material to butt tightly to adjacent surfaces, built-in casework, and permanent fixtures and pipes.

G. Apply adhesive (only enough to hang one sheet at a time) with a 1/16 inch trowel to the area to receiving the sheet.

H. Work from top to bottom then side to side. Roll sheet firmly into adhesive for positive contact and to remove air bubbles.

I. Remove adhesive residue immediately after each panel is hung with a mild soap/water solution and a soft cloth/sponge.

3.04 CLEAN-UP

A. Protect installed product and finish surfaces from damage during construction.

B. Upon completion of the work, remove surplus materials, rubbish and debris resulting from the wallcovering installation. Leave areas in neat clean and orderly condition.

END OF SECTION
SECTION 09 84 13
FIXED SOUND ABSORPTIVE PANELS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work consists of furnishing all labor, materials, accessories and equipment necessary to provide sound absorptive panels as indicated on project Drawings and as specified below. Sound absorptive panel materials shall be designed to achieve the minimum sound absorption coefficients and minimum NRC ratings specified below.

1.3 REFERENCES


1.4 SUBMITTALS

A. Compliance: Comply with pertinent provisions of Division 1 – General Requirements.

B. Product Data: For each type of panel edge, core material and mounting indicated, submit Manufacturer’s specifications and other data needed to prove compliance with all specified requirements.

C. Acoustical Test Reports: Submit manufacturer’s sound absorption data for specified systems, including; octave band sound absorption values from 125 hertz to 4,000 hertz and Noise Reduction Coefficient (NRC) values for the specified systems. Sound absorption data shall be based on measurements conducted by a laboratory accredited for specific acoustical testing under the National Voluntary Laboratory Accreditation Program (NVLAP) and in accordance with ASTM C 423 and ASTM E795 standards.
D. Shop Drawings: For sound absorptive panels, include mounting devices and details; details at panel head, base, joints and corners; and details at ceiling, floor base and wall intersections. Indicate panel edge and core materials. All materials affected by structural or seismic requirements shall be reviewed and signed by a registered structural engineer showing compliance with all structural load and seismic design criteria.
   1. Include elevations showing panel sizes and direction of fabric weave and pattern matching.

E. Coordination Drawings: Show intersections with wall base, doors, electrical outlets and switches, and other permanent wall features.

F. Exceptions: Identify all proposed changes, differences, and/or discrepancies, including verbiage, terms, definitions between Contract Documents and submittals.

G. Samples for Verification. Prepare Samples from same material to be used for the Work.
   1. Fabric: Full width 36-inch long Sample from dye lot to be used for the Work, as follows:
      a. With specified treatments applied.
      b. Show complete pattern repeat.
      c. Mark top and face of fabric.
   2. Panel Edge: 12-inch long Sample showing edge profile, corner and finish.
   3. Core Material: 12-inch square Sample showing corner.
   5. Sample Panels: No larger than 36-inches by 36-inches. Show joints and mounting methods.

H. Maintenance Data: For stretched fabric wall systems to include in maintenance manuals. Include fabric manufacturer’s written cleaning and stain removal recommendations.

I. Warranty: Warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: The Manufacturer shall have successful experience in acoustical surface finish fabrication and installation, including no less than five years experience in the fabrication and installation of materials identical to those required in this project.

B. Source Limitations: Obtain sound absorptive panels through one source from a single manufacturer.

C. Acoustical Performance: Sound absorption tests shall be conducted in accordance with ASTM C 423 – Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method and ASTM E 795 – Standard Practices for Mounting Specimens during Sound Absorption Tests. The test shall be conducted by a laboratory accredited for specific acoustical testing under the National
Voluntary Laboratory Accreditation Program (NVLAP). Acoustical test reports shall include a description of the tested material sample, size of the sample, test setup (including type of mounting used), measurement instrumentation, test procedure and octave band sound absorption coefficients.

D. Fire-Test Response Characteristics: Provide sound absorptive panels with the following surface burning characteristics as determined by testing identical products per ASTM 84 by UL or other testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Flame-Spread Index: 25 or less.
   2. Smoke Development Index: 450 or less.

E. Mockups: Before installing sound absorptive panels, install mockups for each form from panel and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Install mockups to comply with the following requirements, using materials indicated for the completed Work:
   1. Install mockups in the location and of the size indicated or, if not indicated, as directed by the Architect.
   2. Notify Architect seven days in advance of dates and times when mockups will be installed.
   3. Obtain Architect’s approval of mockups before starting installation of sound absorptive panels.
   4. Maintain mockups during installation in an undisturbed condition as a standard for judging the completed Work.
      a. Demolish and remove mockups when directed.
      b. Approved mockups may become part of the completed Work if undisturbed at the time of Substantial Completion.

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with sound absorptive panel manufacturer’s written instructions for minimum and maximum temperature and humidity requirements for shipment, storage and handling.

B. Protect products during transit, storage and handling to prevent damage, soiling and deterioration. Comply with the requirements of the manufacturer’s instructions for storage and handling.
   1. Package products at factory prior to shipping using manufacturer’s standard method.

C. Deliver materials and panels in unopened bundles and store in a temperature controlled dry place with adequate air circulation.

D. Protect panel edges from crushing and impact.

1.7 MAINTENANCE MATERIAL SUBMITTALS
A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Fabric: For each fabric, color and pattern installed, furnish length equal to 10 percent of amount installed but no fewer than 10 yards.
   2. Mounting Devices: Full size units equal to 5 percent of amount installed, but no fewer than five devices, including unopened adhesives.

B. Protect products during transit, storage and handling to prevent damage, soiling and deterioration. Comply with the requirements of the manufacturer’s instructions for storage and handling.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install sound absorptive panels until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Verify locations of sound absorptive panels by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of sound absorptive panels that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, fabric sagging, distorting or releasing from panel edge; or warping of core.
   2. Warranty Period: Two years from date of Substantial Completion.

PART 2  PRODUCTS

2.1 BLACK FIBERGLASS INSULATION (TYPE ASF-1)

A. Application: Walls or Ceilings, as indicated or scheduled on the drawings.

B. Configuration: Black semi-rigid fiberglass insulation. Insulation shall be black throughout its thickness. Glass fiber insulation shall not be field painted. Exposed portion of insulation shall not have visible labels, logos or color other than black.

C. Thickness: 1, 2 or 4-inches, as indicated or scheduled on drawings.

D. Insulation Density: 1.5 pounds per cubic foot (minimum).
2.2 PROTECTED BLACK GLASSFIBER INSULATION (TYPE ASF-2)

A. Application: Walls or Ceilings, as indicated or scheduled on the drawings.

B. Configuration: Black semi-rigid fiberglass insulation (ASF-1) covered with a protective perforated sheet metal covering. Perforated sheet metal shall consist of 20% (min.) open area with minimal solid surface area between holes, such as 3/32-inch holes on 3/16-inch staggered centers. Black semi-rigid fiberglass insulation (ASF-1) covered with a protective wire mesh hardware cloth. Hardware cloth shall consist of 70% (min.) open area. Insulation shall be placed between structural supports, such as wood furring strips or unistrut, sized to accommodate insulation thickness. Perforated sheet metal shall be placed over insulation and mechanically fastened to structural support.

C. Insulation shall be placed between wood furring strips sized to accommodate insulation thickness. Hardware cloth shall be placed over insulation and mechanically fastened to wood furring strips.

D. Thickness: 1, 2 or 4-inches, as indicated or scheduled on drawings.

E. Insulation Density: 1.5 pounds per cubic foot (minimum).

F. Edge Detail: Raw.

G. Fabric: None.

H. Minimum Sound Absorption Coefficients:
   1. NRC 0.70 at 1-inch thickness (Type A-mounting); Type ASF-2A.
   2. NRC 0.90 at 2-inch thickness (Type A-mounting); Type ASF-2B.
   3. NRC 1.00 at 4-inch thickness (Type A-mounting); Type ASF-2C.

H. Mounting: Impaling clips and adhesive per manufacturers instructions.

I. Products: Owens Corning SoundSelect Black, Johns Manville Insul-Shield Coated Black, Manson Akousti –Liner.
2.3 STANDARD FABRIC WRAPPED ACOUSTICAL PANELS (TYPE ASF-3A-C)

A. Application: Walls or Ceilings, as indicated or scheduled on the drawings.


C. Thickness: 1-inch, as indicated or scheduled on drawings.

D. Insulation: Unfaced fiberglass core, 6-7 pounds per cubic foot density, dimensionally stable, molded rigid board.

E. Edge Detail: As specified by Architect.

F. Fabric: Acoustically transparent. Fabric shall be selected by architect, but shall not have backing or any other material with sound blocking properties. A misting of glue shall be used on the front face of the panel to adhere the fabric to the fiberglass insulation core. The gluing process shall not compromise the assembly’s sound absorption properties. When fabric is peeled away from the fiberglass insulation core, the fabric shall not retain any fiberglass insulation material as a result of the gluing process. The finish shall be flat and wrinkle free and fully tailored at corners with no exposed darting.

G. Minimum Sound Absorption Coefficients:
   1. NRC 0.85 at 1-inch thickness (Type A-mounting); Type ASF-3A.

H. Mounting: Mechanical fastening per manufacturers instructions.

I. Products: Decoustics A.P. or Wall Technology, Inc A100 WP Series.

2.4 IMPACT RESISTANT FABRIC WRAPPED ACOUSTICAL PANELS (TYPE ASF-4)

A. Application: Walls or Ceilings, as indicated or scheduled on the drawings.

B. Configuration: Dual core construction of dimensionally stable medium density fiberglass insulation with a thin high density impact resistant face sheet adhered to medium density core. Insulation core and face sheet shall be covered with approved acoustically transparent fabric.

C. Thickness: 1-inch, as indicated or scheduled on drawings.

D. Insulation: Unfaced fiberglass core, 6-7 pounds per cubic foot density, dimensionally stable, molded rigid board with 16-20 pcf density impact resistant acoustically transparent face sheet.

E. Edge Detail: As specified by Architect.

F. Fabric: Acoustically transparent. Fabric shall be selected by architect, but shall not have backing or any other material with sound blocking properties. A misting of glue shall be used on the front face of the panel to adhere the fabric to the fiberglass insulation core.
The gluing process shall not compromise the assembly’s sound absorption properties. When fabric is peeled away from the fiberglass insulation core, the fabric shall not retain any fiberglass insulation material as a result of the gluing process. The finish shall be flat and wrinkle free and fully tailored at corners with no exposed darting.

G. Minimum Sound Absorption Coefficients:
   1. NRC 0.85 at 1-inch thickness (Type A-mounting); Type ASF-4.

H. Mounting: Mechanical fastening per manufacturers instructions.

I. Products: Decoustics H.I.R.#1 or Wall Technology, Inc IR108 WP Series.

2.5 FIELD STRETCHED FABRIC WRAPPED ACOUSTICAL PANELS (TYPE ASF-5)

A. Application: Walls or Ceilings, as indicated or scheduled on the drawings.

B. Configuration: Site fabricated acoustical panel assembly with stretched fabric held in place by interlocking jaws of extruded track.

C. Thickness: 1-in, as indicated or scheduled on drawings.

D. Insulation: Unfaced fiberglass core, 6-7 pounds per cubic foot density, dimensionally stable, molded rigid board.

E. Edge Detail: As specified by Architect.

F. Finish: Acoustically transparent fabric. Fabric shall be selected by architect, but shall not have backing or any other material with sound blocking properties.

G. Minimum Sound Absorption Coefficients:
   1. NRC 0.85 at 1-1/16-inch thickness (Type A-mounting); Type ASF-5A.

H. Mounting: Fabric shall be mounted over fiberglass insulation using a field installed extruded track system capable of locking the fabric in low tension over the fiberglass insulation. No glue or stapling shall be used to support fabric. The finish shall be flat and wrinkle free and fully tailored at corners with no exposed darting.

I. Products: FabriTrack System, Snap-Tex International or Stretch Wall Systems.

2.6 GYPSUM BOARD LOOKING FIBERGLASS ACOUSTICAL PANELS (TYPE ASF-6)

A. Application: Ceilings, as indicated or scheduled on the drawings.

B. Configuration: Dual core construction of dimensionally stable medium density fiberglass insulation covered with a factory applied acoustically transparent coating or painted finish.

C. Thickness: 1-1/16, or 2-1/16-inches, as indicated or scheduled on drawings.
D. Insulation Density: 6-7 pounds per cubic foot medium density core and 16-20 pcf density acoustically transparent face sheet.

E. Edge Detail: As specified by Architect.

F. Coating or Painted Finish: Acoustically transparent coating or painted finish with a gypsum board appearance. Coating or painted finish shall not have backing or any other material with sound blocking properties.

G. Minimum Sound Absorption Coefficients:
   1. NRC 0.85 at 1-1/16-inch thickness (Type A-mounting); Type ASF-6A.
   2. NRC 0.90 at 2-1/16-inch thickness (Type A-mounting); Type ASF-6B.

H. Mounting: Standard ceiling mountings per manufacturer’s instructions.

I. Products: Decoustics A.P. with Claro Finish or Wall Technology, Inc New Dimensions.

2.7 CELLULOSE FIBER SPRAY APPLIED INSULATION (TYPE ASF-10)

A. Application: Ceilings, as indicated or scheduled on the drawings.

B. Configuration: Sprayed cellulose thermal and acoustical insulation consisting of recycled natural fibers, chemical treatment and binding agents, which is sprayed directly on a solid substrate such as metal deck or gypsum board. The sprayed on insulation shall be integrally colored at the factory and shall not be field painted.

C. Thickness: 1 or 2-inches, as indicated or scheduled on drawings.

D. Insulation Density: Per manufacturer’s recommendations.

E. Edge Detail: N/A.

F. Fabric: None.

G. Minimum Sound Absorption Coefficients:
   1. NRC 0.75 at 1-inch thickness (Type A-mounting); Type ASF-10A.
   2. NRC 0.95 at 2-inch thickness (Type A-mounting); Type ASF-10B.

H. Mounting: Spray applied without spalling or delamination by factory trained applicators per manufacturer’s instructions.


2.8 FIBERGLASS BASED ACOUSTICAL CEILING CLOUDS (TYPE ASF-13)

A. Application: Ceilings, as indicated or scheduled on the drawings.
B. Configuration: Dimensionally stable 6 to 7 pcf density fiberglass insulation core laminated with 16-20 pcf density molded fiberglass sheet or a sound transparent scrim. Finishes shall be completely adhered to all surfaces.

C. Thickness: 1-inch (minimum), as indicated or scheduled on drawings.

D. Insulation Density: 6 to 7 pcf fiberglass core and 16-20 pcf density face sheet.

E. Edge Detail: Finished.

F. Fabric: None.

G. Minimum Sound Absorption Coefficients: NRC 0.80 at 1-inch minimum thickness (Type A-mounting).

J. Mounting: Aircraft cable or wire per manufacturers instructions.

K. Products: Armstrong SoundScape Clouds, Wall Technology Skyway Ceiling Clouds Type I or II or equal.

**PART 3 EXECUTION**

3.1 EXAMINATION

A. Examine fabric, materials, substrates, areas and conditions, with the installer present, for compliance with requirements, installation tolerances and other conditions affecting performance of the acoustical surface finishes.

B. Do not proceed with Work until unsatisfactory conditions have been corrected.

C. Clean acoustical surface finishes and hardware to remove deleterious and soil substances.

3.2 PREPARATION

A. Measure each area and establish layout of panels and joints as indicated in the Drawings.

B. Before installation, allow acoustical surface finishes to adjust and become stable in the area in which they will be installed in accordance with the manufacturers installation instructions.

3.3 INSTALLATION
A. Do not install any work until space is enclosed and weatherproofed, wet work in space is completed and nominally dry, work above ceilings is complete and temperature and humidity is continuously maintained at values near those of final occupancy.

B. Comply with the manufacturers printed instructions, recommendations and approved shop drawings.

C. Install framework, support hardware, acoustical surface finishes in accordance with the manufacturers instructions and recommendations. Install panels vertical and plumb and if applicable, true in plane.

3.4 INSTALLATION TOLERANCES

A. Edge Straightness: Plus or minus 1/16-inch over 8-feet.

B. Variation from Level and Plumb: Plus or minus 1/16-inch over 8-feet.

C. Variation of Panel-Joint Width: Not more than hairline.

3.5 CLEANING

A. Clean all surfaces following installation.

B. Replace material having scratches, abrasions or other defects with unblemished acoustical surface finish assemblies at no cost to the owner.

3.6 PROTECTION

A. Protection of acoustical surface finishes from damage by other trades after installation shall be provided by the General Contractor.

END OF SECTION
SECTION 09 91 00
PAINTING

PART 1 GENERAL

1.01 SCOPE

A. Work Included

1. Surface preparation and painting or finishing of all interior and exterior exposed items and surfaces except as otherwise indicated. Work includes, but is not necessarily limited to, the following:
   a. Walls, ceilings and soffits of gypsum board.
   b. Concrete masonry walls; exterior concrete.
   c. Hollow metal doors and frames.
   d. Wood trim, casework and millwork as required.
   e. Exposed structure including deck and all framing.
   f. Exposed ferrous metal of any type, interior and exterior, including galvanized items.
   g. Exposed sheet metal, ductwork, conduit and piping in finished spaces; not mechanical equipment or electrical equipment rooms.
   h. Exposed prime coated or unfinished mechanical or electrical items outside of mechanical equipment rooms. Repaint factory finished mechanical or electrical items where specified.
   i. Stenciling of fire walls above ceilings.
   j. Paint existing surfaces and items where indicated on the drawings and where these surfaces and items are located within areas where new work is being performed.
   k. Exposed cementitious fireproofing.
   l. Other items noted or specified.

2. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified in other sections of the work.

B. Mechanical Equipment Rooms: Painting subject to the following requirements:

1. Paint finish on walls and ceiling, when scheduled on drawings, to be applied prior to installation of MPE work as much as possible.
2. Spray painting not permitted after electric motors have been installed.

C. Work Excluded: Do not paint the following items unless specifically called for on the drawings or specified herein:

1. Concrete floors.
2. Shop or prime coats on items to which shop or prime coats have been applied by the fabricator, unless noted otherwise.
3. Items with factory finish or natural finish (brick, stone, stainless steel, aluminum, and others) unless specifically noted elsewhere.
4. Colored concrete masonry units.
5. Wall areas permanently concealed by fixed equipment or accessories.
6. Sprayed fireproofing and items receiving sprayed fireproofing.
7. Equipment, sheet metal, ductwork and equipment in mechanical and
electrical rooms; painting of these items, if required, provided under Divisions 23 and 26 as applicable.

8. Piping in mechanical rooms, except exposed gas and fire protection piping.
10. Factory finished equipment, except for touch-up, unless otherwise specified
11. Concealed piping.
12. Items permanently concealed above ceilings.

D. Surface Preparation
1. It is the intention of this specification that new substrates will be ready for decoration as specified except for normal construction dust and soiling.
2. New surfaces installed by other trades are required to be acceptable for work specified under Part 3, Surface Preparation. New surfaces to be clean, sound, free from loose particles, dirt, loose mortar and grease.
3. Existing Surfaces: Unless otherwise specified, provide all surface preparation required for decoration.

1.02 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Example: installations within unheated shelters.

1.03 QUALITY ASSURANCE

A. Application: Performed only by skilled, experienced painters.

B. Provide lead free prime and finish coatings. All top coatings shall be mold and mildew resistant.

C. Coordination: Provide finish coats compatible with prime paints used. Review other specification sections to ensure compatibility of total coating system with prime paints provided for the various substrates. Provide barrier coats over non-compatible primers or remove primer and reprime as required. Notify the Architect of anticipated problems using coating systems specified on substrates primed in accordance with other section requirements.
D. Reference Specifications
1. The following Society for Protective Coatings (SSPC) specifications are referenced by code number within this Section.

<table>
<thead>
<tr>
<th>Code</th>
<th>Method</th>
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<tr>
<td>SP-1</td>
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<tr>
<td>SP-2</td>
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<tr>
<td>SP-6</td>
<td>Commercial Blast Cleaning</td>
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<tr>
<td>SP-11</td>
<td>Power Tool Cleaning to Bare Metal</td>
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E. Job Mock-Ups: Mock-ups will serve as standard for acceptance of work. Leave approved mock-ups in place as part of completed project. Manufacturers' representatives shall be available to advise applicator on proper application techniques and procedures. Locate mock-up areas as directed by Architect. Provide the following mock-ups of spaces or areas indicated:

1. Concrete Masonry, Epoxy Coating: 50 square feet.
2. Concrete Masonry, Painted Finish: 50 square feet.
4. Gypsum Board, Painted Finish: Mock-up room walls complete as specified in Section 09 21 16.
5. Ductwork: 6 linear feet of each paint type.

F. Paint walls prior to installing wall mounted signage.

G. Pre-painting Walk-Thru: In areas where ceilings and walls are scheduled or indicated to be field painted, and equipment, ductwork, piping, conduit and other wall/ceiling mounted or suspended items are exposed, the areas are to be reviewed to determine colors of the various items.

1.04 SUBMITTALS

A. Submit a complete selection of manufacturer's color chips indicating color, texture and sheen for approval for each finish specified herein.

B. Submit a complete schedule for identifying manufacturer and specific brand name or number of products proposed for finishing specified surfaces.
   1. Provide percent of solids by volume content data for each paint material.
   2. Provide paint label analysis and application instructions for each type paint.

C. Provide one (1) unopened gallon of each type and color of paint and stain required for maintenance purposes. Provide original, unopened, labeled containers with color samples and a list of project use. Extra materials are not to be used for touch-up by Contractor.

D. Color/Finish Samples
   1. After receiving color chips from the Contractor, the Architect will provide a complete schedule of colors and sheens desired.
   2. Obtain schedule well in advance of commencing work and submit samples of specified finishes for approval.
   3. Submit duplicate samples on the same kind of materials to which finishes will be applied. One half of the sample shall show the completed treatment
and the other half shall show the successive steps, taken in producing the finish. When approved, samples will be so marked; one set will be retained by the Architect and one set will be returned for the painter's use.

4. No finishes shall be applied on the work until samples are approved. Approved samples shall be strictly duplicated in the work. Additional coatings, if required to reproduce approved samples, shall be applied without additional cost to the Owner.

5. Use representative colors when preparing samples for Architect's review.

E. Statement From Manufacturer

1. Contractor, in submitting the list of proposed subcontractors, shall include for approval, along with the name of the painting subcontractor, the names of the manufacturers whose materials the subcontractor proposes to use in the work.

2. Following tentative approval of the subcontractor and the materials manufacturers, notify the manufacturers, in writing, that the specifications require the manufacturers to submit to the Architect, a statement by a corporate officer of the manufacturer that coatings scheduled by the Architect are proper for the intended use and that the manufacturer's representative will be available to advise the Architect and the Contractor regarding applications of all coatings.

3. **Coating Maintenance Manual**: Upon conclusion of the project, the Contractor or paint manufacturer / supplier shall furnish a coating maintenance manual (equivalent to the Sherwin-Williams "Custodian Project Color and Product Information" report). Manual shall include an area summary with finish schedule; area detail designating where each product/color/finish was used; product data pages; Material Safety Data Sheet (MSDS); care and cleaning instructions and touch-up procedures.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials on the job site in original, new, unopened packages and containers bearing the manufacturer's name and label, and the following information:

1. Name or title of material.
2. Manufacturer's stock number and date of manufacture.
3. Manufacturer's name.
4. Contents by volume, for major pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.

B. Store, protect and handle materials in accordance with manufacturer's recommendations to prevent damage and deterioration. Store paint materials at minimum of 50°F.

C. Maintain paint material storage space as clean, non-hazardous and orderly. Place waste and soiled paint rags in tightly covered metal containers; safely dispose of at end of each working day. Take every precaution to avoid fire hazards and spontaneous combustion. Provide acceptable type of fire extinguisher immediately adjacent to paint storage area.
1.06 PROJECT CONDITIONS

A. Coordinate painting and finishing work with other trades to ensure adequate illumination, ventilation and dust-free environment during application and drying of paint and finish treatments.

B. Maintain uniform interior building temperature of minimum 50°F for 24 hours before, during and continuously for 48 hours after painting.

C. Do not apply coatings when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Provide adequate ventilation as required for specified paint and finish treatment materials in spaces scheduled. Maintain for time periods recommended by material manufacturer to provide proper drying.

E. Provide adequate illumination on surfaces to be finished. Maintain a minimum 80 foot candle lighting level measured mid-height at substrate surface.

F. Protect adjoining surfaces against damage or soiling.

G. Maintain work in neat and orderly condition, promptly removing empty containers, wrappings, soiled rags, waste and rubbish from site.

H. Material Safety Data Sheets (MSDS): Provide documents available to Owner's Representative, Architect and construction personnel at the job site. Comply with MSDS requirements.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Paint: SHERWIN WILLIAMS; FARRELL-CALHOUN; PPG and AKZO NOBEL (Glidden Professional and Devoe Coatings) brands of paint and stain are specified in "Paint and Material Finish Schedule," only to establish a standard of quality. Other paint brands and manufacturers such as; BENJAMIN MOORE; MARTIN SENOUR; PRATT and LAMBERT; PORTER; CORONADO PAINT COMPANY are acceptable upon proof of satisfactory experience records for the intended use and compliance with specified VOC content; colors as indicated on drawing or as selected by Architect.

B. Secondary products not specified by name (i.e. turpentine, thinners, mineral spirits, fillers, linseed oils, etc.) shall be "best grade" or "first line" products.
   1. Filler material shall be woodworker's option of material that can be tinted and worked so as to match adjacent wood surfaces.

C. Special Coatings: TNEMEC brand of coatings are specified in "Coatings and Material Finish Schedule," to establish a standard of quality. Coatings manufactured by DuPONT, INTERNATIONAL PROTECTIVE COATINGS or CARBOLINE are acceptable upon proof of satisfactory experience records for the intended use. Colors as indicated on drawing or as selected by Architect.
2.02 MATERIAL QUALITY

A. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24)
   1. Flat Paints and Coatings: 50 g/L.
   2. Nonflat Paints and Coatings: 150 g/L.
   3. Dry-Fog Coatings: 400 g/L.
   4. Primers, Sealers, and Undercoaters: 200 g/L.
   5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
   7. Pretreatment Wash Primers: 420 g/L.
   8. Floor Coatings: 100 g/L.
   9. Shellacs, Clear: 730 g/L.
   10. Shellacs, Pigmented: 550 g/L.

B. Material Compatibility
   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. Stains: Factory-mixed, penetrating, transparent oil-base type. Applicator shall be allowed to add approved colorants on the job to match approved samples. No other ingredients shall be added to stains.

2.03 ACCESSORY MATERIAL

A. Application Equipment: Not required to be new, but shall be adequate for the work and workmanship required herein.

B. Accessories: Provide all required ladders, scaffolding, drop cloths, masking, scrapers, tools, dusters and cleaning solvents as required to perform the work and achieve the results specified herein.

2.04 EXTERIOR PAINT AND FINISH MATERIAL SCHEDULE

A. Apply paint and finish materials to substrate surfaces indicated. Apply touch-up prime coats in addition to shop-applied prime coats. Provide additional job site prime coats when indicated.

B. Metals-Ferrous: Galvanized & Shop Primed (Semi-Gloss): (Acrylic Latex System)
   1. SW
2. **PPG**

3. **GLIDDEN PROFESSIONAL**

4. **FARRELL-CALHOUN**
   a. Finish: Tuff Boy Waterborne 100% Acrylic DTM Enamel 8000 Line. Two (2) coats.

5. Galvanized Metals: Provide pretreatment as specified herein.

C. Metal – Ferrous: Unprimed (Semi-Gloss): (Acrylic Latex System),

1. **SW**
   b. Finish: S-W Metalatex Semi-Gloss Enamel B42 Series. (2) coats
   c. Optional Finish: S-W Direct-to-Metal DTM Acrylic Semi-Gloss Coating, B66-200. Two (2) coats

2. **PPG**

3. **GLIDDEN PROFESSIONAL**
   a. Primer: Devflex 4020 Direct to Metal Primer; One (1) coat.
   b. Finish; Devoe Coatings Devflex 4216HP High Performance Acrylic Semi-Gloss 4216L Series. Two (2) coats.

4. **FARRELL-CALHOUN**
   a. Primer: Tuff Boy 100% Acrylic DTM Primer 5-56. One (1) coat.
   b. Finish: Tuff Boy Waterborne 100% Acrylic DTM Enamel 8000 Line. Two (2) coats.

D. Alumínium Shapes and Railings
1. Surface Preparation: Clean surfaces of dirt, grease, loose rust, mill scale and other deleterious materials.
2. **SW**
   a. Prime Coat: Pro Industrial Pro-cryl Universal Primer B66-310. One coat at 2.4 mils dft.; VOC 110 g/L.
   b. Finish Coat (All steel exposed to view): Waterbased Acrolon 100 Water Based Urethane B65 Series. Two coats at minimum 2.0-4.0 mil dft per coat. VOC <100 g/L.

3. **BENJAMIN MOORE**
   a. Prime Coat: Waterborne Polyamid Epoxy Gray Primer Series M42. One (1) coat at 1.5 to 2.5 mils dft. 43% solids; VOC 136 g/L.
   b. Finish Coat (All Steel Exposed to View): Waterborne Urethane Semi-Gloss Finish Series M73S. Two (2) coats at 1.5 to 2.5 dft per coat. 38% solids; VOC 213 g/L.
4. **GLIDDEN PRO**  
   a. **Prime Coat:** Devoe Coatings Devran 203 Waterborne Epoxy Primer. One (1) coat.  
   b. **Finish Coat:** Devoe Coatings Devthane 379H Aliphatic Urethane Gloss Enamel. Two (2) coats.  
5. **Colors:** As selected by Architect.  
6. **Perforated Steel Panels:** Same finish; factory applied.  
7. **Galvanized Metals:** Provide pretreatment as specified herein.  

**E. Gypsum Board Soffits/Ceilings**  
1. **SW**  
   a. **Primer:** S-W A-100 Exterior Latex Primer B42 Series. 34% to 38% solids; VOC 89 g/L.  
   b. **Finish:** A-100 Exterior Latex Flat Coating A6 Series. Two coats at 1.2 mils dft per coat. 34% solids; VOC <50 g/L.  
2. **PPG**  
   a. **Primer:** Seal Grip Interior/Exterior 100% Acrylic Universal Primer/Sealer 17-921 Series. One (1) coat at minimum 1.5 mils dft. 37% to 41% solids; VOC 89 g/L.  
   b. **Finish:** Pitt-Cryl Exterior Wood and Stucco Flat Latex 10-6 Series. Two coats at minimum 1.2 mil dft. 36% to 40% solids; VOC 95 g/L.  
3. **GLIDDEN PRO**  
   a. **Primer:** Hydrosealer Exterior Primer Sealer 6001-1200. One coat.  
   b. **Finish:** Fortis 450 Exterior Flat Paint 6201V Series; Two (2) coats.  
4. **FARRELL-CALHOUN**  
   a. **Primer:** Interior/Exterior 100% Acrylic Latex Undercoater 235. One (1) coat at 1.7 mils dft per coat. 41.3% volume solids; VOC 35 g/L.  
   b. **Finish:** 100% Acrylic Exterior Flat Latex 200 Line. Two (2) coats at 1.9 mils dft per coat. 40.8% volume solids; VOC 45 g/L.  

### 2.05 INTERIOR PAINT AND FINISH MATERIALS SCHEDULE  

**A.** Apply paint and finish materials to substrate surfaces indicated. Apply touch-up prime coats in addition to shop-applied prime coats. Provide additional job site prime coats when indicated.  

**B. Gypsum Board and Plaster – Walls, (Acrylic Latex System)**  
1. **SW**  
   a. **Primer:** ProMar 200 Zero VOC Interior Latex Primer, B28-2600. One (1) coat at 1.2 mils dft. 26% volume solids; VOC <50 g/L.  
   b. **Finish:** ProMar 200 Zero VOC Interior Latex Eg-Shell B20-2600 Series. Two (2) coats at minimum 1.7 mil dft per coat. 42% volume solids; VOC 0 g/L.  
2. **PPG**  
   a. **Primer:** SpeedHide Interior Latex Primer 6-2 Series.  
   b. **Finish:** Speedhide Zero 6-4310XI Series; latex eggshell. (2) coats  
3. **GLIDDEN PRO**  
   a. **Primer:** Lifemaster No VOC Interior Primer 9116-1200. One (1) coat.  
   b. **Finish:** Lifemaster No VOC Interior Latex Eggshell Paint 9300 Series. Two (2) coats.
4. FARRELL-CALHOUN
   a. Primer: Perfik-Seal Interior Latex Primer/Sealer 380. One (1) coat at 1.8 mils dft. 39.2% volume solids; VOC 47 g/L.
   b. Finish: Evergreen Acrylic Interior Latex Eggshell Enamel 3900 Line. Two (2) coats at 1.8 mils dft per coat. 39% volume solids; VOC 0 g/L.

5. Surfaces: Gypsum board wall surfaces.

C. Gypsum Board – Walls, Epoxy
1. SW
   a. Primer: ProMar 200 Zero VOC Interior Latex Primer. One coat at 1.2 mil dft. 26% solids; VOC 0 g/L.
   b. Finish: SW Water Based Catalyzed Epoxy B70 Series. Two coats at minimum 2.5 to 3.0 mils dft per coat. Semi-gloss. VOC <200 g/L; 39% solids.
2. PPG
   a. Primer: Seal Grip Interior/Exterior 100% Acrylic Universal Primer/Sealer 17-921 Series. One (1) coat at minimum 1.5 mils dft. 37% to 41% solids; VOC 89 g/L.
   b. Finish: Pitt-Glaze Water Base Acrylic Epoxy Semi-Gloss 16-551 Series. Two (2) coats at 2.3 to 2.7 mils dft per coat. 44% to 48% solids; VOC <183 g/L.
3. GLIDDEN PRO
4. FARRELL-CALHOUN
   a. Primer: Perfik-Seal Interior Latex Primer/Sealer 380. One (1) coat at 1.8 mils dft. 39.2% volume solids; VOC 47 g/L.
   b. Finish: Tuff Boy 100% Acrylic Waterborne Epoxy 1200WB. Two (2) coats at 2.2 mils dft per coat. 41% volume solids; VOC 99 g/L.

5. Surfaces: Where indicated.

D. Gypsum Board and Plaster - Ceilings and Soffits (Acrylic Latex System)
1. SW
   a. Primer: ProMar 200 Zero VOC Interior Latex Primer B28-2600. One (1) coat at 1.2 mils dft. 26% volume solids; VOC 0 g/L.
   b. Finish: ProMar 200 Zero VOC Interior Latex Flat B30-2600 Series. Two (2) coats at minimum 1.6 mil dft per coat. 39% volume solids; VOC 0 g/L.
2. PPG
   a. Primer: SpeedHide Interior Latex Primer 6-2 Series.
   b. Finish: Speedhide Zero 6-4110XI Series; latex flat. Two (2) coats.
3. GLIDDEN PRO
   a. Primer: Lifemaster No VOC Interior Primer 9116-1200. One (1) coat.
   b. Finish: Lifemaster No VOC Interior Latex Flat Paint 9100 Series. Two (2) coats.
4. FARRELL-CALHOUN
   a. Primer: Perfik-Seal Interior Latex Primer/Sealer 380. One (1) coat at 1.8 mils dft. 39.2% volume solids; VOC 47 g/L.
b. Finish: Interior Premium Flat Latex 300 Line. Two (2) coats at 1.7 mils dft per coat. 36.5% volume solids; VOC 46 g/L.

5. Surfaces: Ceilings, soffits, bulkheads.

E. Concrete Masonry Surfaces (Semi-Gloss): (Vinyl Acrylic Latex System)

1. SW
   a. Filler: Preprite Block Filler B25W25. Minimum 8 mil dft to pin hole free. 48% to 52% solids; VOC 42 g/L.
      Optional Filler: Heavy Duty Block Filler, B42W46 10-18 mil dft, 53% solids, VOC <100 g/l
   b. Finish: ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series. Two (2) coats at minimum 1.6 mil dft per coat. 38% volume solids; VOC 0 g/L.

2. PPG
   a. Filler: Speedhide Block Filler Latex 6-7 Series. Minimum 8.5 mil dft to pin hole free.

3. GLIDDEN PROFESSIONAL
   b. Finish: Lifemaster Semi-Gloss 9200 Series. Two (2) coats.

4. FARRELL-CALHOUN
   a. Filler: Interior/Exterior Latex Masonry Block Filler 470. Minimum 8 mils dft to pin hole free. 46.7% volume solids; VOC 20 g/L
   b. Finish: Evergreen 100% Acrylic Interior Semi-Gloss Enamel 3300. (2) coats at 2.0 mils per coat. 38% volume solids; VOC <5 g/L.

5. Surfaces: New walls, graphics (do not use in high humidity areas)

F. Concrete Masonry Surfaces (Semi-Gloss): Epoxy.

1. SW
   a. Filler: Heavy Duty Block Filler, B42W46. 10-18 mil dft. 53% solids; VOC <100 g/L.
   b. Finish: SW Water Based Catalyzed Epoxy B70 Series. Two coats at minimum 2.5 to 3.0 mils dft per coat. Semi-gloss. VOC 209 g/L; 37% to 41% solids.

2. PPG
   a. Filler: Speedhide Int/Ext Acrylic Masonry Block Filler 6-15 Series. Minimum 8 mils dft to pin hole free.

3. GLIDDEN PRO
   a. Primer: Devoe Coatings Bloxfil 4000 Interior/Exterior Heavy Duty Acrylic Blockfiller, 4000-1000. Minimum 8 mils dft to pin hole free.

4. FARRELL-CALHOUN
   a. Primer: Interior/Exterior Acrylic Latex Masonry Block Filler 470A. Minimum 8 mils dft to pin hole free. 50% volume solids; VOC 35 g/L
   b. Finish: Tuff Boy 100% Acrylic Waterborne Epoxy 1200WB. Two (2) coats at 2.2 mils dft per coat. 41% volume solids; VOC 99 g/L.

5. Surfaces: Where indicated.
G. Metals - Ferrous: Shop Primed and Unprimed. (Acrylic Latex System)

1. SW
   a. Primer: Direct-to-Metal DTM Acrylic Primer B66W1. 2.5 mils dft. 46% solids; 138 g/L.
      Optional primer: Pro Industrial Pro-Cryl Universal Primer, B66-310 2.0-4.0 mil dft, 36% solids, VOC <100 g/l
   b. Finish: ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series. Two (2) coats at minimum 1.6 mil dft per coat. 39% volume solids; VOC 0 g/L.
      Optional Upgrade Finish: Pro Industrial High Performance Acrylic S/G, B66-650 Series. 2.5 - 4.0 mil dft, VOC <50 g/l

2. PPG

3. GLIDDEN PROFESSIONAL
   a. Primer: Devoe Coatings Devflex 4020PF Direct to Metal Primer/Finish 4020.
   b. Finish: Lifemaster No VOC Interior Latex Semi-Gloss Paint 9200 Series. Two (2) coats.

4. FARRELL-CALHOUN
   a. Primer: Tuff Boy 100% Acrylic DTM Primer 5-56. One (1) coat at 1.8 mils dft. 39% volume solids; VOC 45 g/L.
   b. Finish: Evergreen 100% Acrylic Interior Semi-Gloss Enamel 3300. Two (2) coats at 2.0 mils per coat. 38% volume solids; VOC <5 g/L.

5. Surfaces: Hollow metal doors, frames, mullions, railings, ferrous metal.

H. Metals - Ferrous: Galvanized. (Acrylic Alkyd System),

1. SW
   a. Primer: Direct-to-Metal DTM Acrylic Primer B66W1. 2.5 mils dft. 46% solids; 138 g/L.
   b. Finish: ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series. Two (2) coats at minimum 1.6 mil dft per coat. 39% volume solids; VOC 0 g/L.
      Optional Upgrade Finish: Pro Industrial High Performance Acrylic S/G, B66-650 Series. 2.5 - 4.0 mil dft, VOC <50 g/l

2. PPG
   b. Finish: Speedhide Interior Semi-Gloss Enamel, 6-500 Series. Two (2) coats.

3. GLIDDEN PRO
   a. Primer: DevFlex 4020 Direct to Metal Primer 4020PF.
   b. Finish: Lifemaster No VOC Interior Latex Semi-Gloss Paint 9200 Series. Two (2) coats.

4. FARRELL-CALHOUN
   a. Primer: Tuff Boy 100% Acrylic DTM Primer 5-56. One (1) coat at 1.8 mils dft. 39% volume solids; VOC 45 g/L.
   b. Finish: Evergreen 100% Acrylic Interior Semi-Gloss Enamel 3300. Two (2) coats at 2.0 mils per coat. 38% volume solids; VOC <5 g/L.

5. Surfaces: Hollow metal doors, frames, door mullions, railings, galvanized metal surfaces.
I. Wood - Painted.

1. SW
   a. Primer: Premium Wall & Wood Primer B28W8111  One (1) coat at minimum 1.8 mil dft. 46% solids; VOC <50 g/L.
   b. Finish: ProMar 200 Zero VOC Interior Latex Semi-Gloss B31-2600 Series. Two (2) coats at minimum 1.6 mil dft per coat. 38% volume solids; VOC 0 g/L.

2. PPG
   a. Primer: Seal Grip Interior/Exterior 100% Acrylic Universal Primer/Sealer 17-921 Series. One (1) coat at minimum 1.5 mils dft. 37% to 41% solids; VOC 89 g/L.
   b. Finish: Speedhide Interior Enamel Latex Semi-Gloss. Two (2) coats at minimum 1.3 mil dft per coat. 35% to 39% volume solids; VOC <5 g/L.

3. GLIDDEN PRO
   a. Primer: Lifemaster No VOC Interior Primer 9116-1200. One (1) coat.
   b. Finish: Lifemaster No VOC Interior Latex Semi-Gloss Paint 9200 Series. Two (2) coats.

4. FARRELL-CALHOUN
   a. Primer: Waterborne 100% Acrylic Enamel Undercoater 699. One (1) coat at 1.6 mils dft. 34.5% volume solids; VOC 46 g/L.
   b. Finish: Evergreen 100% Acrylic Interior Semi-Gloss Enamel 3300. Two (2) coats at 2.0 mils per coat. 38% volume solids; VOC <5 g/L.

J. Wood – Satin Stained Finish: Alkyd based stain with alkyd based polyurethane satin varnish finish.

1. Wood Filler: Paste wood filler (open grains only).
2. Stain: Interior alkyd wiping stain; colors as indicated on the drawings. Final stain approval by Associate from approved samples.
   a. FARRELL-CALHOUN
      (1) Wood Kraft Waterborne Penetrating Wiping Stains 1500. 30% volume solids; VOC 125 g/L.
      (2) Wood Kraft Linseed Oil-Alkyd Wiping Stains 1110/1500 Line. 32.5% volume solids; VOC 519 g/L
   b. Sherwin-Williams
      (1) WoodClassics “250” Interior Oil Wood Stain, A49W8 75% solids, VOC <250 g/l
      (2) WoodClassics Interior Oil Wood Stain, A49 Series 34% solids, VOC 524 g/l

3. Sanding Sealer: Satin urethane varnish thinned per manufacturer’s recommendations.
4. Finish Coats: Two (2) coats satin polyurethane varnish at approximately 1.4 mils dft per coat.
   a. FARRELL-CALHOUN
      (1) Wood Kraft Interior Waterborne Acrylic-Polyurethane Satin Varnish 1192. Minimum of three (3) coats at 1.2 mils per coat dft. 27.5% volume solids; VOC 146 g/L.
      (2) Wood Kraft Satin Polyurethane Varnish 1122. Min.of two (2) coats at 1.8 mils dft. 46.7% volume solids; VOC 425 g/L.
   b. Sherwin-Williams
K. Steel Stairs and Railings: Steel and Iron Finish
1. Surface Preparation: Clean surfaces of dirt, grease, loose rust, mill scale and other deleterious materials.

2. SW
   a. Prime Coat: Pro Industrial Procryl Primer B66-310. One coat at 2.4 mils dft.; VOC 110 g/L.
   b. Finish Coat (All steel exposed to view): Waterbased Acrolon 100 Water Based Urethane B65 Series. Two coats at minimum 2.0-4.0 mil dft per coat. VOC <100 g/L.

3. BENJAMIN MOORE
   a. Prime Coat: Waterborne Polyamid Epoxy Gray Primer Series M42. One (1) coat at 1.5 to 2.5 mils dft. 43% solids; VOC 136 g/L.
   b. Finish Coat (All Steel Exposed to View): Waterborne Urethane Semi-Gloss Finish Series M73S. Two (2) coats at 1.5 to 2.5 dft per coat. 38% solids; VOC 213 g/L.

4. GLIDDEN PRO

5. PPG
   b. Finish: Pithane Ultra Gloss Urethane Enamel 95-812 Series, 2 coats

6. Colors: As selected by Architect.

L. Cementitious Fireproofing
1. SW
   a. Finish: ProMar 200 Zero VOC Interior Latex Semi-Gloss B30-2600 Series. Two (2) coats at minimum 1.7 mil dft per coat. 39% volume solids; VOC 0 g/L.

2. PPG
   b. Finish: Pure Performance Interior Semi-Gloss Latex 9-500 Series. Two (2) coats at minimum 1.3 mil dft per coat. 35% to 39% volume solids; VOC 0 g/L.

3. GLIDDEN PRO
   a. Finish: Lifemaster No VOC Interior Latex Semi-Gloss Paint 9200 Series. Two (2) coats.

4. FARRELL-CALHOUN
   a. Finish: Evergreen 100% Acrylic Interior Semi-Gloss Enamel 3300. Two (2) coats at 2.0 mils per coat. 38% volume solids; VOC <5 g/L

M. Exposed Structure - Ferrous (Eg-Shel): Dryfall (Acrylic) Similar to MPI INT 5.1C.
1. SW
   a. Primer: ProCryl Universal Primer, B66-310 Series (2-4 mils dft)
b. Finish: Low VOC Waterborne Acrylic Dry Fall, B42W82 Two coats at minimum 4.5 mils dft.

2. PPG
   b. Finish: Speedhide Interior Super Tech WB Acrylic Dry Fog Latex, 6-725 two coats at minimum 2.5 mil dft per coat.

3. GLIDDEN PRO
   a. Primer: Devflex DTM Waterborne Acrylic Primer #4020PF; 1 coat.


N. Exposed Structure - Galvanized (Flat): Dryfall (Acrylic) Similar to MPI INT 5.3H.
   1. SW
      a. Finish: Low VOC Waterborne Acrylic Dry Fall, B42W82 Two coats at minimum 2.5 mils dft per coat.
   2. PPG
      a. Finish: Speedhide Interior Super Tech WB Acrylic Dry Fog Latex, 6-725 two coats at minimum 2.5 mil dft per coat.
   3. GLIDDEN PRO
      a. Finish: Waterborne Interior Flat Dry Fall #1280; 2 coats.

O. Gypsum Board Walls – Scrub Resistant Paint
   1. Manufacturer/Product: SCUFFMASTER Scrubtough (MASTER COATING TECHNOLOGIES) or equal by TNEMEC or manufacturers listed in 2.01A complying with performance requirements.
   2. Water based; eggshell.
   3. Maximum VOC (EPA Test Method 27): Less than 150 g/L.
   5. System
      a. Primer: Scuffmaster Primemaster Primer/Sealer; 1 coat.
      b. Finish: Scuffmaster Scrubtough Performance Paint with Microban; 2 coats; dft as required for complete coverage.

P. Gypsum Board Walls – Pearlescent Coating
   1. SCUFFMASTER Smooth Pearl (MASTER COATING TECHNOLOGIES) or equal by TEX COTE, POLOMYX or manufacturers listed in 2.01A complying with performance requirements.
   2. System consisting of base coat, pearlescent coat and clear coat.
   3. Water based; smooth finish; satin.
   4. Maximum VOC (EPA Test Method 27): Less than 150 g/L.
   5. System
      a. Primer: 1 coat acrylic high-solids. Type as recommended by finish coat manufacturer.
      b. Base Coat: Scuffmaster Master-Coat 100; dft complete coverage
      c. Pearlescent Coat: Scuffmaster Clear Pearl Coat; applied in 2-3 passes to match Architect approved sample.

2.06 COATINGS AND FINISH MATERIALS SCHEDULE
A. Metals – Steel and joist surfaces that will be concealed after erection, such as, the top flange or steel embedded in concrete and masonry.
   1. TNEMEC
      b. Finish: Series L69F Epoxoline II.
   2. CARBOLINE
      a. Primer: Carbozinc® 18 WB
      b. Finish: Carboguard 890
   3. GLIDDEN PRO
      c. Field Spot Primer: Devoe Coatings Devran 201H Universal Epoxy Primer.
   4. SHERWIN-WILLIAMS
      a. Shop Preparation and Shop Primer: See Section 05 12 00.
      b. Field Preparation: SSPC SP-11.
      c. Field Spot Primer: S-W does not have equal to primer listed
      d. Finish: DuraPlate 235 Epoxy, B67W235 @ 3.0 to 4.0 mils DFT.

B. Metals: Exposed structural framing and metal deck in areas.
   1. TNEMEC
      a. Finish: Series 115 Unibond DF @ 2.0 to 4.0 mils DFT.
   2. CARBOLINE
      a. Finish: Galoseal Finish @ 2.0 - 4.0 DFT
   3. GLIDDEN PRO
   4. SHERWIN-WILLIAMS
      a. Shop Preparation and Shop Primer: See Section 05 12 00 and 05 30 00.
      b. Field Preparation: SSPC SP-11.
      c. Finish: S-W Spraylastic Exterior S/G Dryfall @ 2.0 to 4.0 mils DFT, B42W17, 43% Solids, VOC <100 g/l

C. Pavement / Traffic Marking Paint
   1. Type: Alkyd or latex.
   2. Color: White; unless indicated otherwise on drawings
   3. Sheen: Flat
   4. Percent Solids (by weight): 70% to 78%.
   5. Reference: (Alkyd) TT-P-115F Type 1; (Latex) TT-P-1952B Type 1.
   6. Drying Items: Under normal field conditions, paint shall be dry to the touch, be free from pickup within 20 minutes, and completely dry within one hour.
   7. Bleeding: Paint shall not bleed or discolor when sprayed on bituminous surfaces.
   8. Manufacturer/Product: PORTER GUARD Alkyd Zone Marking Paint #PP1418 (white) / #PP1419 (yellow); PITTSBURGH PAINTS Traffic and Zone Marking #11-3 (white) #11-10 (yellow); SHERWIN WILLIAMS Setfast Acrylic Waterborne Traffic Marking Paint #TM226 (white) #TM225 (yellow) or equivalent by ICI PAINTS or WILSON PAINT COMPANY.

PART 3   EXECUTION
3.01 INSPECTION

A. Examine substrate surfaces and installation condition. Report condition(s) that might affect proper application.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

C. Initial application of paint to a surface constitutes acceptance of existing conditions and responsibility for satisfactory performance.

D. Examine specification sections of other trades and their provisions regarding painting. Surfaces left unfinished shall be painted or finished as part of the work of this Section unless specifically noted otherwise.

3.02 SURFACE PREPARATION

A. General
   1. Broom clean and remove excess dust before painting is started in any area
   2. Broom cleaning not permitted after operations have begun in the area.
   3. Surfaces shall be clean, dry and adequately protected from dampness.
   4. Surfaces shall be free of any foreign materials that will adversely affect adhesion or appearance of applied coating.
   5. Remove any mildew and neutralize the surface prior to applying coating.

B. Existing Surfaces Scheduled for Painting or Finishing
   1. Condition, clean, sand, prime, seal and prepare existing surfaces for application of finish materials specified. Provide only finish coats over existing surfaces except where condition of existing surfaces or type of existing surface requires priming and sealing.
   2. Remove loose, blistered, scaled, or crazed finish to bare base material.
   3. At conditions where new work adjoins existing work, prepare existing surface extending to the nearest break in the plane of the surface.

C. Concrete Masonry and Concrete
   1. Remove splatters, dust, dirt by brushing or water washing with clear water
   2. Remove misplaced mortar.
   3. Cracks, abrasions and other defects shall be cut out, patched flush, and sanded smooth and sealed before applying prime coat.
   4. Existing Surfaces
      a. Surfaces with minor loose or blistered paint: Remove loose, flaking, blistered paint; clean as specified. Fill surface cracks with approved latex base filler; apply primer-sealer over substrate and filled cracks
      b. Multi-coated surfaces with major loose or blistered paint requiring complete paint removal: Remove paint down to bare substrate using chemicals, pressure methods, or other acceptable methods. Fill contraction and structural cracks with self-bonding filler or elastomeric sealant worked well into the cracks to prevent leaks, then wipe excess materials from the surface. Apply a latex base or other acceptable prime and fill material to fill all defects and holes, wipe excess material off surface; let filler material dry for 24 hours minimum before applying primer.
D. Wood - Painted
1. Prime and backprime interior finish wood products, before their installation, with interior wood prime paint.
2. Sandpaper to smooth and even surface, dust off.
3. Countersink nails.
4. Remove resin with scrapers, sandpaper, mineral spirits or turpentine.
5. Apply shellac or knot sealer to all knots, pitch and resinous sapwood, allow to dry thoroughly prior to priming.
6. After priming, putty all nail holes, cracks, open joints and other defects, sand smooth and dust off. Color putty to match primer; if putty is not compatible with finish, spot prime puttied areas.

E. Wood - Stained
1. Prime and backprime faces, edges and end with first coat before installation.
2. Sandpaper to smooth and even surface, dust off.
3. Countersink nails.
4. Putty all nail holes, cracks, open joints and other defects with mixture of stain and putty so that appearance of completed work is uniform. Sand smooth and dust off.

F. Structural Steel and Miscellaneous Ferrous Metal
1. Bare Metal Surfaces
   a. Remove grease, oil, dirt and other foreign material prior to prime coat application as needed according to SP-1, SP-2 and/or SP-3.
   b. Remove rust prior to prime coat application according to SP-11.
   c. Include all hangers and miscellaneous fabricated items.
2. Shop Primed Surfaces
   a. Fill open joints or abrasions in shop prime coat with filler; feather edges, sand smooth, and touch-up with primer compatible with shop primer. Extend primer beyond treated area.
   b. Remove grease, oil, dirt and other foreign material prior to prime coat touch-up where necessary per SP-1, SP-2 and/or SP-3.
   c. Include all hangers and miscellaneous fabricated items.

G. Galvanized or Zinc-Coated Items
1. Pretreat surfaces prior to application of prime coat with phosphate pretreatment, unless prime coat material to be used is recommended by its manufacturer for direct application over zinc treated surfaces of the type at hand. Follow manufacturer's directions.
2. Remove dirt or grease on surfaces scheduled for paint finish according to SP-1. Wipe dry with clean cloths.
3. Roughen surface with steel wool as necessary to remove gloss.

H. Gypsum Board
1. Fill minor irregularities with spackling paste.
2. Sand to smooth level surface and dust off.
3. Avoid raising nap of paper.

I. Plaster: Allow to cure a minimum of 2 weeks before finishing. Provide sonic moisture meter test results to confirm that plaster is dry and ready for paint.
J. Factory Primed Items: Verify compatibility between factory applied primer and finish painting system. If compatibility cannot be guaranteed, then provide barrier coat compatible with both finishes.

K. Aluminum and aluminum-alloy, lead, copper, and other nonferrous metal surfaces: Solvent clean in accordance with SSPC SP 1 and wash with mild non-alkaline detergent to remove dirt and water soluble contaminants. If aluminum does not come from the manufacturer with an approved paint grip finish, consult the coating manufacturer for the appropriate surface preparation requirements. Minimum requirement to meet SSPC SP 16.

3.03 APPLICATION

A. General
1. Apply all paint in strict accordance with the manufacturer's instructions. Data sheets take precedence over these specifications if more restrictive, except for the minimum DFT specified in the schedule.
2. Do not apply until preceding coat is dry to manufacturer's recommendations.
3. Do not apply on any surface unless it is thoroughly dry.
4. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes if moisture content of surface is greater than recommended by manufacturer.
5. Do not use material that has exceeded the pot life stated by the MFR.
6. Apply to the following workmanship requirements:
   b. Absence of ridges, sags, runs, drops, laps, unnecessary brush marks, holidays, air bubbles and excessive roller stipple.
   c. Thorough mixing of paint and limited use of thinners.
   d. Uniformity of film thickness.
   e. Proper drying time between coats.
   f. Protection of unpainted and finished surfaces.
7. Coverage and hide shall be complete. When color or undercoats show through final coat, recoat until the paint film is of uniform finish, color, appearance, and coverage, at no additional cost to Owner.
8. Edges of paint or finish adjoining other materials or colors shall be sharp and clean without overlapping.

B. Methods
1. Application may be by roller, brush, spray or other approved means.
2. When utilizing spraying, be careful not to use methods which will affect other trades work in adjacent areas.

C. Mixing
1. Mechanically mix before use.
2. Agitate during application as required.
3. Do not tint or shade in field unless permitted by Architect.

D. Thinning
1. Dilute only as required to achieve suitable application viscosity.
2. Use only type and amount recommended by manufacturer.
E. Approvals: Do not apply succeeding coat of paint until previous coat has been inspected and written approval is given.

F. Electrical Conduits
1. Do not paint any electrical conduit or boxes unless they are exposed and abutting a surface that is to be painted or stained.
2. Conduits and boxes to be painted shall be given a coat of galvanizing pretreatment followed by the paint system for the adjoining surface.

G. Protection of Surfaces
1. Provide covers, drop cloths and masking to protect unpainted surfaces previously finish painted. Use special care in protecting electrical and mechanical items which may be damaged by the painting operations (i.e., overspray and solvents that might damage the internals of the item).
2. If possible, remove items not to be painted such as hardware, accessories, electrical plates, lighting fixtures and/or trim, mechanical grilles and louvers and similar items in contact with painted surfaces.
3. Use caution when painting exterior work to avoid wind carrying overspray, drippings, etc., onto adjacent structures, facilities and vehicles.
4. Following completion of painting, reinstall removed items by workmen skilled in the trade involved and remove all covers, masking and drop cloths.

H. Fire and Smoke Partitions
1. Identify partitions above ceilings on both sides of partitions except within shafts in letters not less than 2 1/2 inches high.
2. Stenciled message: "SMOKE PARTITION" or, "X HOUR FIRE PARTITION" as applicable.
3. Locate not more than 20 feet on center on corridor sides of partitions, and with a least one message per room on room side of partition.
4. Use semi-gloss paint of color that contrasts with color of substrate.
5. Locate approximately 12" above ceiling tile.

END OF SECTION
SECTION 10 11 00
VISUAL DISPLAY SURFACES

PART 1 GENERAL

1.01 WORK INCLUDED
A. Provide the following items, as specified herein and indicated on the drawings:
   1. Tackboards
   2. Markerboards
   3. Glass markerboards, magnetic.

1.02 RELATED SECTIONS
B. Wood Blocking: Section 06 10 00.

1.03 REFERENCES
A. ASTM International
   1. ASTM C1036 Specification for Flat Glass
   2. ASTM C1048 Specification for Heat-Treated Flat Glass-Kind HS Coated
      and Uncoated Glass
B. ANSI - American National Standards Institute
   1. ANSI Z-97.1 Safety Performance Specifications and Methods of Test
      Used in Buildings

1.04 SUBMITTALS
A. Samples: Submit samples of color finishes for all items specified for selection by
   Architect.
   1. Submit 6" length sample of trim required.
B. Shop Drawings: Submit drawings showing sizes, arrangements, accessories and
   installation details of all items specified.
C. Submit manufacturer's product data showing reference numbers, construction
   details and methods of assembly.
D. Guarantee
   1. Markerboard: Provide written guarantee to the Owner signed by an officer
      of the manufacturer of the marker board stating that all marker boards
      which do not retain their original writing quality, original erasing quality and
      original visual acuity for 5 years after date of acceptance will be replaced
      without charge to the Owner.
E. Cleaning Instructions: Provide written instructions for any care, maintenance and
   cleaning required beyond normal custodial care.
1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original unopened shipping cartons. Store indoors in clean, dry area in manner to prevent warping or physical damage.

B. Protect work from dust, dirt and physical damage during and after installation until final acceptance.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. POLYVISION; CLAIRIDGE PRODUCTS AND EQUIPMENT; ADP LEMCO; PLATINUM VISUAL SYSTEMS; GHENT MANUFACTURING, DRAPER.

2.02 MARKERBOARD

A. Description: Steel sheets with nickel cobalt primer coat of .002" min. thickness and surface coat of high fired type porcelain frits of .0025" min. thickness; laminated to 3/8" particleboard core and aluminum foil panel backing.

B. Color: White.

C. Trim: Extruded aluminum perimeter trim approximately 5/8" wide; marker trough with end closures (approximately 3-1/4" from face of wall); map rail with cork insert (approximately 1" wide).
   1. Finish: Clear anodized.
   2. Provide 2 map hooks per 4’ of chalkboard.

D. Provide all required mounting devices for installation without exposed fasteners.

E. Sizes: As indicated on drawings.

2.03 MAGNETIC GLASS MARKERBOARD

A. Manufacturers
   1. Basis of Design: Drawings and specifications are based on GLASPRO.
   2. Other Manufacturers: Glass boards manufactured by HIGHTOWER GROUP, FORMS + SURFACES or CLARUS GLASSBOARDS are acceptable provided they meet the Basis of Design requirements and the design intent indicated.

B. Materials
   1. Description: Single sided magnetic; polished edges, holes and cutouts.
   2. Sizes: As indicated on drawings.
   4. Thickness: 5/16”.
   5. Provide all required mounting devices and trim for installation without exposed fasteners. Provide one marker tray for each board.
2.04 TACKABLE WALLBOARD

A. Provide vinyl faced fiberboard tackboard in areas indicated. Conform to the following:
   1. Description: ½" thick 7 pcf fiberboard with Type I vinyl facing. Colors as selected by Architect.
   2. Manufacturer: POLYVISION or manufacturers listed under Article 2.01.
   3. Limits: Extend from floor to ceiling.
   4. Joints: Butt type; wrap facing around joints; similar to POLYVISION Type C-2.
   5. Mounting: Adhesive mount to substrate; use methods and material as recommended by manufacturer.

2.05 FABRICATION

A. Fabricate and factory assemble complete units where possible. Frames shall be straight and square with joints tight and neat.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify building items affecting this section are placed and ready to receive work.

B. Field measurements shall be taken to verify that boards will fit in their designated locations.

C. Install wood grounds or wood blocking as required.

3.02 INSTALLATION

A. Workmanship
   1. Install boards straight and level and securely anchored in place.
   2. Leave surfaces clean and free from defects at time of final acceptance.

B. Clean-up: Remove all cartons, debris, scraps, etc. and leave spaces clean and have boards ready for use.

END OF SECTION
PART 1 GENERAL

1.01 WORK INCLUDED

A. Work includes:
1. Room numbers.
2. Room identification.
3. Restrooms (Wheel Chair Accessible and Non-Accessible)
4. Stairwell identification.
5. Floor identification (stairwell).
6. Directional/Informational signs.
7. Elevator door jamb plate (floor numbering).
9. Posted occupancy limit.
10. Elevator fire emergency plaque.
11. Tactile (ADA) exit signs
12. No Smoking signage.

B. All signs which identify permanent facilities/accommodations shall be tactile and braille and limited minimally to room numbers, restrooms, stairways, floor identification, elevators and room names as deemed appropriate by the Owner.

1.02 SUBMITTALS

A. Shop Drawings: Submit manufacturer’s product data, where applicable, and complete drawings showing all identifying devices and installation details in accordance with the requirements of the General Conditions.

B. Samples: Submit samples for materials, finishes, colors, letter styles, etc., as required for selection and approval by A/E prior to fabrication of identifying devices.

C. Final signage schedule must be approved by Owner prior to fabrication. Submittal to Owner should be made through the Architect.

1.03 QUALITY ASSURANCE

A. Signage Standards: Conform to the Americans with Disabilities Act (ADA) Standards where applicable and to the extent as indicated.

B. Acceptable Manufacturers: All units are to be custom fabricated; manufacturer’s products meeting the specifications will be acceptable. Manufacturers must be regularly engaged in fabrication and installation of signage units and related identifying devices.

1. Fabricator shall make at least one visit to the site before production begins to review all sign locations and installation conditions with Architect and Owner’s representative.
2. Fabricator must review all dimensional changes with Architect.

C. Approvals: All identifying devices shall be approved at the fabricator's shop by the Architect prior to shipment and installation.

D. Spelling and Braille Accuracy: Responsibility of sign manufacturer.

E. The Owner has the right to renumber the room numbers during construction. Manufacturer must not begin fabrication of room number plates until room numbers have been approved by the Owner, in writing, through the Architect.

F. Room identifications will be provided to the Contractor by the Owner during construction.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original shipping cartons with seals unbroken.

B. Protect materials from physical damage.

C. Store materials in clean, dry area.

D. Inspect all materials prior to installation to assure proper function and condition of all items.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Locations, Quantities, Graphics and Copy: As indicated on drawings and/or specified (scheduled) herein.

2.02 MATERIALS

A. Plates: High pressure phenolic "ES" plastic; scratch resistant, non-static, thermoset, rated self-extinguishing.
   1. Colors: As selected by Architect.
   2. Thickness: 3/32" for ADA plates; 1/16" for non-raised copy (flat) plates.

B. Changeable Copy: Provide 3/32" thick plastic back-up plate laminated to back of face plate to create slot for removable nameplates.

C. Provide an integral method to create tactile and Braille signs; producing a unitary component. Glued on or laminated letters or Braille cells are not acceptable.

2.03 DESIGN GUIDELINES

A. Plate Shape: Square cornered; do not bevel edges.

B. Letter Style
1. ADA Signs: Helvetica medium, all capital letters.
2. All Other Signs: Helvetica medium, mixed upper and lower case.

C. Tactile Letters and Braille: Grade II braille; raised 1/32” above background surface. Provide Braille dome topped same color as background. Sign manufacturer shall be responsible for verifying accuracy of spelling, both tactile and Braille.

D. Letter Size
1. Tactile Signs: Minimum letter size is 5/8" for capital letters. Room numbers to be 1”.
2. Non-tactile Signs: Between 3/8" and 1" capital letter height. Larger letters are permitted on directional signs or on signs where reading distance is greater than 15'-0”.

2.04 METHOD OF MANUFACTURING

A. Tactile Signs: Relief engraved plates.
B. Non-Tactile Signs: Routed engraved.

2.05 SIGNS REQUIRED FOR TACTILE/BRAILLE

A. Room Numbers: 2-1/4" x 6-3/4" plate with 1" numerals centered horizontally on plate with Braille directly below numerals.

B. Room Identification: This sign is in addition to Room Number specified in 2.05A.
1. Size determined by copy requirements, laid out flush left with 3/4” margin on left, room name in 5/8" caps with Braille directly below type copy, all flush left.

C. Restrooms - Wheel Chair Accessible: Approximately 6” wide x 8” high plate with 1" capital letters (MEN or WOMEN), centered on the plate with Braille centered directly below the word. Provide a routed engraved wheel chair access symbol and a universal man or woman symbol located above the word. No border.

D. Restrooms - Non-Accessible: Two plates required.
1. 6-3/4” wide by 3-3/4” high plate with 1" room number centered horizontally on plate with Braille centered directly below numerals. "Men" and "Women" will appear in 3/4 inch capital letters, centered horizontally on the plate with Braille centered directly below the word.
2. 6-3/4” x 6-3/4” plate with 5/8” raised caps informing location of nearest accessible restroom. Same message in Braille centered below copy.

E. Stairwell Identification: 2-1/4” x 8-1/4” plate with 3/4” capital letters centered on plate. Braille centered directly below the type copy.

F. Floor Identification - Inside Stairwells: 2-1/4” x 8-1/4” plate with 3/4” capital letters (1st FLOOR, 2nd FLOOR, etc.) centered on plate. Braille centered directly below the type copy.
G. Directional/Informational Signs: Wall mounted; non-tactile; in upper and lower case. Letter height shall be at least 1" cap height for directional signs. Letter sizes for informational signs may be less than 1".

H. Elevator Door Jamb Plate: 3-3/4" x 3-3/4" plate with 2" numerals centered horizontally on plate with Braille centered directly below numerals.

I. Tactile (ADA) Exit Signs: Approximately 5" x 3" plate with minimum 3/4" high capital letters centered on plate. Braille centered directly below the type copy.

2.06 SIGNS REQUIRED FOR NON-TACTILE/BRAILLE SIGNAGE

A. Plate Shape: Square cornered; do not bevel edges.

B. Plate Heights
   1. 2-1/4" for one line of copy.
   2. 3-3/4" for two lines of copy.
   3. 5-1/4" for three lines of copy.

C. Changeable Copy Plates
   1. Height: Same as in "B" above.
   2. Length: 7-1/2"
   3. Face openings of slot: 1" high with 3/4" margin at ends and bottom.
   4. Allow 1/2" vertically between slot openings.
   5. Slots behind openings: Allow for 1-1/4" wide x 1/16" thick blank changeable copy strips supplied by the Contractor for future engraving by Owner.
   6. Tactile room numbers with Braille may appear on the face of the sign frame.

2.07 EMERGENCY ESCAPE DIRECTORY

A. Description: 18" x 12". Extruded aluminum "F" frame with anodized medium bronze finish and non-glare acrylic face. Provide with rigid masonite backing.

B. Copy: Color screen printed removable graphic of floor plan showing escape route from installed location. Locate at elevators and stair doors at each floor, and at building main entrance.

2.08 COPY POSITION

A. Lines of copy laid out flush left with a margin of 3/4" along the left edge of plate. Exceptions are small room numbers, restrooms and stairways shall be centered on the plate.

B. Left hand, right hand and bottom margins are 3/4". Vertical spacing measured between lower case letters is 3/4". Overall width and height of a plate is achieved with multiples of 3/4".

C. Locate directional arrows in upper left hand corner of plate. Arrows count as one line of copy.
2.09 ELEVATOR FIRE EMERGENCY PLAQUE

A. Description: Approximately 12" x 12". Text to read, "in case of fire use stairs" in 1" letters with Braille centered below. Graphics to include international wheelchair and stair symbols.

2.10 POSTED OCCUPANCY LIMIT

A. Posted Occupancy Limit: Provide sign reading, "Maximum Occupants Permitted This Space". Provide signage in accordance with IBC 1004 "Posting of Occupant Load". Locate signs in the following rooms:

- Pre-function 121
- Cave 142
- Gaming 142D
- Main Corridor 143
- Lounge 145
- Collaboration (Lower Level x2)
- SORC Forum 211
- Meeting 217
- Meditation 218
- Meeting 219
- Lounge 271
- East Tennessee Room 272
- Lounge 274
- Forum 311
- Ballroom Pre-function 330
- Dining 360
- Private Dining 366
- Dining 389
- Outdoor Dining Terrace (Upper Level)
- Collaboration (Upper Level)

**PART 3 EXECUTION**

3.01 INSTALLATION

A. Mount signs plumb and level.

B. Mount all identification devices with 3/4" foam tape on all four edges.

C. Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.

3.02 SIGNAGE SCHEDULE

A. Provide the following Sign Plates

1. Room Identification Signs: For bidding purposes, each sign will contain 20 symbols/characters arranged in two lines.
2. Women, combined with room number and handicap symbol and
international symbol, as applicable, at each restroom.

3. Men, combined with room number and handicap symbol and international symbol, as applicable, at each restroom.

B. Provide room numbers at all door locations.

C. Stairwell Identification: Provide at all stair doors.

D. Floor Identification: Provide inside stairwell at all stair doors.

E. Elevator Fire Emergency Plaque: Provide at each elevator stop.

F. Elevator Door Jamb Plates: Two plates required per elevator door, one on each side of the jamb.


H. Directional/Informational Signs: For bidding purposes, provide one per stair door on each floor and an additional one per lobby and vestibules on the entry floor. Each sign will contain 25 symbols/characters arranged in two lines. Locate as directed by Architect.

I. Posted Occupancy Limit: As specified hereinbefore.

J. Tactile (ADA) Exit Signs: as indicated on drawings

K. Sign Locations
   1. Single Doors: Locate signs on the wall next to the latch side of the door, 1" from the outside edge of the door frame and with the top edge of the uppermost sign 61-1/2" A.F.F.
   2. Pairs of Doors: Locate signs as specified above for single doors, except Architect will direct in field if sign occurs on right or left jamb of opening.

3.03 CLEAN UP

A. After completion of work remove all debris and tools from the premises, clean all adhesive spatter and run-over from finished surfaces and wash all plated clean of fingermarks and soil. Polish sign surfaces with a soft cotton rag.

END OF SECTION
SECTION 10 14 19

DIMENSIONAL LETTER SIGNAGE

PART 1  GENERAL

1.01  DESCRIPTION

A. Provide wall mounted building identification letters.

1.02  SUBMITTALS

A. Layout Drawings: Provide full size layout drawing indicating letter style, size and spacing.

B. Product Data: Submit for each cast dimensional character specified, including details of construction relative to materials, dimensions, gages, profiles, method of mounting, specified options, and finishes.

1.03  PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver in manufacturer's original unopened protective covering.

B. Store in original packing.

C. Handle so as to prevent damage.

PART 2  PRODUCTS

2.01  MATERIALS

A. Material: Cast aluminum; alloy and temper as recommended by sign manufacturer for the casting process used and for the use and finish indicated.

B. Fasteners: Use concealed fasteners fabricated from metals that are not corrosive to the sign material and mounting surface.

C. Anchors and Inserts: Use nonferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Furnish inserts, as required, to be set into masonry work.

2.02  DIMENSIONAL LETTERS

A. Cast Letters: Form individual letters by casting. Produce characters with smooth, flat faces, sharp corners, and precisely formed lines and profiles, free from pits, scale, sand holes, or other defects. Cast lugs into the back of characters and tap to receive threaded mounting studs. Comply with requirements specified for finish, style and size.
B. Text: THE D.P. CULP UNIVERSITY CENTER.
C. Letter Style: to be determined by Owner / Designer; all uppercase.
D. Size: 12" and 18" high; see drawings for locations.
E. Thickness: 1 ½ ".

2.03 GENERAL FINISH REQUIREMENTS
A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
C. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.04 FINISH
A. General: Comply with NAAMA "Metal Finishes Manual" for finish designations and applications recommendations.
B. All exposed aluminum surfaces: Architectural Class II, medium bronze anodized finish.

2.05 MANUFACTURERS
A. Manufacturer: Subject to compliance with requirements, letters manufactured by A.R.K. RAMOS, ANDCO INDUSTRIES CORP., ASI SIGN SYSTEMS or VOMAR PRODUCTS, INC. are acceptable.

PART 3 EXECUTION
3.01 EXAMINATION
A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

3.02 INSTALLATION
A. Securely install in location indicated on the drawings in accordance with manufacturer's written instructions and recommendations.

1. Install letters level, plumb, true to line and at heights and locations indicated, with surfaces free from distortion or other defects in appearance.
2. Mount letters with 1” projection from wall surface.

3.03 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION
PART 1  GENERAL

1.01  WORK INCLUDED

   A. Provide phenolic toilet partitions and urinal screens with related components and accessories for complete installations.

1.02  RELATED SECTIONS

   A. Toilet Accessories: Section 10 28 13.

1.03  SUBMITTALS

   A. Shop Drawings: Include the following:
      1. Manufacturers product data.
      2. Plans, elevations, details of construction, sizes of openings, anchoring devices, leveling details, hardware fittings, and fastenings.

   B. Color Selector: Complete range of manufacturer's colors.

1.04  QUALITY ASSURANCE

   A. Take field measurements prior to fabrication to assure proper fitting.

   B. Provide setting drawings, templates, instructions and directions for installation of anchorage devices.

   C. Installer Qualifications: Minimum five (5) years continuous experience installing toilet compartments on projects of equivalent size, quantity and complexity.

   D. Regulatory Requirements: Conform to ANSI A117.1 code for access for the handicapped operation of toilet compartment door and hardware.

1.05  DELIVERY, STORAGE AND HANDLING

   A. Deliver items in manufacturer's original unopened protective packaging. Store materials in original packaging to prevent soiling, physical damage or wetting.

   B. Handle so as to prevent damage to finish surfaces.

PART 2  PRODUCTS

2.01  DESCRIPTION

   A. Type: Floor mounted, overhead braced type, standard height, width as required to fit between walls or as indicated.
B. High Density Polyethylene: High Density Polyethylene Solid Plastic component material shall be of 1” thick polymer resin construction.
   1. Fire Classification: ASTM E84, Class II.
      a. Flame Spread: 70.
      b. Smoke Density: Under 100.
      c. Colors: As selected by Architect

C. Hardware and Accessories
   1. Headrail: Aluminum extrusions, clear anodized finish; with anti-grip configuration; fastened to the pilaster tops.
   2. Hinges: Gravity type, adjustable to hold door open at any angle up to 90 degrees. 3 hinges per door.
   3. Latch: Minimum 14 gage. Recessed latch unit. Latch units shall have emergency access capability.
      a. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.
   4. Keeper: Minimum 11 gage. Covers top and bottom of latch when door is in closed/locked position.
   5. Stops: Minimum 11 gage. 2 required per door.
   6. Brackets: U-shaped channels, aluminum, anodized and polished with 3 brackets per connection
   7. Shoes: Nominal 4” high, one piece, stainless steel shoe to conceal leveling device on stiles. #4 finish.
   8. Coat Hook and Bumper: Manufacturer's standard unit, rubber tipped for in-swinging doors.
   9. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors
   10. Coat Hook: Manufacturer's standard at out-swinging doors.

D. Urinal Screen: Provide wall mounted type consisting of ¾” thick screen panel and required fittings and hardware.

2.02 FABRICATION

A. Reinforcement
   1. Provide threaded steel inserts and reinforcement for installation of hardware, fittings, brackets and accessories specified elsewhere.
   2. Where grab bars attach to toilet partitions, reinforce as required to support 300 pounds, minimum.

B. Panels, Doors, Posts and Stiles
   1. Provide leveling devices at floor, bolted to panels and concealed with removable shoes as specified below.
   2. Ease edges for smooth surface, free of sharp corners.
   3. Panels and doors to be approximately 58” high; provide bottom 12” above floor.
   4. Door Dimensions: Unless otherwise indicated, furnish 24” wide in-swing doors for ordinary toilet compartments and minimum 32” wide (clear
opening) out-swing doors for compartments that meet the requirements of the Americans with Disabilities Act (ADA).

2.03 MANUFACTURER

A. Subject to compliance with specified requirements, provide partitions by one of the following:
1. ACCURATE PARTITIONS CORPORATION.
2. AMPCO, INC.
3. BRADLEY CORPORATION
4. COMTEC INDUSTRIES/CAPITOL PARTITIONS.
5. GENERAL PARTITIONS MFG. CORP.
6. GLOBAL STEEL PRODUCTS CORP.
7. HADRIAN
8. KNICKERBOCKER PARTITION CORPORATION.
9. METPAR CORP.
10. SANTANA PRODUCTS, INC.
11. SCRANTON PRODUCTS

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's specifications.
1. Field verify dimensions.
2. Securely fasten in place, neat, level and plumb.
3. Evidence of drilling, cutting and fitting to room finish shall be concealed in finished work.
4. Adjust doors to swing freely and to remain open approximately 6" when unlatched.
5. Set units with not more than 1/2" between pilasters and panels, and not more than 1" between panels or doors and walls.
6. Adjust bottoms of doors level when doors are in closed position.
7. Clean exposed surfaces and touch-up minor finish imperfections using materials and methods recommended by partition manufacturer and as acceptable to Architect.

END OF SECTION
SECTION 10 26 00

WALL PROTECTION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Work under this section includes the following:
1. Resilient wall panels.
2. Resilient corner guards

1.02 REFERENCE STANDARDS

2. ASTM E84 - Surface Burning Characteristics of Building Materials.
3. UL - Underwriters Laboratories Classifications.

1.03 QUALITY ASSURANCE

A. Manufacturer: Firm with minimum five years experience in successfully producing wall guards and wall panels similar to that indicated for this project.

B. Installer qualifications: Engage an installer who has no less than 3 years experience in installation of systems similar in complexity to those required for this project.

C. Fire performance characteristics: Provide engineered PETG wall protection system components with UL label indicating that they are identical to those tested in accordance with ASTM E84 for Class 1 characteristics listed below:
1. Flame spread: 25 or less
2. Smoke developed: 450 or less

D. Impact Strength: Provide assembled wall protection units that have been tested in accordance with the applicable provisions of ASTM F476.

E. Chemical and stain resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D543.

F. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01 33 23.

B. Shop Drawings: Clearly indicate the following for each type of wall protector:
1. Type of wall protector identified by manufacturer's model numbers including profiles, sizes, accessories and finish.
2. Types and sizes of wall anchors for each type of wall construction.
C. Samples: 6" long full size samples representative of each type of wall protector specified.

D. Manufacturer's certification indicating compliance with ADA Accessibility Guidelines for Protruding Objects.

1.05 DELIVERY, HANDLING AND STORAGE

A. Products shall be delivered to job-site in original unopened packages bearing manufacturer's labels.

B. Store and protect products in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.01 WALL PANELS

A. Description: Vinyl/acrylic sheet (.022") factory bonded to 3/8" thick fiber board core. Factory bond moisture resistant balance sheet to backside of panel.

1. Edges: Beveled; vinyl/acrylic sheet extending to all edge surfaces.
2. Color: As selected by Architect.

B. Manufacturer: High Impact Panels (Acrovyn) by DECOGARD PRODUCTS or equal by BALCO METALINES, KOROSEAL, PAWLING or IPC.

2.02 RESILIENT CORNER GUARDS

A. Description: Assembly consists of extruded aluminum retainer (0.063") and textured high impact snap-in acrylic cover (0.11").

B. Vinyl/Acrylic Cover: U.L. classified. Tested in accordance with ASTM E84 meeting both flame spread and smoke development requirements for Class 1 rating.
2. Smoke Developed: 250 - 450.

C. Wing Width: 2".

D. Angle: 90 degrees.

E. Length: 6'-0".

F. Manufacturer: Type CGS-2 by BALCO/METALINES; FS-20 by CONSTRUCTION SPECIALTIES, INC.

G. Color: As selected by Architect.
**PART 3 EXECUTION**

3.01 EXAMINATION

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. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer’s instructions.

B. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer’s installation instructions.

3.03 INSTALLATION

A. Install items in accordance with manufacturer's instructions and directions.

B. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
   1. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.
   2. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches.
   3. Adjust termination caps as required to ensure tight seams.

C. Impact-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.04 CLEANING

A. Remove protective material from all wall protectors and clean in accordance with manufacturer's recommendations.

B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.05 PROTECTION

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION
SECTION 10 28 13

TOILET ACCESSORIES

PART 1  GENERAL

1.01  SCOPE

A. This section covers all toilet accessories. Extent of each type of accessory is indicated on the drawing and specified herein.

B. Included are accessories for:
   1. Toilet rooms.
   2. Janitor rooms.
   3. Kitchens, Break Rooms and similar areas with sinks.

C. Coordinate toilet partition mounted items with partition manufacturer for proper fastener reinforcements.

D. Also included is installation of Owner furnished items. These items are listed herein. Coordinate obtaining items from Owner and installation. Provide Owner with a minimum 72 hours notice prior to installing items. Contractor shall be responsible for items damaged or missing after being received from Owner.

1.02  WORK SPECIFIED IN OTHER SECTION

A. Unframed Mirrors: Section 08 81 00.

1.03  QUALITY ASSURANCE

A. Provide each type of products of one manufacturer. Provide locks with same keying for all accessory units in the project.

B. Stamped names or labels on exposed faces of units not permitted.

1.04  SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each type of toilet accessory required.

1.05  DELIVERY, STORAGE AND HANDLING

A. Delivery accessory items in manufacturer's original, unopened packaging.

B. Store and handle materials in accordance with manufacturer's recommendations. Protect against soiling, damage and wetting.

1.06  PROJECT CONDITIONS
A. Furnish anchoring devices and inserts for installation of toilet accessories. Coordinate delivery of items which must be set or built into other work.

B. Provide setting drawings, templates and instructions for installation of anchorage devices.

1.07 WARRANTY

A. Submit mirror manufacturer’s written ten year warranty against silver spoilage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Where a manufacturer's product is specified as a Basis of Design, equal products as manufactured by BOBRICK, BRADLEY, AJW, AMERICAN SPECIALTIES, may be used provided the product meets the requirements of the specifications, unless otherwise indicated.

2.02 ITEMS

A. Toilet Paper Holder: Owner furnished / contractor installed

B. Soap Dispenser Owner furnished / contractor installed

C. Handicap Bars: BRADLEY Series 812
   1. Diameter: 1-1/2 inch.
   3. Fasteners: Concealed.
   4. Style and Length
      a. As indicated; where not indicated provide 42” long horizontal and 18” vertical bars.
      b. Provide both horizontal and vertical bars in conformance with ANSI A117.1, 604, 608 and 609.

D. Paper Towel Dispenser: Owner furnished / contractor installed

E. Waste Receptacle: Owner furnished / Owner installed

   1. Type: Surface mounted on toilet partition. Hinged bottom for disposable liner removal.

G. Mirrors
   1. Standard Framed Type: BRADLEY Model 780.
      a. Frame: Stainless steel angle, theft resistant concealed fasteners.
      b. Glass: Tempered 1/4” thick with full silver coating, copper coating and organic coating. Warranted by manufacturer 10 years against silver spoilage.
c. Size: 18" wide x 36" high, unless otherwise indicated or scheduled on the drawings.
2. Unframed Type: Section 08 81 00.

H. Mop Strip: BRADLEY Model 9953.
1. Description: Stainless steel, satin finish back plate with three spring activated rubber cam mop holders.
2. Location: Provide at each janitors sink. Coordinate height with Architect.

2.03 FABRICATION

A. Edges: All throat openings and similar type exposed edges of towel dispensers, seat cover dispensers, waste receptacles and similar type accessories to be hemmed or sufficiently rounded to preclude accidental cuts to users.

B. Miters: Provide one-piece seamless beveled or return flange; open miters, if not welded, must be worked to eliminate sharp edges; edges which may cut or snag are not acceptable.

2.04 SCHEDULE OF ACCESSORIES

A. Location, quantity and mounting height of accessories as indicated on drawings.

B. Keyed Units: Key all similar types of units alike. Provide two keys per unit.

PART 3 EXECUTION

3.01 INSPECTION

A. Installer: Examine substrates, previously installed inserts anchorages necessary for mounting of accessories and other conditions under which installation is to occur.
1. Notify Contractor in writing of conditions detrimental to proper and time completion of the work.
2. Do not proceed with work until satisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions using fasteners which are appropriate for substrate and recommended by manufacturer of unit. Install units and plumb and level, firmly anchored in positions indicated.

B. Provide concealed fasteners wherever possible of types required for substrate conditions encountered.
1. Metal Stud and Gypsum Board: Screws or bolts anchored to 16 gage (minimum) metal plate blocking or wood blocking located within stud space. See Section 09 21 16.
2. Concrete Masonry Units: Integral fasteners (i.e. expansion anchors, etc.).
C. Lead, plastic or fiber plugs are not acceptable.

D. Grab Bars: Coordinate grab bar locations as to right hand or left hand installations with field conditions.
   1. Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F446.

E. Upon completion of installation, adjust each accessory unit for proper operation and clean exposed surfaces. Turn over keys to designated Owner's personnel.

END OF SECTION
SECTION 10 44 00

FIRE EXTINGUISHERS AND CABINETS

PART 1  GENERAL

1.01  WORK INCLUDED

A. Provide fire extinguishers and cabinets as shown and specified; provide units with wall brackets in non-finished areas (i.e. mechanical rooms, electrical rooms, etc.).

1.02  RELATED SECTIONS

A. Masonry (coordination for recessed cabinets): Section 04 00 00
B. Basis of Design for fire extinguishers: Division 21

1.03  QUALITY ASSURANCE

A. Provide fire extinguishers complying with Fire Protection Association (NFPA) Pamphlet No. 10; and as described in Division 21.
B. Provide only new portable fire extinguishers fully loaded, tested and approved by Underwriter's Laboratories (UL), and ready for use.
C. Fire-Rated, Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

1.04  SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
    1. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
B. Samples: Submit 6” x 6” sample for each type of exposed finish required.

1.05  COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
B. Coordinate sizes, locations of recessed fire protection cabinets with wall depths.
    1. Coordinate location of fire extinguisher cabinets prior to construction of concrete masonry walls. Verify recessed type installations and coordinate these locations with the masonry construction.
       a. Provide mason with rough opening size of cabinets.
PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Portable Fire Extinguishers
   1. AMEREX CORP.
   2. CROKER-STANDARD
   3. WALTER KIDDE, THE FIRE EXTINGUISHER CO.
   4. J. L. INDUSTRIES
   5. LARSEN’S MANUFACTURING COMPANY
   6. POTTER-ROEMER
   7. WATROUS

B. Fire Extinguisher Cabinets
   1. CROKER-STANDARD
   2. J.L. INDUSTRIES
   3. LARSEN’S MANUFACTURING COMPANY
   4. POTTER-ROEMER
   5. WATROUS
   6. THE WILLIAMS BROTHERS CORP.

C. Where a specific manufacturer’s product is specified herein it is to establish a level of quality. Products by the other manufacturers listed are acceptable providing they meet these specifications.

2.02 FIRE EXTINGUISHERS

A. Multipurpose Dry-Chemical Type: Fabricate in accordance with NFPA No.10, 10A, and 10L and UL Standards, except hose, gauge face cover, and horn cone parts shall be metal. No plastic or nylon valves, trigger/handle, casing, or gauge will be acceptable. Fire extinguishers, unless indicated otherwise, shall be 10 lb. multi-purpose dry chemical type for use on A, B, and C fires (4A-60BC), with hose and horn. Provide this type throughout facility, unless noted otherwise.

B. Wet Chemical Type: Fabricate in accordance with NFPA No.10, 10A, and 10L, UL Standards, and State Codes, except hose, gauge face cover, and horn cone parts shall be metal. No plastic or nylon valves, trigger/handle, casing, or gauge will be acceptable. Wet chemical extinguisher types specified in Division 21

C. Size: 21-1/2" high x 8-1/2" wide x 5" deep; unless otherwise indicated.

2.03 FIRE EXTINGUISHER CABINETS

A. Provide steel construction, unless stainless steel is otherwise indicated.

B. Basis of Design: Drawings and specifications are based on LARSEN Architectural Line with full glass door. LARSEN catalog numbers are listed to establish a standard of quality and mounting type. Equal products may be provided from the listed acceptable manufacturers. Provide the following wall mounting types where a specific type of cabinet is indicated on the drawings. Where no type is indicated, provide recessed units.
2. Surface Mount - Steel: 2409-SM.
3. Semi-Recessed - Steel: 2409-6R.
5. Surface Mount - Stainless Steel: SS-2409-SM.
6. Doors
   a. Damage resistance / security areas: Solid
   b. All Other Areas: Full glass

C. Coordinate final model size with fire extinguisher.

D. Finish
   1. Steel: Baked enamel, white.
   2. Stainless Steel: No. 4.

E. Mounting Brackets: Provide manufacturer's standard plated finish, heavy duty mounting brackets for surface mounted fire extinguishers. Provide proper size and type for capacity of extinguishers indicated.

F. Fire Rated Cabinets: Listed and labeled to meet requirements of ASTM E814 for fire resistance rating of wall where it is installed.
   1. Construct fire rated cabinets with double walls fabricated from 0.0478 inch thick, cold rolled steel sheet lined with minimum 5/8 inch thick, fire barrier material.

G. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate the words "FIRE EXTINGUISHER" vertically on cabinet door.
   1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

2.04 CABINET FABRICATION

A. Provide standard steel box with trim, frame, door and hardware to suit cabinet type, trim style and door indicated. Weld all joints and grind smooth; miter and weld door frames. Fabricate trim in one piece with corners mitered, welded and ground smooth. Open miters are not acceptable.

PART 3 EXECUTION

3.01 COORDINATION

A. Coordinate location of fire extinguisher cabinets prior to construction of concrete masonry walls. Verify recessed type installations and coordinate these locations with the masonry construction. Provide mason with rough opening size of cabinets

3.02 INSTALLATION

A. Install fire extinguishers and fire extinguisher cabinets where indicated or as directed by Architect in accordance with manufacturer's recommendations. Mount
at heights indicated, when not indicated as directed by Architect.

B. Securely anchor brackets and cabinets to substrate construction with toggle bolts or expansion anchors. Lead, wood or plastic plugs and fasteners are not acceptable.

C. Fire extinguishers are to be fully charged and ready for use when building is turned over to the Owner. Extinguishers shall be certified as fully charged by an approved fire extinguisher service company and shall be tagged or labeled as such.

3.03 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust cabinet doors that do not swing or operate freely.

B. Refinish or replace cabinets and doors damaged during installation.

C. Provide final protection and maintain conditions that ensure that cabinets and doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION
SECTION 11 24 23

WINDOW WASHING SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes, but is not limited to, design and furnishing portable davits, davit sleeves, and davit bases, including fasteners and appurtenances as required or necessary for complete installation.

B. Products Furnished But Not Installed Under This Section:
   1. Davit bases, anchor bolts and lifeline tie-backs.
   2. Quick release intermittent stabilization anchors and inserts on building facade.

1.02 SYSTEM REQUIREMENTS

A. Delegated Design: Design cold formed metal framing assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design Requirements: Manufacturer is responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
   1. Employ registered professional engineer, licensed to practice structural engineering in jurisdiction where Project is located, to engineer each component of window washing system.
   2. Comply with ANSI A39.1, A120.1, and OSHA 1910.28 and 1910.66.
   3. All Vertical Surfaces of Building Exterior: Accessible by means of powered platform or other means included as work of this Section.

C. Performance Requirements: Installation: Withstand 50 MPH wind velocities while being used and remain fully operational at wind velocities up to 25 MPH.
   1. Suspension Rope Angulation and Tie-In Lanyard System: Design to ensure minimum force of 10 pounds against face of building.

D. Structural Requirements: Engineer structural assemblies, davits, sockets and socket bases and components to carry minimum load of 1000 pounds at extreme cable attachment point with minimum safety factor of 4 to 1 against failure.
   1. Provide intermittent stabilization anchors capable of resisting 600 pound load perpendicular and parallel to face of building.

1.03 ACTION SUBMITTALS

A. Product Data: Include major equipment items.

B. Shop Drawings: Stamp shop drawings with seal and signature of professional engineer responsible for design.
1. Submit plans, sections, elevations and details showing sizes, arrangements, materials, thicknesses, finishes, dimensions and other data to clearly explain character and nature of proposed equipment.

2. Include location diagrams for inserts, davits, outriggers, quick release stabilizer anchors, and other items to be built into structure.

3. Submit sequence drawings to illustrate cleaning of all exterior surfaces of building facade from platform; show intended operations can be accomplished in safe and unencumbered manner in conformance with codes and regulations having jurisdiction.

4. Provide large scale roof plans and elevations showing equipment in various positions at various launch points to ensure that clearances and space restrictions have been considered and accommodated. Show special details to allow placement of platforms at each washing position.

5. Verify Project conditions affecting work of this Section and obtain accurate measurements for incorporation into shop drawings.

C. Submit changed condition drawings.

1.04 INFORMATIONAL SUBMITTALS

A. Informational Submittals: Submit following packaged separately from other submittals:

1. Design Data: Submit following information with proposal for review by Architect.
   a. Indicate weights of major assemblies including davits.

2. Support reactions design data.

3. Test Reports: Field test reports signed by independent testing laboratory, verifying compliance with specified and regulatory requirements.

4. Certifications specified in Quality Assurance article.

5. Qualification Data: Manufacturer's, engineer's, and installer's qualification data.

6. Manufacturer's instructions.

1.05 CLOSEOUT SUBMITTALS

A. Closeout Submittals: Submit maintenance data in accordance with Section 01 78 21.

1. Include step-by-step operating procedure directions, parts list, equipment checklist, schematic wiring diagrams, and procedure to be followed during emergency operations.

2. Provide maintenance checklist broken down on weekly, monthly and yearly basis, describing procedures to be followed, time intervals, and materials to be used. Include names, addresses, and telephone numbers of service firms in vicinity of building available to respond within 24 hours of service call.

1.06 QUALITY ASSURANCE

A. Single Source Responsibility: Provide window washing components and systems from same manufacturer or approved by manufacturer.

B. Engineer Qualifications: Registered professional engineer licensed to practice
structural engineering in jurisdiction where Project is located, with minimum of five years experience in design of window washing systems.

C. Manufacturer's Qualifications: Firm solely involved in design, manufacture, and installation of power operated window washing units, that has been actively engaged in this business for not less than 10 years.
   1. Submit evidence when requested, indicating that firm has successfully installed at least three platform powered window washing units of similar type as proposed for use on this Project on buildings over 130 feet in height. Include one installation not less than five years old.
   2. Submit with proposal, concept drawing which demonstrates manufacturer's proposed solution to building requirements showing aspects that may deviate from Drawings and Specifications. Show coordination with building structure, intermittent stabilization locations, layout, plumbing requirements, electrical requirements, and loads imposed on building structure along with description of proposed system operation.

D. Installer Qualifications: Installer employed by manufacturer or approved in writing by manufacturer.

E. Welder Qualifications: AWS certified within past 12 months for each type of weld required.

F. Regulatory Requirements:
   1. Electrical Components and Wiring: Comply with National Electrical Code (NEC) and National Electrical Manufacturer's Association (NEMA) standards.
   2. Comply with federal, state and local codes, ordinances, and requirements pertaining to work of this Section.
   3. Where requirements of governing codes, regulations, laws and rules conflict with these Specifications and are mandatory, comply with regulatory requirements.

G. Certifications: Submit following:
   1. Engineering certifications.

1.07 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference in accordance with Section 01 31 00.
   1. Plan necessary coordination with structural, curtain wall, roofing, plumbing, and electrical trades.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Shop fabricate window washing equipment in sizes as large as practical. Deliver to Project properly packaged and crated to prevent damage during transit and handling.

B. Store materials under cover in dry, clean location, off ground. Remove materials which are damaged or otherwise not suitable for installation from Project and replace with acceptable materials.
1.09 MAINTENANCE


PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide products from one of the following:
   1. Equicon, Inc.
   4. Sky Climber, Inc.
   5. Spider Staging Corporation
   6. Swingstage Inc.

2.02 MATERIALS

A. Metals:
   1. Aluminum Alloy: Alloy 6061-T6, Schedule 80, designed in accordance with ANSI A120.1
   2. Steel Pipe: ASTM A53, Type E or S, Grade B.
   5. Stainless Steel Components: UNS S30400.

   B. Connectors: Galvanized steel anchor bolts, ASTM A307 or A325.
      1. Fasteners Exposed to Weather and Carrying Calculated Stress: Galvanized or stainless steel.

   C. Non-Shrink Grout: Non-shrink, non-ferrous, equivalent to Masterflow 713 by Master Builders.

2.03 WINDOW WASHING DAVIT AND SUPPORT ASSEMBLIES

A. Davit Socket Bases: Permanently attached to structure at locations indicated in accordance with Drawings and manufacturer’s recommendations.
   1. Socket Bases: Fabricate from pipe of such size and wall thickness suitable for design requirements. Perform welding in compliance with AWS D1.1.
   2. Gussets or other protrusions that interfere with flashing or roofing membrane not allowed.
   3. Socket Bases: Design to accommodate bolts or pins for attachment of portable sockets.
   4. Provide minimum of one anchor point for securing a safety line.
   5. Hot-dip galvanize steel after fabrication.

   B. Portable Davit Sockets: Fabricated from seamless mechanical steel pipe or tubing with 4:1 factor of safety.
1. Hinge to permanently attached socket bases by means of stainless steel pins or bolts to permit insertion of davit into socket and subsequent tilting into working position.
2. Make provisions to securely lock davit in upright position.
3. Provide pneumatic tires for portability on roof area.
4. Hot-dipped galvanized steel finish unless otherwise indicated.

C. Davits: Fabricated of Schedule 80, 6061-T6 aluminum alloy pipe and sized to fit into davit socket fixtures.
   1. Rotatable type, designed to allow self-powered platform to be brought inboard over parapet to roof for transfer.
   2. Close end of each assembly with aluminum cast thrust bearing to ensure easy rotation. Fit upper base section with steel bearing sleeve to protect davit from abrasion when rotating in davit socket.
   3. Equip each davit with positive friction brake to prevent rotation of davit from desired work position.
   4. Hanger Bar: Equip each davit with multiple pick-up hanger bar to provide for variable suspension radius and to allow use of Type F (four wire) and Type T (two wire) work platforms.
      a. Construct hanger bar to permit suspension radius of at least 5 feet and minimum of approximately 46 inches.
      b. Provide at least three suspension points between maximum and minimum radii.

D. Safety Tie-Backs: Position directly behind each davit base and at right angles to building face or integral with permanently supported socket base.
   1. Where right angle spacing cannot be achieved, furnish two safety tie-backs for each davit location.
   2. Determine design for safety tie-back on davit reactions. However, do not consider safety tie-back in davit design.
   3. Hot dip galvanize safety tie-backs after fabrication.

2.04 ROPE STABILIZERS

A. Wire Rope Stabilizers: No rope in excess of 300 feet long hangs between stabilizers or between davit attachment point and stabilizer.

B. Stabilize power cord to building or support ropes at 100 foot intervals maximum.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 014000.

3.02 INSTALLATION

A. Window Washing Davits and Supports: Install in accordance with accepted shop and erection drawings and manufacturer's recommendation and instructions.
   1. Coordinate with construction operations.
B. Davit Socket Base Plates: Install plumb and level with non-shrink grout placed in accordance with manufacturer's instructions.

3.03 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. Inspections and tests of installation of anchors and bases permanently attached to structure will be performed by independent laboratory selected and paid by Owner.
   2. Perform inspections and tests in accordance with ASTM E329.
   3. Inspect field bolted connections in accordance with AISC requirements.
   4. For welding connections:
      a. Verify welders are qualified in accordance with American Welding Society requirements.
      b. Perform visual inspection of welds.
      c. Perform ultrasonic inspection of full penetration welds.
      d. Record types and locations of defects and work performed to correct defects.
   5. Obtain local and state inspections and permits. Make tests as required for regulations of authorities having jurisdiction.
   6. Conduct tests as required by regulation of state and local authorities having jurisdiction.

B. Permits: After installation is complete, obtain city, state and other authority documents, permits, and licenses necessary to operate window washing system. Owner's approval, acceptance, and payment will not be forthcoming until necessary permits and documentation have been approved and issued.

3.04 DEMONSTRATION

A. Manufacturer's Factory Trained Representative: After completion of installation, conduct full load and operation tests in accord with applicable standards under maximum design loading conditions and operate over full range (horizontally and vertically) of building surfaces to be maintained.

B. Manufacturer's Factory Trained Representative: Instruct Owner's designated personnel in complete operation and maintenance of installed system.

C. When necessary, make minor adjustments. Carefully document and submit adjustments to Owner.

END OF SECTION
SECTION 11 40 00

FOODSERVICE EQUIPMENT

PART 1 – GENERAL

1.1 SCOPE

A. Foodservice Equipment Contractor/Kitchen Equipment Contractor (KEC as abbreviated in documents) Scope: The work referred to in this section consists of furnishing all labor and material required to provide and deliver all equipment hereinafter specified into the building, uncrate, assemble, hang, set in place, level, and completely install, excluding final utility connection. The kitchen equipment contractor shall provide all equipment included in this section, including all foodservice equipment counters and equipment contained in such.

B. All foodservice equipment as shown on the foodservice equipment drawings will be provided through Foodservice Equipment Contractor/Kitchen Equipment Contractor (KEC as abbreviated in documents) under contract to the owner (East Tennessee State University) and set in-place. General Contractor will be responsible for the rough-in of all utilities for the foodservice equipment. Final utility connection to include mechanical, electrical, plumbing and data/telephone as required will be provided by the General Contractor

C. Kitchen equipment contractor will be required to coordinate with the general contractor regarding installation, schedule and completion of work.

D. Kitchen equipment contractor to coordinate with the owner and general contractor the installation of all equipment noted as Vendor and/or Owner supplied.

E. All equipment pricing to be submitted itemized with detailed costing per each item. No lump sum bids.

F. KEC will be responsible for removal, storage, cleaning and resetting equipment in building for all equipment noted as existing to be reused, existing to remain, existing to be relocated, etc. KEC to evaluate existing equipment and provide proposal to owner to service and repair equipment to return unit to full operational order.

G. Equipment manufacturer and model included in plans and specifications section 4 are used as a basis of design. Contractor may submit equal equipment for consideration. KEC will be responsible for coordination of size, utility modifications and coordinate with general contractor and all relevant trades
1.2 SUBMITTALS – (Provided by Kitchen Equipment Contractor)

A. Upon award of Contract, furnish the university or appointed representative with hard copies of the following drawings, in accordance with the approved project schedule, which shall be made on sheets equal in size and matching the bid set drawing size. Reproduced copies of bid documents will not be accepted for this purpose in any fashion.

1. Equipment specified for fabrication shall be detailed and fully dimensioned to a minimum scale of $\frac{3}{4}" = 1'-0"$ for plan and elevation views and $1\frac{1}{2}" = 1'-0"$ for sections.

2. Prepare separate electrical and mechanical dimensioned rough-in drawings at $\frac{1}{4}" = 1'-0"$ scale showing exact point of penetration of floors, walls, and ceilings for all services required to operate the equipment that the Contractor shall furnish. These drawings shall also show exact locations of final connections to equipment. Indicate floor drains, floor sink, receptacles, lights, and other special conditions.

3. Dimensioned drawings shall be submitted showing the location and size of all bases, depressions, special height walls, openings in walls for equipment, and critical dimensions, etc. Drawings shall be drawn to a scale of not less than $\frac{1}{4}" = 1'-0"$.

B. Manufacturers’ Data: Upon award of Contract, submit bound copies of Manufacturers’ Illustrations and Technical Data to the Architect for review prior to procurement. Items of Standard Manufacture shall be submitted, including items purchased to be built into fabricated equipment. Each illustration shall be marked to describe accurately the item to be furnished as specified, including voltage, phase, load, accessories, etc.

C. Manufacturers’ List: Submit in writing a list of all manufacturers’ representatives of the foodservice equipment, such as convection ovens, ranges, etc., and their authorized service agencies’ addresses and telephone numbers.

D. Foundation Data: Data and drawings shall be submitted for each item, if any, requiring special foundations, structures, or supports. Such foundations, structures, or supports will be provided and installed by other appropriate trades in accordance with the drawings and specifications which shall be provided by the Contractor and reviewed by the Architect.

E. Operation and Maintenance Manuals: Bound copies of operation, maintenance, and parts manuals shall be supplied for all equipment items of standard manufacture including standard component assemblies built into all custom-fabricated items.

F. Review by the Architect of the drawings and brochures submitted by the Contractor does not waive the responsibility of the Contractor to furnish each item of equipment in complete compliance with the specifications and contract drawings.

G. The number of copies of all submittals shall be as determined by the Owner.
H. **Samples:** Samples of materials, products, fabrication methods, and reworking of damaged areas or equipment shall be submitted for review upon request at no additional cost, before proceeding with the work.

### 1.3 QUALITY ASSURANCE

A. **Standard Products:** Materials, products, and equipment furnished under this contract shall be the standard items of manufacturers regularly engaged in the production of such materials, products, and equipment and shall be of the manufacturers’ latest design that complies with the specifications.

B. **Manufacturers’ Qualifications:** Manufacturers shall be regularly engaged in the production of the items furnished and shall have demonstrated the capability to furnish similar equipment that performs the functions specified or indicated herein.

C. **Installation Qualifications:** Contractor shall use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work defined in this Section.

D. **Coordination of Work:** Coordinate work with the respective trades performing preparatory work for installation of equipment under this Contract, including, but not limited to: construction of pits, trenches, receptors; rough-in of supply, waste and vent piping; electrical connections; and field verification of dimensions.

### 1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver foodservice equipment in containers designed to protect equipment and finish until final installation. Make arrangements to receive equipment at project site or to hold in warehouse until delivery can be made to job site.

B. Store foodservice equipment in original containers and in location to provide adequate protection to equipment while not interfering with other construction operations.

C. Handle foodservice equipment carefully to avoid damage to components, enclosures, and finish. Do not install damaged foodservice equipment; replace and return damaged components to equipment manufacturer.

### 1.5 APPLICABLE CODES AND STANDARDS

A. Except as otherwise indicated, each item of equipment shall comply with the latest current edition of the following standards as applicable to the manufacture, fabrication, and installation of the work in this section. Comply with all Federal, State, and Municipal regulations and notifications which bear on the execution of this work.

1. **NSF Standards:** Comply with applicable National Sanitation Foundation standards and criteria and provide NSF “Seal of Approval” on each manufactured item and on major items of custom-fabricated work.
2. UL Standards: For electrical components and assemblies, provide either UL labeled products or, where no labeling service is available, provide a complete index of the components used as selected from the UL “Recognized Component Index.” All fabricated foodservice counters to be fabricated by UL listed fabricator and assembled to UL standard. Counter shall be pre-wired to subpanel provided in counter by KEC ready for final field connection electrical contractor. Exhaust hoods and fire suppression systems shall by UL300

3. ANSI Standards: Comply with applicable ANSI standards for electric-powered and gas-burning equipment. Comply with ANSI B57.1 for compressed gas cylinder piping and connections and with applicable standards of the Compressed Gas Association for water connection air gaps and vacuum breakers.

4. AGA: All gas-fired equipment shall be AGA approved, equipped to operate on the type gas available at the job site, and shall contain 100% automatic safety shut-off devices.

5. NFPA Standards: Comply with NFPA Bulletin 96 for exhaust systems; with NFPA Bulletins 13, 17, and 96 for fire extinguishing systems; and with NFPA 54, National Fuel Gas Code and NFPA 70, National Electrical Code.

6. ASME Code: Comply with ASME boiler code requirements for steam-generating and steam-heated equipment; provide ASME inspection, stamps, and certification of registration with National Board.

7. Americans with Disabilities Act (ADA): Call to the attention of the Owner in writing any design conflict with the requirements of the Americans with Disabilities Act (ADA) during Bid Process so resolution can be effected prior to Contract Award.

1.6 PROJECT CONDITIONS

A. Visit the job site to field check actual wall dimensions and roughing-in and be responsible for furnishing, fabricating, and installing the equipment in accordance with the available space and utility services as they exist on the job site for an accurate fit.

B. Check all door openings, passageways, elevators, etc., to be sure that the equipment can be conveyed to its proper location within the building and, if necessary, check with the Contractor regarding the possibility of holding wall erection, placement of doorjambs, windows, etc., for the purpose of moving the equipment to its proper location. Any removal and rebuilding of walls, partitions, doorjambs, etc., necessary to place the equipment or, if caused by incorrect information on the Contractor’s drawings, shall be done at the expense of the Contractor.

C. Physically check the location and utility size of all “rough-ins” at the job site for compatibility with the equipment being installed before finished floors, walls, and/or ceilings are in place.

D. Check electrical characteristics and water, steam, and gas pressure. Provide pressure-regulating valves where required for proper operation of equipment.

1.7 GUARANTIES AND WARRANTIES

A. Self-contained or remote refrigeration systems furnished under this Contract shall be provided with start-up and a one-year service contract providing free service, 24 hours
per day, seven days per week, including parts and labor. Hermetic or semi-hermetic compressors shall be covered by the manufacturers’ factory warranty for an additional four years. Other equipment provided shall include a one-year warranty covering parts and labor, plus any extended warranties as normally provided by individual manufacturers. Equipment including refrigeration systems both self-contained and remote shall be warranted by the Contractor on the project for one year as indicated in the preceding sentence. The first day of the first year commences upon the earlier of 1) the date the equipment is put into production at the facility or 2) the date the equipment is accepted by the Architect.

PART 2 - PRODUCTS

2.1 GENERAL

A. The equipment and its component parts shall be new and unused. All items of standard manufactured equipment shall be current models at the time of delivery. Parts subject to wear, breakage, or distortion shall be accessible for adjustment, replacement, and repair.

B. Means shall be provided to ensure adequate lubrication for moving parts. Oil holes, grease fittings, and filler caps shall be accessible without the use of tools.

C. Plastic nameplates, to identify controls on fabricated equipment and when specified elsewhere, shall be provided of two-ply, 1/16”, rigid plastic material which shall be specifically manufactured for engraving such nameplates. The finished nameplate shall be machine engraved with white letters on a black background and shall have edges beveled at a 45° angle. Nameplates shall be attached using an adhesive recommended by the manufacturer of the engraving material.

D. The design of the equipment shall be such as to provide for safe and convenient operation. Covers or other safety devices shall be provided for all items of equipment presenting safety hazards. Such guards or safety devices shall not present substantial interference to the operation of the equipment. Guards shall provide easy access to guarded parts.

E. Trim shall not be an acceptable substitute for accuracy and neatness. When trim is required and accepted by Architect in lieu of rejection of items of equipment, it shall be the Contractor’s responsibility to provide same at no additional cost.

F. Unless otherwise specified herein, no material lighter than #20 gauge shall be incorporated into the work. Gauges for sheet iron and sheet steel shall be U.S. Standard Gauges and finished equipment gauge thickness shall not vary more than 5% plus or minus from the thickness indicated below.

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2.2 MATERIALS

A. Submit a certified copy of the mill analysis of materials if requested by the Architect.

B. Stainless steel sheets shall conform to ASTM A240, Type 304 Condition A, 18-8, having a No. 4 finish. A No. 2B finish shall be acceptable on surfaces of equipment not exposed to view. Sheets shall be uniform throughout in color, finish, and appearance.

C. Stainless steel tubing and pipe shall be Type 304, 18-8, having a No. 4 finish, and shall conform to either ASTM A213 if seamless or ASTM A249 if welded.

D. Rolled shapes shall be of the cold-rolled type conforming to ASTM A36.

E. Galvanized sheet steel shall conform to ASTM A526; where extensive forming to take place, conform to ASTM A527; conform to ASTM A525, coating designation G115, chemical treatment.

F. Galvanized steel sheets shall be cold-rolled, stretcher leveled, bonderized, and rerolled to ensure a smooth surface.

G. Castings shall be corrosion-resisting metal containing not less than 30% nickel. Castings shall be rough ground, polished, and buffed to bright luster and free from pit marks, runs, checks, burrs, and other imperfections. In lieu of corrosion-resisting metal castings, die-stamped or cast 18-8 stainless steel will be acceptable.

H. Not used

I. Sealant, wherever required, for sealing backsplashes to walls, cabinet bodies to concrete or tile bases, roll-in refrigerators to floors, or other types of application shall be Dow-Corning #780 or General Electric “Silastic” or equivalent in either clear or approved color to match surrounding surfaces and applied in accordance with sealant manufacturers’ recommendations for smooth, sealed finish.

2.3 FINISHES

A. Paint and coatings shall be of an NSF approved type suitable for use in conjunction with foodservice equipment. Such paint or coating shall be durable, non-toxic, non-dusting, non-flaking, and mildew resistant; shall comply with all governing regulations; and shall be applied in accordance with the recommendations of the manufacturer.

B. Exterior, galvanized parts, exposed members of framework, and wrought steel pipe where specified to be painted shall be cleaned, properly primed with rust-inhibiting primer, degreased, and finished with two (2) coats of epoxy-based grey hammertone paint, unless otherwise specified.
C. Stainless steel, where exposed, shall be polished to a #4 commercial finish. Where unexposed, finish shall be #2B. The grain of polishing shall run in the same direction wherever possible. Where surfaces are disturbed by the fabricating process, such surfaces shall be finished to match adjacent undisturbed surfaces.

D. Galvanized shelving shall not be painted.

E. Fabricated equipment shall be spray coated with plastic suitable for protecting the equipment during transport and installation. The coating shall be easily removable and shall be removed after the equipment installation is complete at the work site or, alternatively, when directed by the Architect.

F. Exposed surfaces on brass, bronze, or steel shall be plated with chromium over nickel in accordance with Federal Specifications WW-P-541, Paragraph 9.5 and Table 9.4, unless otherwise specified.

2.4 ELECTRICAL AND MECHANICAL REQUIREMENTS

A. Standard UL listed materials, devices, and components shall be selected and installed in accordance with NEMA Standards and recommendations and as required for safe and efficient use and operation of the foodservice equipment without objectionable noise, vibration, and sanitation problems.

1. Provide recognized commercial grade signals, “on-off” pushbuttons or switches, and other speed and temperature controls as required for operation of each item, complete with pilot lights and permanent engraved, plastic laminate signs and graphics identifying each item. Provide stainless steel cover plates at controls and signals.

2. Each item requiring electrical power shall be equipped with either a terminal box for permanent connection or with cord and plug for interruptible connection, as indicated. Provide NEMA standard grounding type plugs, where used.

3. Furnish foodservice equipment completely wired internally using wire and conduit suitable for a wet location, including a separate grounding wire. Provide electrical outlets and receptacles required to be mounted on or in fabricated equipment and interconnect to a suitable terminal box (subpanel, starter, or disconnect switch if so specified) with all wires neatly tagged showing item number, voltage characteristics, and load information.

4. Receptacles for all wall- and floor-mounted outlets will be provided to be used for plug-in equipment with characteristics as noted on the drawings. Provide Hubbell three-wire or four-wire grounding-type connectors and neoprene cords installed on each item of plug-in equipment to match receptacles provided.

5. Electrically heated equipment shall be internally wired to a thermostatic control and an “on-off” red neon light indicator, which shall be mounted in a terminal box on a removable stainless steel access panel.

6. Only rigid steel conduit shall be used, zinc-coated where unexposed and chrome-plated where exposed. Wiring shall be run concealed wherever possible.
7. Provide on or for each motor-driven appliance or electrical heating or control unit, a suitable control switch or starter of the proper type and rating and in accordance with Underwriters Code wherever such equipment is not built in.

8. Appliances shall be furnished complete with motors, driving mechanism, starters, and controllers, including master switches, timers, cut-outs, reversing mechanism, and other electrical equipment if and as applicable. Wiring and connection diagrams shall be furnished with electrically operated machines and for electrically wired fabricated equipment.

9. Appliances shall be of rigid construction, free from objectionable vibration. Quietness of operation of all foodservice equipment is a requirement. Remove or repair any equipment producing objectionable noise and/or vibration as directed by the Architect.

10. Motors shall be of the drip-proof, splash-proof, or totally enclosed type, having a continuous duty cycle and ball bearings, except small timing motors which may have sleeve bearings. Motors shall have windings impregnated to resist moisture. Motors located where subject to deposits of dust, lint, or other similar matter from the machine on which installed shall be of the totally enclosed type. Motors shall have ample power to operate the machines for which designated under full load operating conditions without exceeding their nameplate ratings. Horsepower requirements on driven equipment shall be determined by the manufacturer based on normal operation at maximum capacity. The nominal rated motor horsepower shall be not less than the horsepower required for normal operation of the equipment at maximum capacity. Insulation shall be NEMA Class B, or better.

11. Cover plates shall be furnished and installed for all electrical outlets, receptacles, switches, etc., to match the material and finish of the equipment to which they will be fastened.

12. Switches, controls, etc., shall be conspicuously labeled as to use with plastic nameplates secured to the adjacent surface as previously specified in Article 2.01-C. Submit a sample for approval if requested by Architect.

13. Where specified for custom fabricated equipment, provide compartment with electrical sub-panel which shall be pre-wired in conduit concealed in cabinet body construction and connected to all electrical components built into or set upon the counter. Electrical sub-panel shall be UL listed, 3-phase, 4-wire circuit breaker type with a ground buss main breaker and individual breakers for each serviced load. Buss shall be copper and the circuit breakers shall be the molded case, bolt-on type with thermomagnetic quick-make, quick-break trip. Multi-pole circuit breakers shall have an internal trip bar. The circuit breakers shall have an interrupting capacity of 10,000 amperes at 120 volts and there shall be a separate breaker for each connected load. Each breaker shall be sized for 125% of the connected load and a minimum of two (2) extra, single pole, 20 amp circuit breakers shall be provided. The loads shall be connected through the breakers in a phased sequence to balance the load on each phase.

B. Water inlets shall be located above the positive water level wherever possible to prevent siphoning of liquids into the water supply system. Wherever conditions shall require a submerged inlet, a suitable type of check valve (except in jurisdictions where check valves are prohibited) and vacuum breaker shall be provided with the fixture to prevent siphoning. Where exposed, piping and fittings shall be chrome-plated. Where vacuum breaker piping is through equipment, provide chrome-plated escutcheon plates to cover holes.
1. KEC to provide and install copper indirect waste lines (insulated from ice bins and ice storage units) from equipment which will discharge into floor drains or safe wastes. Extend to a point at least 1" (or as required by local or state code) above the rim of the floor drain, cut bottom on 45-degree angle and secure in position. CONTRACTOR to coordinate all necessary requirements with the General Contractor.

2. Horizontal piping lines shall be run at the highest possible elevation and not less than 6" above the floor, through equipment where possible.

3. No exposed piping in or around fixtures or in other conspicuous places shall show tool marks or more than one thread at the fitting.

4. Steam operating valves on or in fabricated and purchased foodservice equipment shall be provided with composition hand wheels, which shall remain reasonably cool in service.

5. Provide suitable pressure-reducing valves for equipment with such components that might reasonably be expected to be affected over a period of time by adverse pressure conditions, including but not limited to dishwashers, booster heaters, coffee urns, steam boilers, etc.

C. Provide and install complete refrigeration systems—charged, started, and operating properly—including, but not limited to:

- compressors, condensers, racks, coils, vibration eliminators, sight glasses (moisture indicating type), expansion valves, filters, oil separators, thermostats, defrost time clocks, all controls and control wiring, liquid line driers, piping, and refrigeration grade copper tubing with all sweat joints using Safety-Silv No. 1200 or equivalent silver solder (with as few joints as possible)

1. Where specifications call for pre-piped lines (i.e., from a fixture to a valve compartment, etc.), provide such work in strict conformance with other sections of the specifications which set forth standards for this type of work or in conformity with the requirements of the Board of Fire Underwriters or ASHRAE Standards, whichever is the greater.

2. Mechanically refrigerated cold pans shall have a normally closed liquid line electric solenoid valve installed before the expansion valve and wired to a silent-type toggle switch complete with an "on-off" red neon light indicator and both mounted in a terminal box on a removable access panel. This switch shall be fed by a separate control circuit and shall not to be wired into the compressor circuit so that it shall stop the flow of refrigerant to the cold pan and not turn off the compressor. The compressor shall then pump down and turn off through the action of the pressure control.

3. Each refrigeration item specification is written to provide minimum specifications and scope of work. Refrigeration equipment shall be designed and installed to maintain the following general temperatures unless otherwise specified.

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<tr>
<th>Item</th>
<th>Temperature</th>
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<tbody>
<tr>
<td>a. Walk-In Refrigerators</td>
<td>1.7°C / 35°F</td>
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<tr>
<td>b. Walk-In Freezers</td>
<td>-23.3°C / -10°F</td>
</tr>
<tr>
<td>c. Reach-In Refrigerators</td>
<td>1.7°C / 35°F</td>
</tr>
</tbody>
</table>
4. Provide electrical and refrigeration components needed by the completed system and complete all connections of and to said components.
5. Provide evaporator coil defrost system on all walk-in refrigerator and freezer rooms where the refrigeration systems are designed to operate at room temperature of less than 35°F.
6. Verify the requirements of and provide any or all additional refrigeration specialty(s) or component(s) required or recommended by the manufacturer for proper operation under the specific operating conditions and location of each system specified.
7. Verify and provide manufacturer’s certification (or certification by manufacturer’s authorized agent) that the equipment selection hereinafter specified for each refrigeration system is properly sized and shall meet the operating requirements set forth for each system regarding maintaining specified operating temperature, hours of compressor running time, and system pressures and velocities as recommended by the equipment manufacturer(s).
8. During check-out and initial operation, make sure that:
   a. Controls are properly adjusted, including refrigeration circuits, room air temperature controls, etc.
   b. Condensers will carry an overload protector.
   c. A competent service mechanic is available during the first eight (8) hours of operation.
   d. Switches, starters, and controls are identified as to function.
9. Unless otherwise specified, thermometers for walk-in units will be furnished with suitable length armored capillary tubes to allow the sensing bulb to be installed in the incoming air stream to the blower coil with runs fastened to the walk-in walls to prevent it from damage. This identical requirement applies to alarm systems when specified.

2.5 PRODUCT SPECIFICATIONS

A. Refer to Part 4 for complete itemized product specifications.

PART 3 - EXECUTION

3.1 INSTALLATION
A. Begin installing the equipment at the time the building is ready to receive the equipment and in accordance with the schedule.

B. Provide a competent foreman or supervisor for erection of equipment and to coordinate with other trades regarding connections, installation, and inspection. Coordinate delivery schedule to ensure adequate openings in the building to receive the equipment.

C. Refrigeration work shall be accomplished in an approved manner, using first quality fittings, controls, valves, etc. Refrigeration items shall be started up, tested, adjusted, and turned over to the Architect in first-class condition and left operating in accordance with the manufacturer’s specifications.

D. Equipment that rests on masonry bases shall be set level onto a bed of silicone rubber sealant.

E. Equipment that butts to a wall or against other equipment shall be sealed with silicone rubber sealant. Trim strips or other items requiring fasteners shall be set in a bed of silicone rubber sealant and fastened with suitable stainless steel fasteners 48” or less on centers. Prior to the application of sealant, surfaces shall be thoroughly cleaned and degreased.

F. Install and interconnect electrical controls, switches, or other units which are separately furnished for field installation in or on equipment provided, unless otherwise specified.

G. Refrigeration systems shall be installed and wired in strict conformance with the manufacturer’s instructions and recommendations. Ensure that all refrigeration-condensing units are ventilated properly and are accessible for repair, maintenance, and inspection.

H. Hang blower coils per the manufacturer’s recommendation at the locations as shown on the drawings. Unit shall be mounted sloping such that the drain pans are pitched to the drain lines. The coils shall be hung using nylon or other approved non-conductive, non-corrosive fasteners. Coils shall be installed 4” from the interior walk-in ceiling. Furnish #12 gauge galvanized steel fish plates of suitable size and shape on the exterior ceiling of the walk-in to spread the weight of the coils adequately. The coils shall be connected to the condensing unit and the installation shall constitute a complete working system capable of maintaining the interior temperatures specified regardless of the heavy usage the walk-in units may receive.

I. Furnish and install a copper drain line from each coil outlet to a point 1” above the floor drain. Drainlines shall be trapped immediately above the floor drain. The freezer drainline shall be wrapped with a continuous electrified heater tape.

J. Refrigeration tubing shall be the Type L, ACR hard drawn degreased, sealed copper and shall be installed with horizontal runs sloped 1” per 20 feet toward the condensing units. Refrigerant piping shall be properly supported by adjustable hangers spaced and adjusted to the drop required. Where vertical runs of more than 5’ occur in the suction line, the risers shall be trapped at the bottom. Piping is to be installed so that refrigerant or oil cannot drain back into the coils from the suction line.
K. Suction and refrigerant lines shall be insulated with minimum ½” armalflex or equal cellular type insulation. Metal pipe sleeves shall be provided where piping passes through a wall, ceiling, or floor. Space around the tubing shall be filled with mastic insulating compound. Install a permanent suction line filter in each compressor suction line with pressure fitting ahead of the filter to facilitate checking of pressure drop through the filter. Penetrations through walk-in cooler or freezer structures shall be fully insulated and sealed to be vapor tight to prevent condensation within any light fixtures, switch boxes, junction boxes, or any other fittings. Refrigeration and drain lines shall be fully sealed and provided with escutcheon plates by the installer.

L. Furnish and completely install a thermostat to control the refrigeration temperatures for each individual compartment.

M. The condensing units shall be mounted on a welded steel rack. The rack shall contain accessories and components necessary to form a complete condensing unit package. Each condensing unit shall have a factory mounted, pre-wired control panel/disconnect switch complete with circuit breakers, contactors, and time clocks as required.

N. The refrigeration systems shall be furnished with a one-year refrigeration service contract, covering all parts and labor, with service available seven days per week, 24-hours per day. Continuation of the service contract after the first year shall be an option. The refrigeration system shall be warranted for one year and the compressors shall carry the manufacturer’s extended five-year warranty.

O. Furnish four (4) copies of complete remote refrigeration system control wiring and piping diagrams. One (1) copy shall be framed in plexiglass and mounted at compressor location.

P. Coordinate the equipment work with the respective trades so that electrical and mechanical components built into the equipment will conform and/or adapt to the type, materials, and characteristics of the building components.

Q. Install heated and motor-driven equipment so as to operate efficiently. Provide additional vents, guards, deflectors, and other accessories as needed at no additional cost. Note such additions or modifications on the shop drawings and bring to Architect’s attention by special accompanying letter.

3.2 FABRICATION

A. Items of fabricated equipment shall be fabricated in the same factory and shall be similar in construction details, materials, methods, and appearance to similar types of items so fabricated under this contract.

B. Each fabricated item of equipment shall include necessary reinforcing, bracing, and welding with the proper number and spacing of uprights and cross members for strength. Wherever standard sheet sizes will permit, the tops of all tables, shelves, exterior panels of cabinet type fixtures, and doors and drainboards shall be constructed of a single sheet of metal. Except where required to be removable, flat surfaces shall
be secured to vertical and horizontal bracing members by welding or other approved means to eliminate buckle, warp, rattle, and wobble. Equipment not braced in a rigid manner and which is subject to rattle and wobble shall be unacceptable, and the Contractor shall add additional bracing in an approved manner to achieve acceptance.

C. Suitable pipe slots shall be provided on fabricated equipment to accommodate service and utility lines and mechanical connections. These slots shall be of proper size and shall be neatly made with turned up edges around to eliminate cutting or defacing of equipment on the job. Cabinet bases shall be provided with an inner panel duct at the ends or rear of the cabinet allowing adequate space to conceal vertical piping. Such work, when performed at the job site, shall be of the same quality as similar work performed in the shop.

D. Exposed surfaces shall be free from bolt and screw heads. When bolts are required, they shall be of the concealed type and of similar composition as the metal to which they are applied. Where bolt or screw threads on the interior of fixtures are visible or may come into contact with hands or wiping cloths, they shall be capped with a stainless steel acorn nut and stainless steel lock washer.

E. Where screw threads are not visible or readily accessible, they shall be assembled with stainless steel lock washers and nuts. Wherever bolts or screws are welded to the underside of trim or tops, the reverse side of the weld shall be finished uniformly with the adjoining surfaces. Depressions at these points shall not be acceptable.

F. Rivets shall not be permitted in any location.

G. Welding shall be the heliarc method with welding rod of the same composition as the sheets or parts welded. Welds shall be complete, strong, and ductile with excess metal ground off and joints finished smooth to match adjoining surfaces. Welds shall be free of mechanical imperfections such as gas holes, pits, cracks, etc., and shall be continuously welded so that the fixtures shall appear as one piece construction. Butt welds made by spot solder and finished by grinding shall not be acceptable.

1. Spot welds shall have a maximum spacing of 3”. Tack welds shall be of at least ¼” length of welding material at a maximum space of 4” from center to center. Weld spacing at the ends of the channel battens shall not exceed 2” centers.

2. In no case shall soldering be considered as a replacement for welding, nor shall any soldering operation be done where dependence is placed on stability and strength of the joint.

3. Fixtures shall be shop fabricated of one piece and shipped to the job completely assembled wherever possible. Equipment too large to transport or enter the building as one piece shall be constructed so that the field joints can be welded at the job site.

4. Exposed joints shall be ground flush with adjoining material and finished to harmonize therewith. Whenever material has been sunk or depressed by welding operation, such depression shall be suitably hammered and peened flush with the adjoining surface and, if necessary, again ground to eliminate low spots. In all cases, the grain of rough grinding shall be removed by successive fine polishing operations.
5. Unexposed welded joints on undershelves of tables or counters in stainless steel construction shall be suitably coated at the factory with an approved metallic-based paint.

6. After galvanized steel members have been welded, welds and areas where galvanizing has been damaged shall have a zinc dust coating applied in conformance with U.S. Government Military Specification Number MIL-P-26915.

H. Butt joints and contact joints, wherever they occur, shall be close fitting and shall not require a filler. Wherever break bends occur, they shall be free of undue extrusion and shall not be flaky, scaly, or cracked in appearance; where such breaks do mar the uniform surface appearance of the material, such marks shall be removed by suitable grinding, polishing, and finishing. Wherever sheared edges occur, they shall be free of burrs, fins, and irregular projections and be finished to obviate danger of cutting or laceration when the hand is drawn over them. In no case shall overlapping materials be acceptable where miters or bullnosed corners occur.

I. The grain of polishing shall run in the same direction on horizontal and on vertical surfaces of each item of fabricated equipment except in the case where the finish of the horizontal sections of each shall terminate in a mitered edge. Where sinks and adjacent drainboards are equipped with backsplash, the grain of polishing shall be consistent in direction throughout the length of the backsplash and sink compartment.

J. Component parts, whether fabricated by the Contractor or purchased for building into the fabricated equipment, shall conform to the following.

Bolts, screws, nuts, and washers shall be of steel, except where brass or stainless steel is fastened, in which case they shall be of brass or stainless steel, respectively. Where dissimilar metals are fastened, bolts, screws, nuts, and washers shall be of the higher grade metal. The spacing and extent of bolts and screws shall be such as to ensure suitable fastening and prevent buckling of the metals fastened.

3.3 START-UP AND TESTING

A. Supply a trained person who shall start up equipment, test, and make adjustments as necessary, resulting in each item of equipment performing in accordance with the manufacturer's specifications.

B. Gas-fired equipment shall be checked by the local gas company as to calibration, air adjustments, etc., and adjustments made as required. Arrange and coordinate such visit.

3.4 CLEAN-UP

A. At completion of the installation, clean up, lubricate, and adjust where necessary items of equipment provided and turn them over in first-class condition.

1. Where stainless steel surfaces are disturbed by the installation or fabricating process, such surface shall be finished to match adjoining undisturbed surfaces.
2. At the completion of the installation work, stainless steel shall be gone over with a portable polishing machine and buffed to perfect surfaces. Painted surfaces shall be carefully gone over and retouched as required.

3.5 OPERATION INSTRUCTIONS AND WARRANTIES

A. Arrange for demonstrations and instructions for operating the equipment as requested and at times selected by the Architect. Furnish to the Architect instructions and service manuals for items of equipment that are mechanically operated or that require periodic service. Provide a list of such equipment showing the manufacturer’s warranty for equipment at jobsite location and how warranty service will be provided when necessary.

3.6 SEISMIC RESTRAINTS

A. The Contractor will be required to install items so designated in these contract documents according to the “SMACNA Guidelines for Seismic Restraint of Kitchen Equipment” in any State, province, or jurisdiction that has legislated this requirement as necessary for acceptance.

The Contractor will be responsible for:

1. Identifying these items on his submittal drawings, Plans, Elevations, and Sections.
2. Showing required SMACNA methods of restraint on his submittal drawings.
3. Referencing the appropriate detail(s).

B. If no SMACNA detail exists for a particular situation, the Contractor is responsible for preparing and obtaining approval for a special attachment detail:

1. Detail must be prepared by an engineer licensed by the State having jurisdiction over the project and accompanied by the supporting calculations used in the design.
2. Contractor is responsible for ensuring that the restraint design is appropriate to the building’s structural conditions and the surfaces to which the equipment will be secured.
PART 4 – ITEM SPECIFICATIONS

All items listed on the contract drawings under the heading "Foodservice Equipment Schedule" shall be furnished by the Owner’s kitchen equipment contractor, unless indicated otherwise, in strict accordance with the foregoing specifications and with the following detailed item specifications.

ITEM #200 WORK TABLE, STAINLESS STEEL TOP

Manufacturer: Eagle Group
Model: T3084SE

1. Model T3084SE Spec-Master® Series Work Table, 84"W x 30"D, 14/300 series stainless steel top, rolled edge on front & back, adjustable 18/300 series stainless steel undershelf with marine edge, Uni-Lok® gusset system, (4) stainless steel legs & adjustable bullet feet, NSF
2. NSF sprayed-on latex sound deadening, add suffix -SD
3. Model DOS1284-14/3 Overshelf, table mount, 84"W x 12"D x 30"H, double deck, rolled edge on front & rear, turned down sides, 12"H shelf spacing, all-welded 14/304 stainless steel construction, 1" diameter stainless steel tubular base legs, shipped assembled, NSF
4. Model 502971 Spec-Master® Heavy Duty Drawer Assembly, 20" x 20" x 5", 304 type stainless steel, insulated drawer front, removable drawer pan, self-closing drawer slides, stackable, hemmed safety pull handle
5. Model CAHW4-SB Table Casters, set of (4), 5" diameter, (2) swivel & (2) swivel/brake, 250 lbs. capacity per caster, polymer cart washable with polymer tread, NSF

ITEM #201 WORK TABLE, STAINLESS STEEL TOP

Manufacturer: Eagle Group
Model: T3084SE

1. Model T3084SE Spec-Master® Series Work Table, 84"W x 30"D, 14/300 series stainless steel top, rolled edge on front & back, adjustable 18/300 series stainless steel undershelf with marine edge, Uni-Lok® gusset system, (4) stainless steel legs & adjustable bullet feet, NSF
2. NSF sprayed-on latex sound deadening, add suffix -SD
3. Model DOS1284-14/3 Overshelf, table mount, 84"W x 12"D x 30"H, double deck, rolled edge on front & rear, turned down sides, 12"H shelf spacing, all-welded 14/304 stainless steel construction, 1" diameter stainless steel tubular base legs, shipped assembled, NSF
4. Model 502971 Spec-Master® Heavy Duty Drawer Assembly, 20" x 20" x 5", 304 type stainless steel, insulated drawer front, removable drawer pan, self-closing drawer slides, stackable, hemmed safety pull handle
5. Model CAHW4-SB Table Casters, set of (4), 5" diameter, (2) swivel & (2) swivel/brake, 250 lbs. capacity per caster, polymer cart washable with polymer tread, NSF

ITEM #202 WORK TABLE, STAINLESS STEEL TOP

Manufacturer: Eagle Group
Model: T3060SE

1. Model T3060SE Spec-Master® Series Work Table, 84"W x 30"D, 14/300 series stainless steel top, rolled edge on front & back, adjustable 18/300 series stainless steel undershelf with marine edge, Uni-Lok® gusset system, (4) stainless steel legs & adjustable bullet feet, NSF
2. NSF sprayed-on latex sound deadening, add suffix -SD
3. Model DOS1284-14/3 Overshelf, table mount, 84"W x 12"D x 30"H, double deck, rolled edge on front & rear, turned down sides, 12"H shelf spacing, all-welded 14/304 stainless steel construction, 1" diameter stainless steel tubular base legs, shipped assembled, NSF
4. Model 502971 Spec-Master® Heavy Duty Drawer Assembly, 20" x 20" x 5", 304 type stainless steel, insulated drawer front, removable drawer pan, self-closing drawer slides, stackable, hemmed safety pull handle
5. Model CAHW4-SB Table Casters, set of (4), 5" diameter, (2) swivel & (2) swivel/brake, 250 lbs. capacity per caster, polymer cart washable with polymer tread, NSF
1. Model T3060SE Spec-Master® Series Work Table, 60"W x 30"D, 14/300 series stainless steel top, rolled edge on front & back, adjustable 18/300 series stainless steel undershelf with marine edge, Uni-Lok® gusset system, (4) stainless steel legs & adjustable bullet feet, NSF

2. NSF sprayed-on latex sound deadening, add suffix -SD

3. Model TM60PR Pot Rack, table mount, 52"W x 20"D, triple-bar design with tubular table supports, constructed of 3/16" x 2" stainless steel flat bar, includes (15) double-pronged pot hooks, for 60"W table, NSF

4. Model TM60PRS Shelf, for table mounted pot rack, 60"W x 12"D, 16/304 stainless steel

5. Model CAHW4-SB Table Casters, set of (4), 5" diameter, (2) swivel & (2) swivel/brake, 250 lbs. capacity per caster, polymer cart washable with polymer tread, NSF

ITEM #203 WORK TABLE, STAINLESS STEEL TOP

Manufacturer: Eagle Group
Model: T3084B-BS

1. Model T3084B-BS Budget Series Work Table, 84"W x 30"D, 4-1/2"H backsplash, 430 stainless steel top, rolled front edge, adjustable galvanized undershelf, Uni-Lok® gusset system, (4) galvanized legs with adjustable plastic bullet feet, NSF

ITEM #203 WORK TABLE, STAINLESS STEEL TOP

Manufacturer: Eagle Group
Model: T3084SEM-BS

1. Model T3084SEM-BS Spec-Master® Marine Series Work Table, 84"W x 30"D, 4-1/2"H backsplash, 14/300 series stainless steel top, box marine edge on front & sides, adjustable 18/300 series stainless steel undershelf with marine edge, Uni-Lok® gusset system, (4) stainless steel legs & adjustable bullet feet, NSF

2. Model E39 Enclosed backsplash per linear foot

3. NSF sprayed-on latex sound deadening, add suffix -SD

4. Model DOS1284-14/3 Overshelf, table mount, 84"W x 12"D x 30"H, double deck, rolled edge on front & rear, turned down sides, 12"H shelf spacing, all-welded 14/304 stainless steel construction, 1" diameter stainless steel tubular base legs, shipped assembled, NSF

5. Model E24 Sink, 18" x 20" x 14" bowl, for 30"W tables, complete with faucet & basket drain (specify location)

6. Model E35 Apron in front of sink or cutout, 16 gauge stainless steel, per linear foot

7. Model 301001 Faucet, 12" long, splash-mounted mixing faucet, 8" centers, swing nozzle, heavy duty

8. Model 341190 Twist Handle Drain, with overflow, 2" NPS connection & overflow

9. Model -TB Twist bracket, per drain

10. Model 313835 Flanged Feet, stainless steel, each

ITEM #203A SINK

Manufacturer: Eagle Group

1. Specified as Part of Item 203
ITEM #204  HD RANGE, 32", 4 OPEN BURNERS  

Manufacturer: Southbend  
Model: P32A-XX  

1. Model P32A-XX Platinum Heavy Duty Range, gas, 32", (4) 45,000 BTU open burners, manual controls, (1) convection oven, includes (3) racks, stainless steel front, sides & 6" adjustable legs, 225,000 BTU, CSA, NSF  
2. Domestic Shipping, inside of North America  
3. Standard (3) years limited parts and labor warranty (reference warranty document for details)  
4. NOTE: 5" flue riser, standard  
5. Natural Gas  
6. Natural Gas pressure regulator required for stand alone unit (1" npt male rear gas supply connection standard)  
7. cord & plug  
8. Stainless steel rear on range, standard  
9. Stainless steel burner box bottom, sides, and drip tray, standard  
10. Stainless steel oven burner box bottom & sides, standard  
11. Stainless steel exterior bottom, standard  
12. Casters, 2 locking & 2 standard, in lieu of legs  

ITEM #205  COMBI OVEN, ELECTRIC  

Manufacturer: RATIONAL  
Model: B118106.12  

1. Model B118106.12 (QUICK SHIP) (SCC 101 E 208V) SelfCooking Center® Combi Oven/Steamer, electric, (10) 13" x 18"half size sheet or (10) 12" x 20" full size hotel pan capacity, iCookingControl with 7 modes, HiDensityControl®, iLevelControl, Efficient CareControl, Combi-Steamer with 3 modes, core temp probe with 6 point measurement, hand shower with automatic retracting system, ethernet interface, (dual voltage: retrofitable to ), IPX 5, cULus, NSF, ENERGY STAR®  
2. Model B608106.12 (QUICK SHIP) (SCC XS E 208V Three Phase) SelfCooking Center® Combi Oven/Steamer, electric, (4) half sheet pans, or (4) 1-1/2" deep 2/3 GN or (3) 2-1/2" deep 2/3 GN pan capacity, iCookingControl with 7 modes, HiDensityControl®, iLevelControl, Efficient CareControl, Combi-Steamer with 3 modes, core temp probe with 6 point measurement, hand shower with automatic retracting system, ethernet interface, (dual voltage: retrofittable to )  
3. NOTE: All discounts subject to approval by manufacturer  
4. 2 years parts and labor, 5 years steam generator warranty  
5. Model CAP Chef Assistance Program, a RATIONAL certified Chef conducts 4 hours/location specialized application training with personnel, no charge  
6. Model 87.01.402US Installation Kit, for electric SCC/CMP XS, 208V or 240V/60Hz/3-ph - Copper Drain THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)  
7. Door hinged on right std.  
8. NOTE: All discounts subject to approval by manufacturer  
9. 2 years parts and labor warranty  
10. Model CAP Chef Assistance Program, a RATIONAL certified Chef conducts 4 hours/location specialized application training with personnel, no charge  
11. Model 9999.9951 RCI Rational Certified Installation, new certified installation cost for a countertop model is $1000 for the first unit (61/62/101/102) (Pricing based on a 50 mile radius,
Additional charges may apply, See attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)

12. Model 9999.9957 RCI Rational Certified Installation, additional countertop unit installed at same location on same day will be an additional $800 per countertop unit (61/62/101/102) (Pricing based on a 50 mile radius, Additional charges may apply, See attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)

13. Model 8720.1551US Installation Kit, electric SCC WE/CMP 102 ; electric SCC WE/CMP 201 (440/60/3pm & ); electric SCC WE/CMP 61 ; electric SCC WE/CMP 101 (& /3ph) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)

14. Model 1900.1150US Water Filtration Double Cartridge System, for Combi-Duo models 62/62 or 62/102 or if used for more than 2 units includes: (1) double head with pressure gauge, (2) R95H filter & (1) filter installation kit (for each additional unit add (1) additional head & additional cartridge. Maximum (4) cartridges)

15. NOTE: The Rational Water Filtration Systems helps provide consistent high quality water to your RATIONAL SelfCooking Center or your CombiMaster Plus. The patented carbon block technology reduces the effects of sediment, chloramines and chlorine while providing the required flow rates

16. NOTE: All public water systems using surface water and most ground water systems treat with either chlorine/chloramine or chlorine dioxide (EPA will allow levels as high as 4ppm safe for drinking water, exceeding our maximum level of .2ppm.

17. NOTE: Chloride concentrations above 80ppm can cause corrosion. RATIONAL Water Filtration does NOT reduce chloride

18. Free Water Testing Kits are available (contact factory for info)

19. Note: The Combination of two RATIONAL appliances simply mounted on top of each other opens up new possibilities, even when space in the kitchen is limited. The following descriptions are laid out in this order:

First: Closed or Open; Second: Stationary or Mobile; Third: Top unit - Gas or Electric; Fourth: stacked on Gas or Electric.

The bottom RATIONAL (fourth item) is the one that dictates which type of Stacking Kit must be used.

20. Model 60.71.927 Combi-Duo Closed Stacking Kit, Mobile, casters, for electric or gas SCC 61 or CMP 61 stacked on electric SCC 61, SCC 101, CMP 61, or CP 101

21. Model 9999.9959 RCI Rational Certified Installation, new certified installation cost for a Combi-Duo stacked unit is $200 for the first two units for double-stack (Pricing based on a 50 mile radius, Additional charges may apply, See attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE. USA ONLY (NET)

22. Door hinged on right std.

ITEM #206  KETTLE CABINET ASSEMBLY, DIRECT-STEAM

Manufacturer:  Groen
Model:  162391

1. Model 162391 Kettle Cabinet Assembly, direct steam, (1) 10 quart kettle & (2) 20 quart kettles, hand tilt with support arm, 2/3 jacket, mounted on 63” stainless steel table, 5” wide drain trough, includes: removable sliding dump tray, swing faucet & steam trap, stainless steel construction

2. (1) year parts & labor, (10) year kettle & body warranty, standard

3. Etch Marks, 1 gallon increments

4. Model Z001107 Cover, lift-off, for TDC/3-10, 10 quart table kettle

5. Model Z001108 Cover, lift-off, for TDB/6-10 & TDC/3-20, 10 or 20 quart table top kettle

6. Model N60346 Faucet, double pantry, with 60” spray hose
ITEM #208  KETTLE, DIRECT STEAM, TILTING

Manufacturer: Groen  
Model: DL-40

1. Model DL-40 Tilting Kettle, direct steam, 40-gallon capacity, crank tilt, 2/3 jacket, 316 stainless steel liner, tri-leg base, stainless steel construction, flanged feet, 25 PSI
2. 1 year parts & labor, (10) year kettle & body warranty, standard
3. 2" Tangent draw-off (TDO)
4. Model Z013785 Perforated Disk Strainer, for 2" tangent draw-off, 1/8" hole, for floor model kettles
5. Etch Marks, 4 gallon increments
6. Model 155744 Hinged Cover Kit (No. 41), for 40 gallon tilting kettle
7. Model Z040602 Faucet, double pantry, with 48" spray hose

ITEM #209  GAS FLOOR FRYER

Manufacturer: Pitco Frialator  
Model: SSH75R

1. Model SSH75R Solstice Supreme™ High Efficiency Fryer, gas, 75 lb. oil capacity, full tank, solid state controls, boil out & melt cycle, drain valve interlock, matchless ignition, self-clean ignition, downdraft protection, stainless steel tank, front & sides, total 125,000 BTU, CSA, NSF, CE
2. 1 year parts and labor warranty from the date of installation up to a maximum of 15 months from the date of manufacture (with appropriate documentation), standard
3. Natural gas
4. (SSTC) Solid State Controller, standard
5. Stainless steel back
6. Model P6072184 Basket, (2) oblong/twin size, 17-1/4" x 8-1/2" x 5-3/4" deep, front handle, regular mesh (shipped std for models 65C+, SG18, SE18, SSH75, fryer batteries shipped with (2) per fryer
7. Model B2101502 Tank Cover, 18 gauge light duty, for models: SG18, SGBNB18, SGM18X24, SSH75/75R, SSH60W/60WR (with out basket lifts)
8. Model B3901504 Casters, 9" adjustable swivel (set of 4) non-lock rear & lock front casters, solstice supreme, SG, SE, VF and flat bottom fryers, pasta cookers, rethermalizers, BNB
9. Model B8003102 Gas Connector Hose, 3/4" connection, 36" long, with quick disconnect couplings, restraining device & thermal shut-off, for single unit 240,000 BTU

ITEM #212  FRYER DUMP STATION

Manufacturer: Pitco Frialator  
Model: SSH-BNB-18

1. Model SSH-BNB-18 Solstice Supreme™ Bread & Batter Cabinet, with BNB dump station, fryer match design, approximately 19-5/8" wide, includes 4-5/8" recessed pan and screen, standard finish, stainless steel front, sides & door, for SSH60/75 fryers, NSF
2. 1 year parts and labor warranty from the date of installation up to a maximum of 15 months from the date of manufacture (with appropriate documentation), standard
3. Model PFW-1 Food Warmer, built-in, CSA, NSF, UL
4. All stainless steel exterior on bread & batter unit, add suffix "SS" to model
5. Model B3901504 Casters, 9" adjustable swivel (set of 4) non-lock rear & lock front casters, ALL Solstice BNB’s

ITEM #213 TILTING SKILLET BRAISING PAN, GAS

Manufacturer: Groen
Model: BPM-40G

1. Model BPM-40G Braising Pan, gas, standing pilot, 40-gallon capacity, 10" deep pan, 38" pan height, manual tilt, standard etch marks, faucet bracket, round tubular open leg base, stainless steel construction, bullet feet, 144,000 BTU/hr, NSF, CSA, CSA Flame, Made in USA
2. (1) year parts & labor, (10) year pan & body warranty, standard
3. Natural gas
4. Model ELEV0-2000 For elevation between 0 and 2000 (When order is placed, all equipment with elevation specified will be assigned a different Part# by the factory)
5. std.
6. Standing pilot, standard
7. Model 140144 Gas Quick Disconnect, with AGA approved restraint chain for tilting braising pans & table top & floor model kettles
8. 2" Tangent draw-off with perforated strainer
9. Model Z040602 Faucet, double pantry, with 48" spray hose

ITEM #214 HD RANGE, 32" CHARBROILER

Manufacturer: Southbend
Model: P32D-CC

1. Model P32D-CC Platinum Heavy Duty Range, gas, 32", charbroiler, cast iron grates, manual controls, (1) standard oven, includes (2) racks, stainless steel radiant, front, sides, exterior bottom & 6" adjustable legs, 125,000 BTU, CSA, NSF, cCSAUs
2. Domestic Shipping, inside of North America
3. Standard (3) years limited parts and labor warranty (reference warranty document for details)
4. NOTE: 5" flue riser, standard
5. Natural Gas
6. Natural Gas pressure regulator required for stand alone unit (1" npt male rear gas supply connection standard)
7. Stainless steel rear on range, standard
8. Stainless steel burner box bottom, sides, and drip tray, standard
9. Stainless steel oven burner box bottom & sides, standard
10. Stainless steel exterior bottom, standard
11. Model PR24-32 Platinum Backguard/Flue Riser, 24" H x 32" W, without shelves, stainless steel front & sides
12. Model SSR24-32 Stainless rear, for riser 24" high, 32" wide
13. Casters, 2 locking & 2 standard, in lieu of legs

ITEM #215 REACH-IN REFRIGERATOR

Manufacturer: Continental Refrigerator
Model: DL2R
1. Model DL2R Designer Line Refrigerator, reach-in, two-section, self-contained refrigeration, aluminum exterior & interior, stainless steel front, standard depth cabinet, full-height stainless steel doors, electronic controller w/digital display, 6" stainless steel legs, 1/3 hp, cETLus, NSF, Made in USA
2. Standard warranty (for the United States & Canada Only): 3 year parts and labor; 5 year compressor
3. Left door hinged on left & right door hinged on right, standard
4. Stainless steel case back including rear grill & concealed drain
5. 6" stainless steel adj. legs standard
6. Model 50-P008A Pan Slide Assembly, full section for 18 x 26 or (2) 18 x 14 pans on 3" centers, bottom support, stainless steel angle (holds 16 per full section)
7. NOTE: Please specify location of pan slides

ITEM #216 REACH-IN FREEZER

Manufacturer: Continental Refrigerator
Model: DL2F

1. Model DL2F Designer Line Freezer, reach-in, two-section, 50.0 cu. ft., self-contained refrigeration, aluminum exterior & interior, stainless steel front, standard depth cabinet, full-height solid doors, electronic controller w/digital display, 6" stainless steel legs, 1/2 hp, cETLus, NSF, Made in USA
2. Standard warranty (for the United States & Canada Only): 3 year parts and labor; 5 year compressor
3. Left door hinged on left & right door hinged on right, standard
4. Stainless steel case back including rear grill & concealed drain
5. 6" stainless steel adj. legs standard
6. Model 50-P008A Pan Slide Assembly, full section for 18 x 26 or (2) 18 x 14 pans on 3" centers, bottom support, stainless steel angle (holds 16 per full section)
7. NOTE: Please specify location of pan slides

ITEM #218 HAND SINK

Manufacturer: Eagle Group
Model: HSA-10-F-LRS

1. Model HSA-10-F-LRS Hand Sink, wall mount, 13-1/2" wide x 9-3/4" front-to-back x 6-3/4" deep bowl, 304 stainless steel construction, left & right end splashes, splash mount gooseneck faucet, basket drain, 1/2" NPS water inlet, deep-drawn seamless design-positive drain, inverted "V" edge, NSF
2. Model 606215 Skirt Assembly

ITEM #219 WORK TABLE W/ SINK

Manufacturer: Custom Fabricated Stainless Steel
1. Custom fabricated per Plans and Specifications
   14 Ga. Type 304 SS Construction
   All Stainless frame and undershelf (16 ga.)
   20"x20"x14" deep sink with T&S splash mount facet (12" spout), Lever handle drain with
   overflow

ITEM #222       OVERSHELF
Manufacturer:    Eagle Group
Model:          WSP18144

1. Model WSP18144 Overshelf, wall mount with pot rack, 144"W x 18"D, rolled front edge, 1-1/2"H
   up-turn on sides & rear, 304 stainless steel pot rack bar, includes (12) double-prong stainless
   steel hooks, 16/430 stainless steel, construction, NSF

ITEM #223       PLANETARY MIXER
Manufacturer:    Hobart
Model:          HL600-1STD

1. Model HL600-1STD /1 Mixer; with bowl, beater, "D" whip, & spiral dough arm; US/EXP
   configuration
   Legacy Planetary Mixer, 2.7 HP, 60 quart, (4) fixed speeds, gear-driven transmission, 50-Minute
   SmartTimer™, #12 attach hub, power bowl lift, stainless steel bowl, stainless steel bowl guard,
   "B" beater, "D" wire whip, "ED" dough hook
2. Standard warranty: 1-Year parts, labor & travel time during normal working hours within the USA
3. Model BOWL-HL640 40 quart, Bowl, stainless steel
4. Model BBEATER-HL640 40 quart,"B" flat beater, aluminum
5. Model DWHIP-HL640 40 quart, "D" Wire Whip, stainless steel
6. Model EDDOUGH-HL640 40 qt. "ED" dough hook
7. Model TRUCK-HL1486 Bowl Truck, for use with 60, 80 & 140 quart Legacy Mixers

ITEM #224       WORK TABLE, STAINLESS STEEL TOP
Manufacturer:    Eagle Group
Model:          T3096SE-BS

1. Model T3096SE-BS Spec-Master® Series Work Table, 96"W x 30"D, 4-1/2"H backsplash,
   14/300 series stainless steel top, rolled front edge, adjustable 18/300 series stainless steel
   undershelf with marine edge, Uni-Lok® gusset system, (6) stainless steel legs & adjustable
   bullet feet, NSF
2. Model E39 Enclosed backsplash per linear foot
3. NSF sprayed-on latex sound deadening, add suffix -SD
4. Model DOS1296-14/3 Overshelf, table mount, 96"W x 12"D x 30"H, double deck, rolled edge on
   front & rear, turned down sides, 12"H shelf spacing, all-welded 14/304 stainless steel
   construction, 1" diameter stainless steel tubular base legs, shipped assembled, NSF
5. Model 502971 Spec-Master® Heavy Duty Drawer Assembly, 20" x 20" x 5", 304 type stainless
   steel, insulated drawer front, removable drawer pan, self-closing drawer slides, stackable,
   hemmed safety pull handle
6. Model E15 Vertical tray dividers, four section assembly, 3" on centers
7. Model CAHW6-SB Table Casters, set of (6), 5" diameter, (3) swivel & (3) swivel/brake, 250 lbs. capacity per caster, polymer cart washable with polymer tread, NSF

ITEM #225  WIRE SHELVING

Manufacturer: Metro
Model: 2448BR

1. Model 2448BR Super Erecta® Shelf, wire, 48"W x 24"D, Brite (zinc) finish, plastic split sleeves are included in each carton, NSF
2. Five (5) Shelves per Unit
3. Model 74UP Super Erecta® Post, 73-7/8"H, for use with stem casters, chrome plated finish
4. Model 5MDA Super Erecta® Stem Caster, swivel, 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity
5. Model 5MDBA Super Erecta® Stem Caster, brake (foot operated), 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity, brakes are foot operated

ITEM #226  WORK TABLE, STAINLESS STEEL TOP

Manufacturer: Eagle Group
Model: T3096SE-BS

1. Model T3096SE-BS Spec-Master® Series Work Table, 96"W x 30"D, 4-1/2"H backsplash, 14/300 series stainless steel top, rolled front edge, adjustable 18/300 series stainless steel undershelf with marine edge, Uni-Lok® gusset system, (6) stainless steel legs & adjustable bullet feet, NSF
2. Model E39 Enclosed backsplash per linear foot
3. NSF sprayed-on latex sound deadening, add suffix -SD
4. Model DOS1296-14/3 Overshelf, table mount, 96"W x 12"D x 30"H, double deck, rolled edge on front & rear, turned down sides, 12"H shelf spacing, all-welded 14/304 stainless steel construction, 1" diameter stainless steel tubular base legs, shipped assembled, NSF
5. Model 502971 Spec-Master® Heavy Duty Drawer Assembly, 20" x 20" x 5", 304 type stainless steel, insulated drawer front, removable drawer pan, self-closing drawer slides, stackable, hemmed safety pull handle
6. Model E15 Vertical tray dividers, four section assembly, 3" on centers
7. Model CAHW6-SB Table Casters, set of (6), 5" diameter, (3) swivel & (3) swivel/brake, 250 lbs. capacity per caster, polymer cart washable with polymer tread, NSF

ITEM #227  WALK-IN REFRIGERATOR

Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #227A  EVAPORATOR, +35F

Manufacturer: American Panel Corporation
1. Per Plans and American Panel Proposal Drawing #28512

ITEM #227B CONDENSING UNIT, AIR-COOLED
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #228 WALK-IN FREEZER
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #228A EVAPORATOR, +10F
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #228B CONDENSING UNIT, AIR-COOLED
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #229 WALK-IN FREEZER
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #229A EVAPORATOR, +10F
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #229B CONDENSING UNIT, AIR-COOLED
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #232 WALK-IN FREEZER
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #232A EVAPORATOR, +10F
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #232B CONDENSING UNIT, AIR-COOLED
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #233 WALK-IN REFRIGERATOR
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #233A EVAPORATOR, +35F
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #233B CONDENSING UNIT, AIR-COOLED
Manufacturer: American Panel Corporation

1. Per Plans and American Panel Proposal Drawing #28512

ITEM #252 WIRE SHELVING
Manufacturer: Metro
Model: 1842NK3

1. Model 1842NK3 Super Erecta® Shelf, wire, 42"W x 18"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, NSF
2. Model 70UPK3 Super Erecta® SiteSelect™ Post, 69-3/4"H, for use with stem casters, Metroseal 3 epoxy coated corrosion-resistant finish with Microban® antimicrobial protection®
3. Model 5MDA Super Erecta® Stem Caster, swivel, 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity
4. Model 5MDBA Super Erecta® Stem Caster, brake (foot operated), 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity, brakes are foot operated

ITEM #253 WIRE SHELVING

Manufacturer: Metro
Model: 1848NK3

1. Model 1848NK3 Super Erecta® Shelf, wire, 48"W x 18"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, NSF
2. Model 70UPK3 Super Erecta® SiteSelect™ Post, 69-3/4"H, for use with stem casters, Metroseal 3 epoxy coated corrosion-resistant finish with Microban® antimicrobial protection®
3. Model 5MDA Super Erecta® Stem Caster, swivel, 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity
4. Model 5MDBA Super Erecta® Stem Caster, brake (foot operated), 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity, brakes are foot operated

ITEM #254 WIRE SHELVING

Manufacturer: Metro
Model: 2436NK3

1. Model 2436NK3 Super Erecta® Shelf, wire, 36"W x 24"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, NSF
2. Model 70UPK3 Super Erecta® SiteSelect™ Post, 69-3/4"H, for use with stem casters, Metroseal 3 epoxy coated corrosion-resistant finish with Microban® antimicrobial protection®
3. Model 5MDA Super Erecta® Stem Caster, swivel, 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity
4. Model 5MDBA Super Erecta® Stem Caster, brake (foot operated), 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity, brakes are foot operated

ITEM #255 WIRE SHELVING

Manufacturer: Metro
Model: 2448NK3

1. Model 2448NK3 Super Erecta® Shelf, wire, 48"W x 24"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, NSF
2. Model 70UPK3 Super Erecta® SiteSelect™ Post, 69-3/4"H, for use with stem casters, Metroseal 3 epoxy coated corrosion-resistant finish with Microban® antimicrobial protection®
3. Model 5MDA Super Erecta® Stem Caster, swivel, 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity
4. Model 5MDBA Super Erecta® Stem Caster, brake (foot operated), 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity, brakes are foot operated
1. Model 2448NK3 Super Erecta® Shelf, wire, 48"W x 24"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, NSF

2. Model 70UPK3 Super Erecta® SiteSelect™ Post, 69-3/4"H, for use with stem casters, Metroseal 3 epoxy coated corrosion-resistant finish with Microban® antimicrobial protection®

3. Model 5MDA Super Erecta® Stem Caster, swivel, 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity

4. Model 5MDBA Super Erecta® Stem Caster, brake (foot operated), 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity, brakes are foot operated

ITEM #256 WIRE SHELVING

Manufacturer: Metro
Model: 2460NK3

1. Model 2460NK3 Super Erecta® Shelf, wire, 60"W x 24"D, plastic split sleeves are included in each carton, Metroseal 3™ epoxy-coated corrosion-resistant finish with Microban® antimicrobial protection, NSF

2. Model 70UPK3 Super Erecta® SiteSelect™ Post, 69-3/4"H, for use with stem casters, Metroseal 3 epoxy coated corrosion-resistant finish with Microban® antimicrobial protection®

3. Model 5MDA Super Erecta® Stem Caster, swivel, 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity

4. Model 5MDBA Super Erecta® Stem Caster, brake (foot operated), 5" diameter, 1-1/4" face, high modulus donut wheel tread, with donut bumpers, 250 lb. capacity, brakes are foot operated

ITEM #X1 HAND SINK

Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X2 WIRE SHELF

Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X3 WORK TABLE

Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X4 SLICER
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X5 SLICER
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X6 ROBO COUPE
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X7 ROBO COUPE
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X20 EXHAUST HOOD
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X20A EXHAUST HOOD
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X23A STEAMER, PRESSURE, GAS
Manufacturer: Market Forge
Model: M36G

1. Model M36G Pressure Boiler, gas, 36" cabinet base, modular design, cold water condenser, automatic fill & drain, low water cut-off, pressure gauge, stainless steel construction
2. Standard (1) one year parts & labor warranty, equipment only
3. Gas type to be specified
4. 200,000 BTU operation, standard

ITEM #X25 STEAMER
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X25A STEAM GENERATOR
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X26 STEAMER
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X26A CONVECTION STEAMER
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X34 EXHAUST HOOD
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X39 ICE BIN
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X42 ICE MAKER
Manufacturer: NIKEC/Existing To Remain
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1. Existing to Remain

ITEM #X58 WORK TABLE
Manufacturer: Custom

1. Existing to Remain

ITEM #X59 WIRE SHELF
Manufacturer: Custom

1. Existing to Remain

ITEM #X60 WORK TABLE W/ SINK
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X61 EXHAUST HOOD
Manufacturer: NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X72 CONVECTION OVEN, GAS
Manufacturer: Blodgett Oven
Model: DFG-100 DBL

1. Model DFG-100 DBL Convection Oven, gas, double-deck, standard depth, capacity (5) 18" x 26" pans per compartment, (SSD) solid state digital controls, 2-speed fans, , interior light, simultaneous operated doors with glass, porcelain crumb tray, stainless steel front, sides & top, 6" stainless steel legs, flue connector, (2) 1/2 HP, 55,000 BTU each, cETL, NSF, CE
2. 3 year parts, 2 year labor and 2 additional year door warranty (parts only), standard
3. Natural gas
4. 3-wire with ground, 6' cord, , 1/2 hp (per deck), standard
5. Model SSD Top Oven: Solid State digital with Pulse Plus® and Cook & Hold, standard
7. Draft diverter or Draft hood must be selected below
8. 6" legs, adjustable, stainless steel (set), standard
ITEM #X74      EXHAUST HOOD
Manufacturer:  NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X83      COUNTERTOP MIXER
Manufacturer:  NIKEC/Existing Relocated

1. Existing to be Relocated

ITEM #X97      WIRE SHELF
Manufacturer:  NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X98      TRANSFORMER
Manufacturer:  NIKEC/Existing To Remain

1. Existing to Remain

ITEM #X99      ICE CREAM BUNKER
Manufacturer:  NIKEC/Existing To Remain

1. Existing to Remain

END OF SECTION
SECTION 11 52 13.52

FREE-HANGING CEILING-RECESSED FRONT PROJECTION SCREENS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Electrically operated, ceiling recessed, front projection screens.

1.2 RELATED SECTIONS
A. Division 5 - Metal Fabrications: Suspension systems for projection screens.
B. Section 06 40 00 - Architectural Woodwork.
C. Section 09 22 26 - Suspension Systems.
D. Section 09 26 13 - Gypsum Veneer Plastering.
E. Section 09 21 16.23 - Gypsum Board Shaft Wall Assemblies.
F. Section 09 51 13 - Acoustical Tile Ceilings.
G. Division 26 for electrical wiring, connections, and installation of remote control switches for electrically operated projection screens.

1.3 REFERENCES
A. NFPA 70 - National Electrical Code.
C. GREENGUARD Environmental Institute Gold.

1.4 SUBMITTALS
A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
C. Wiring diagram for electrically operated units.
D. Shop Drawings: Shop drawings showing layout and types of projection screens.
   Show the following:
   1. Location of screen centerline.
   2. Location of wiring connections.
4. Detailed drawings for concealed mounting.
5. Connections to suspension systems.
6. Anchorage details.
7. Accessories.
8. Frame details.

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of projection screen required from a single manufacturer as a complete unit, including necessary mounting hardware and accessories.

B. Coordination of Work: Coordinate layout and installation of projection screens with other construction supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system, and partitions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver projection screens until building is enclosed and other construction where screens will be installed is substantially complete.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Protect screens from damage during delivery, handling, storage, and installation.

1.7 COORDINATION

A. Coordinate work with installation of ceilings, walls, electric service power characteristics, and location.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Draper Inc, Da-lite, RP Visual, Stewart.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MOTORIZED, CEILING RECESSED, FRONT PROJECTION SCREENS

A. Ultimate Access E: Electric motor operated, metal case, independently motorized closure. Ceiling-recessed, metal headbox, 10 inches (254 mm) high and 8 inches (229 mm) deep. UL approved "Suitable for use in environmental air space." Case finished white. Bottom of case consists of an independently motorized trap door that opens up inside the screen case. The trap door and the access door both hinge downward to allow access to inside of screen case. The doors remain attached to the screen case via a concealed full-length hinge. Releasing one latch at each end of screen case allows the doors to hinge downward and a prop arm at each end.
may be pivoted to engage with endcaps, keeping the door assembly in its fully open position. Symmetrical case allows for viewing surface to unroll from the back or front of the roller. The screen is attached to roller with roller brackets. Ultimate Access case may be ordered in advance and the screen installed later to eliminate field damage. The screen installs in minutes. Metal roller mounted on rubber isolation mounts.

1. Motor mounted inside screen roller on rubber isolation insulators. Motor UL certified, rated 110-120V AC, 60 Hz, five wire, instantly reversible, lifetime lubricated with pre-set accessible limit switches. Motor with overload protection and electric brake. Motor shall be left mounted.

2. Motor Screen Controls, UL certified.
   a. Low voltage control unit with three button 24V switches and cover plate to stop or reverse screen at any point, built-in RF receiver, built-in Video Interface Control trigger for 3V-28V, RS232, and dry contact relays.
   b. Video Interface Control for use with equipment with a 115V switched outlet.
   c. Video Interface Control for use with equipment with a 12V switched outlet.
   d. Video Interface Control for use with equipment with a 6V switched outlet.
   e. Motor shall be left mounted.

3. Projection Viewing Surface:

4. Viewing Area H x W.
   a. HDTV Format (16:9). Black masking borders and 12 inches (305 mm) extra black drop are standard.
      1) THE CAVE: 298 inch (7340 mm) diagonal; 260 inches x 146 inches (6604 mm x 3708 mm)
      2) EAST TENNESSEE ROOM (QTY 2): 133 inch (3378 mm) diagonal, 116 inches x 65 inches (2946 mm x 1651 mm)
      3) ROOMS 219: 133 inch (3378 mm) diagonal, 116 inches x 65 inches (2946 mm x 1651 mm); provide with 24 inches (609 mm) extra black drop
      4) ROOMS 360 AND 366: 133 inch (3378 mm) diagonal, 116 inches x 65 inches (2946 mm x 1651 mm)
      5) ROOM 311 (QTY 2): 160 inch (4064 mm) diagonal; 139 inches x 78 inches (3530 mm x 1981 mm)

PART 3 EXECUTION

3.1 EXAMINATION
   A. Do not begin installation until substrates have been properly prepared.
   B. Verify rough-in openings are properly prepared.
   C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION
   A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install front projection screens with screen cases in position and relationship to adjoining construction as indicated, securely anchored to supporting substrate, and in manner that produces a smoothly operating screen with plumb and straight vertical edges and plumb and flat viewing surfaces when screen is lowered.

C. Test manually operated units to verify that screen operating components are in optimum functioning condition

D. Test electrically operated units to verify that screen, controls, limit switches, closure and other operating components are in optimum functioning condition.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION
SECTION 11 52 23

AUDIO-VISUAL EQUIPMENT SUPPORTS

PART 1 - GENERAL

1.1 SUMMARY
   A. Section Includes: Motorized projector lifts.

1.2 ACTION SUBMITTALS
   A. Refer to Section 01 33 23 Shop Drawings, Product Data and Samples
   B. Product Data: For each type of lift, including manufacturer recommended installation procedures.
   C. Shop Drawings: Include dimensions, method of attachment, structural support, bracing, and electrical wiring.
   D. Samples: Provide finish samples.

1.3 CLOSEOUT SUBMITTALS
   A. Refer to Section 01 78 21 Closeout Submittals
   B. Maintenance data.

1.4 QUALITY ASSURANCE
   A. Motors for Scissor Lifts shall be certified for use in the United States and Canada by Underwriters Laboratory (UL), Inc. and shall bear UL label.

1.5 DELIVERY, STORAGE AND HANDLING
   A. Refer to Section 01 60 00 Product Requirements
   B. Deliver motorized projector lifts in manufacturer’s original, unopened, undamaged containers with identification labels intact.
   C. Inspect motorized projector lifts for freight damage, concealed or otherwise, upon delivery to project site. Report damage to freight carrier immediately for replacement of motorized projector lifts.
   D. Store motorized projector lifts in resealed manufacturer’s original containers.
PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Draper, Inc.; 411 South Pearl Street; Spiceland, IN 47385-0425; Phone 765.987.7999; website www.draperinc.com

B. SVS, Inc.; 2513 Jenks Ave.; Panama City, FL 32405; phone 850.522.4747 www.svslifts.com

C. Display Devices; 21075 Westgate Road; Golden, CO 80403; Phone: 303.412.0399; website www.displaydevices.com

D. Source Limitations: Obtain motorized projector lifts from single manufacturer as a complete unit including necessary mounting hardware and accessories.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Bracing: Motorized projector lift suspension components and method of installation shall comply with Seismic Zone requirements.

2.3 MOTORIZED PROJECTOR LIFTS

A. Electrically Operated, Scissor Lift: Electrically operated, tight stacking scissor type, projector lift for lowering and retracting projector from ceiling storage location to position for show or service. Scissor Lift Model SLX17 as manufactured by Draper, Inc. to include controls, mounting hardware, wiring, and other components required for complete operation. If installed in a non-plenum space, or if installed in a plenum space with Environmental Airspace Housing and Closure, the entire unit is US UL Listed to UL 2442 and Canada UL Listed to CSA C22.2 No. 60065-03.

   a. Limit Switches: Provide factory set at 80 inches (2032 mm), 204 inches (5181 mm) and field adjustable.
   b. Maximum Extension: 212 inches (5384 mm).
   c. Maximum Lift Capacity: 350 lbs (159 kg)
   d. Approximate Travel Speed: 90 inches (2286 mm) in 60 seconds.
   e. Voltage: 110-120V.

B. Operating Mechanism: Three sets of steel stabilizing scissors, positioned on sides and rear of operating pan, and two [[1/8] [3/16] inch] [[3] [5] mm] diameter cables with [2,000 foot-pounds] [2,711 newton-meters] [tensile strength per cable, raise and lower operating pan with 110-120V AC, 60 HZ, instantly reversible, thermally protected, lifetime lubricated, 3-wire motor with electric brake.

C. Safety Belt: Provide lift with fail-safe inertial safety belt system.
D. Operating Pan: [2-3/4 by 20 by 20] [3-1/4 by 35 by 35] inches] [[70 by 508 by 508] [83 by 889 by 889] mm], [11 gauge] [3.2 mm] steel pan with powder coat paint finish for attachment of suspended projector.

E. Cable Management System: Provide lift with means for attachment of cables to rear scissor to eliminate cord tangles. Include 110V pre-wired power cable.

F. Ceiling Closure Panel: Coordinate with architect selection of ceiling closure panel.

G. Environmental Airspace Housing: Fabricated from steel panels for recessing projector lift in ceiling space used as return air plenum. Provide with universal closure and metal trim to finish ceiling opening.

I. Provide lift with 110 VAC, 60 HZ fused, switched duplex outlet to power projector. Outlet automatically energized in down position.

J. Current Sensor: AC sensor to delay upward operation of traveling tray while a load (projector's fan) is being placed on switched duplex. Sensor to have a power threshold of 0.5 amps.

2.4 CONTROLS

A. Provide 1 control stations to lower, raise, and stop projector lift.

B. Single Station Control: 3-position, low voltage switch with white cover plate and momentary key switch with stainless steel cover plate.

C. RS232: Interface for serial communication.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate layout and installation of motorized projector lifts with ceiling construction and related components penetrating or above ceilings such as lighting fixtures, mechanical equipment, ductwork, and fire-suppression system.

B. Coordinate requirements for blocking, structural supports, bracing, and ceiling openings to ensure proper installation of motorized projector lifts.

C. Coordinate location and requirements for power supply conduit, and wiring required for motorized projector lifts and controls.

D. Coordinate installation of recessed motorized projector lifts with construction of finished ceiling

E. Coordinate required tolerances and weight restrictions for acoustical ceiling panels adhered to mount closure.
F. Coordinate interface and installation of motorized projector lift controls with provision of motorized screen.

3.2 INSTALLATION

A. Install motorized projector lifts and controls at locations and heights indicated on Drawings.

B. Install motorized projector lifts complete with necessary hardware, anchors, brackets and fasteners; according to manufacturer's written instructions and as specified.

3.3 FIELD QUALITY CONTROL

A. Test motorized projector lifts to verify that lifts, controls, limit switches, closures, and other operating components are functional. Correct deficiencies.

3.4 DEMONSTRATION

A. Demonstrate operation of motorized projector lifts to Owner's designated representatives.

3.5 PROTECTION

A. Protect motorized projector lifts after installation from damage during construction operations. If damage occurs, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

END OF SECTION
SECTION 12 24 13

WINDOW ROLLER SHADES

PART 1  GENERAL

1.01  WORK INCLUDED

A. Work includes:
   1. **Shade Type 1**: Manually operated interior roller-screen solar shades as indicated on the drawings.
   2. **Shade Type 4**: Motor operated, double-shade system, interior roller-screen room darkening and solar shades on same bracket allowing for independent control of each shade as indicated on the drawings.

B. Work also includes furnishing the following for installation by others:
   1. Extruded aluminum ceiling pocket trim assemblies for installation under Section 09 51 13 Acoustic Ceiling Systems.
   2. Electrical control components including switches, relays, etc as necessary to provide control characteristics as specified elsewhere in this section.

1.02  RELATED SECTIONS

A. Wood Blocking: Section 06 10 00.


C. Electrical: Division 26.

1.03  PERFORMANCE REQUIREMENTS

A. Fire Test Characteristics: Provide shade fabrics tested in accordance with:

B. Anti-Microbial: Provide shade fabrics tested in accordance with:
   1. ASTM G22 – Results for ATCC6538 and ATCC13388 indicating minimum 5mm indicating “No Growth Contact Area”.
   2. ASTM G21 – Results for ATCC9642, ATCC9644, ATCC9348 and ATCC9645 indicating “No Growth”.

C. Electrical: Control systems and components approved AS A SYSTEM by either Underwriter Laboratories (UL) or Electrical Testing Laboratories (ETL).

1.04  SUBMITTALS

A. Product Data: Submit manufacturer’s product data sheets, performance data and installation instructions for each item.

B. Shop Drawings
   1. Show location and extent of roller shades.
2. Include elevations, sections, details and dimensions.
3. Show installation details, mountings, attachment to other work, operational clearances and relationship to adjoining work.
4. Complete wiring diagrams including connection details for all components supplied by this section for installation and connection by Division 26.

C. Coordination Drawings: Coordinate with reflected ceiling plans. Show the following:
1. Ceiling suspension system members and attachment to building structure.
2. Ceiling mounted or penetrating items.
3. Shade mounting assembly and attachment.
4. Size and location of access to shade adjustable components.

D. Samples
1. Selection Samples
   a. Submit 3” x 5” shade cloth fabric swatches for initial fabric color selection from manufacturer’s full range of available fabrics.
   b. Submit aluminum finish color samples from manufacturer’s full range of colors.
2. Verification Samples
   a. Submit one fully operational window shade sample of each type required; approximately 30”x30” complete with selected shade cloth
   b. One complete set of all shade components, unassembled.

E. Test Reports, Design Data and Certifications: Current reports from independent testing laboratories demonstrating compliance with Article 1.03.

F. Installation Instructions: Submit for types of shades and mounting substrates encountered.

1.05 QUALITY ASSURANCE

A. Qualifications
   1. Manufacturer: 20 years minimum experience manufacturing products comparable to those specified.
   2. Installer: 5 years minimum experience installing products comparable to those specified.

B. Do not fabricate shades without obtaining field dimensions for each opening. Coordinate construction of surrounding conditions to allow for timely field dimension verification.

1.06 DELIVERY, STORAGE AND HANDLING

A. Do not deliver shades until painting, wet work, grinding and similar operations which could damage, soil or deteriorate shades have been completed in installation areas. If, due to unforeseen circumstances, shades must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

B. Deliver shades to project in labeled protective packaging. Label each shade for the appropriate opening. Schedule deliveries to prevent delays to completion of work but to minimize on site storage time.
C. Store shades in a dry secure place. Protect from weather, surface contaminants, corrosion, construction traffic and other potential damage.

1.07 WARRANTY

A. Provide manufacturer’s warranty for the installed systems. Warranty shall provide for repair or replacement of defective roller shade system components, including excessive deterioration or failure of system components. Repair or replacement shall include all costs associated with verifying failures, removal of deteriorated or defective products, replacement, testing, transportation, travel and other expenses related to corrective measures.

1. Warranty Period: 5 years from date of substantial completion.

B. Shade Motors and motor control system electrical components: Provide Manufacturer’s warranty. Warranty period to be 5 years from Date of Substantial Completion for shade motors and two years for all other control components containing provisions that installation will remain operational without fault for the warranty period and include all operating parts.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Drawings and specifications are based on shades manufactured by MECHOSHADE SYSTEMS INC.

B. Other Acceptable Manufacturers: Shades manufactured by LUTRON, DRAPER, SOLARFECTIVE PRODUCTS LIMITED, NYSAN SHADING SYSTEMS are acceptable providing the shade assemblies meet the requirements specified herein and the profile/arrangements indicated on the drawings.

2.02 COMPONENTS

A. Shadebands: Construction of shade bands includes fabric, hembar and hempocket, and the attachment of the shade band to the roller.

1. **Shade Type 1**: Visually transparent single-fabric shade cloth; MECHOSHADE ThermoVeil Group, single thickness non-raveling 0.03” thick vinyl fabric, woven from 0.18” extruded vinyl yarn comprised of 21% polyester and 79% reinforced vinyl; colors as selected by Architect.
   a. **Dense Basket Weave**: 1500 Series (3% open) or 1300 Series (5% open), 2 x 2 dense basket weave pattern; colors as selected by Architect. Provide a 3’x3’ sample of the shade cloth in both 3% and 5% openness to be submitted to owner and architect to test at the site prior to ordering.

2. **Shade Type 4**: Double shade system incorporating two independently operable shades on one bracket.
   a. **Solar Shade**: Dense basket weave; 1500 Series (3% open) or 1300 Series (5% open), 2 x 2 dense basket weave pattern; colors as
selected by Architect. Provide a 3'x3' sample of the shade cloth in both 3% and 5% openness to be submitted to owner and architect to test at the site prior to ordering.

b. **Black-Out Shade**: ThermoVeil Classic Blackout 0700 Series; vinyl coated fabric; colors as selected by Architect.

3. Hembars and Hempockets: Fabric hempocket with RF-welded seams (including welded ends) and concealed hem weights. Provide continuous hem weights of appropriate size and weight for shadeband inside sealed hempocket.

B. Manually Operated Hardware and Shade Brackets: **Shade Type 1**

1. Provide for regular and offset drive capacity (chain fall at front or rear of bracket) on all shade drive end brackets.
2. Provide shade hardware system that allows for removal of shade roller tube from brackets without removing hardware from opening.
3. Provide shade hardware that allows for removal and re-mounting of the shade band without having to remove shade tube, drive or operating support brackets.
4. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connections are not acceptable.
5. Provide hardware construction of minimum 1/8” thick cadmium plated steel or heavier as required to support 150% of the full weight of each shade.
6. Drive Bracket/Brake Assembly: Manufacturer’s standard type that disengages to 90% during the raising and lowering of the shade and is capable of withstanding a pull force of 50 pounds in the stopped position.

C. Motorized Shade Hardware and Shade Brackets: **Shade Type 4**

1. Provide shade hardware constructed of minimum 1/8” thick (3.175 mm) cadmium plated steel or thicker as required to support 150% of the full weight of each shade.
2. Provide shade hardware system that allows for removal of shade roller tube from brackets without removing hardware from opening or without requiring end or center support brackets to be removed.
3. Provide shade hardware that allows for removal and re-mounting of the shade band without having to remove shade tube, or drive or operating or support brackets.
4. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets regardless of mounting position (inside or outside mount).
5. Provide shade hardware system that allows for removable regular roll fascia(s) to be mounted continuously across two or more shades without requiring exposed fasteners.
6. Provide shade hardware system that allows for operation of multiple shadebands offset by a maximum of 12° from the motor axis between shadebands, 6° on each side of the radial line, by a single motor (Multi-banded shades) subject to manufacturer’s design criteria.
7. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connections for drive mechanism to shade roller tube shall not be accepted.
D. Shade Roller and Shade Cloth Attachment
1. Extruded aluminum; diameter and wall thickness to support shade fabric as determined by manufacturer.
2. Provide for positive mechanical engagement with drive/brake mechanism.
3. Provide for positive mechanical attachment of shade band to roller tube without use of adhesives, adhesive tape, staples or rivets. A mounting method that does not allow the shade band to be removed from the shade tube while installed is not acceptable.
4. Attach shade bands to tube in a manner that allows removal and replacement of the shade band without removing either the tube from the brackets or without removing shade brackets.

E. Drive Chain: #10 Qualified stainless steel chain rated to 90 pound minimum breaking strength.

F. Shade Motors and Motor Control System [IQ/MLC System]: Specifications and Design are based on the IQ/MLC motor control system.

1. Shade Motors
   a. Tubular, asynchronous (non-synchronous) motors with built-in reversible capacitor operating at 110V AC (60hz), single phase, temperature Class A, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor.
   b. Conceal shade motors inside shade roller tube.
   c. Each shade motor draws a maximum current of 2.3 amps.
   d. Use motors rated at the same nominal speed for all shades in the same room.
   e. Total hanging weight of shadeband shall not exceed 80% of the rated lifting capacity of the shade motor and tube assembly.

2. Wall Switches
   a. 3 button architectural flush mounted switches with metal cover plates and no exposed fasteners. Provide key type switches where indicated. Key all switches in accordance with Hardware Section 08 71 10.
   b. Connect local wall switches to control system components via low voltage (12V DC) 4 conductor modular cable equipped with RJ-11 type connectors supplied, installed and certified under Division 26.
   c. Connect master wall switches to control system components via low voltage (12V DC) 6 conductor modular cable equipped with RJ-12 type connectors supplied, installed and certified under Division 26.

3. Motor Control System
   a. Provide power to each shade motor via individual 3 conductor line voltage circuits connecting each motor to the relay based intelligent controllers (IQ/MLC).
   b. Control system components provide appropriate (spike and brown out) over-current protection (+/- 10% of line voltage) for each of the four individual motor circuits and shall be rated by UL or ETL as a recognized component and tested as an integrated system.
   c. Motor control system allows each group of four shade motors in
any combination to be controlled by each of four local switch ports, with up to fourteen possible “sub-group” combinations via local 3 button wall switches and all at once via a master 3 button switch. System shall allow for overlapping switch combinations from 2 or more local switches.

d. Multiple “sub-groups” from different IQ/MLC control components may be combined to form “groups” operated by a single 3 button wall switch, from either the master port or in series from any local switch ports.

e. Each shade motor shall be accessible (for control purposes) from up to four local switches and one master switch.

f. Control system shall allow for automatic alignment of shade hembars at 25%, 50% and 75% of opening heights, or up to three user defined intermediate stopping positions in addition to all up / all down positions regardless of shade height, a total of 5 positions. Control system shall allow shades to be stopped at any point in the opening height, however, shade hembars may not be in alignment at these non-defined positions. (asynchronous motors)

g. Control system shall have two standard operating modes: Normal Mode allowing the shades to be stopped anywhere in the window's opening height and Uniform Mode allowing the shades to only be stopped at the predefined intermediate stop positions. Both modes shall allow for all up/all down positioning.

h. Control system components shall allow for interface with low voltage Audio Visual system components via a dry contact terminal block.

i. Control system components shall allow for interface with external analog input control devices such as solar activated controllers, wind activated controllers, 24 hour timers, etc. via a dry contact terminal block.

j. Reconfiguration of switchable groups [as specified in 3.d above] shall not require rewiring of the hardwired line voltage motor power supply wiring or the low voltage control wiring. Reconfiguration of switch groups shall be accomplished within the motor controller device (IQ/MLC).

G. Accessories

1. Provide extruded aluminum pocket closure assemblies for use with drywall or other framed shade pocket construction as indicated on the drawings.

2. Provide extruded aluminum fascia for all shades mounted below the ceiling. Colors as selected by Architect.

3. Black-Out Shades: Designed for eliminating all visible light gaps when shades are fully closed
   a. Side and Sill Channels: Extruded aluminum with light seals; designed to eliminate light gaps at sides and bottom of shades. Finish as selected by Architect.
   b. Shade Band Retention System: Manufacturer’s standard design for guiding shade band material through range of travel and holding shade band flat with edges of material within side channels.
2.03  FABRICATION

A. Fabricate units to completely fill openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise. Comply with manufacturer’s edge clearance standards and recommendations.

B. Fabricate shadecloth to hang flat without buckling or distortion, with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8” in either direction per 8’ of shade height due to warp distortion or weave design.

2.04  FINISHES

A. Aluminum Components: Baked enamel; colors as selected by Architect.

B. Steel Components: Baked enamel; colors as selected by Architect.

PART 3  EXECUTION

3.01  EXAMINATION

A. Examine substrate and conditions for installation. Do no begin installation until conditions are satisfactory. Beginning installation indicates acceptance of site conditions by contractor. Notify Architect upon inspection when the project conditions are unacceptable for shade installation. Beginning of installation means acceptance of substrate and project conditions.

3.02  INSTALLATION

A. Install units to comply with manufacturer’s instructions for the type of mounting and operation required. Provide units plumb, true and securely anchored in place with recommended hardware and accessories to provide smooth, non-binding operation.

B. Install unit within the following tolerances:
   1. Maximum variation of gap at window opening perimeter: ¼” per 8’ (+/- 1”/”) of shade height.
   2. Maximum offset from level: 1/16” per 5’ of shade width.

3.03  ADJUSTING

A. Adjust drive/brake mechanism for smooth operation. Adjust shade and shade cloth to hang flat without buckling or distortion. Replace units or components that do not hang properly or operate smoothly.

3.04  CLEANING

A. Touch-up damaged finishes and repair minor damage in order to eliminate evidence of repair. Remove and replace work that cannot be repaired to the Architect’s satisfaction.
B. Clean exposed surfaces, including metal and shade cloth, using non-abrasive materials and methods recommended by manufacturer. Remove and replace work that cannot be cleaned to the Architect's satisfaction.

3.05 DEMONSTRATION

A. Demonstrate operation and instruct Owner's personnel in the proper operation and maintenance of the shade systems.

END OF SECTION
SECTION 12 46 19

CLOCKS

PART 1 GENERAL

1.01 WORK INCLUDED
   A. Provide room clocks as indicated on drawings.

1.02 SUBMITTALS
   A. Submit manufacturer's product data.

PART 2 PRODUCTS

2.01 ROOM CLOCKS
   A. Description: 14" diameter, surface mount, electric clock.
   B. Electric: 120 VAC.
   C. Finishes
      2. Face: White enamel with black screened numerals.
   D. Model and Manufacturer: Model 500A-2 by PETER PEPPER PRODUCTS, INC. or equal by SETH THOMAS.

PART 3 EXECUTION

3.01 INSTALLATION
   A. Mount clocks at locations and heights indicated on drawings or as directed by Architect.
   B. Make final "plug-in" connection to electric receptacle provided under Division 26.

END OF SECTION
SECTION 12 93 00
SITE FURNISHINGS

PART 1 GENERAL

1.01 SUMMARY

A. This section includes the following:
   1. Wall-top Mount Bench
   2. Concrete Planter
   3. Landscape Border Edge
   4. Cast Iron Grate Cover
   5. Bike Rack
   6. Bollard

B. Products furnished but not installed under this Section include pipe sleeves, anchor bolts to be cast in concrete footings and installed in concrete paving.

1.02 DESCRIPTION

A. Provide site furnishings and equipment as shown on the Drawings and specified herein.

B. Related requirements specified elsewhere:
   1. General Requirements: Division 1 Sections.

1.03 QUALITY ASSURANCE

A. Source Limitations: Obtain site furnishings through one source from a single manufacturer.

B. Acceptable Manufacturers:
   1. Columbia Cascade
   2. Permaloc Corporation
   3. Vicars Recreation, Inc.
   4. Forms+Surfaces
   5. Col-Met
   6. Dura Art Stone
   7. Victor Stanley
   8. Canterbury International
   9. Modern Pre-cast
   10. Urban Accessories
   11. Equivalent product as approved by the Landscape Architect.

1.04 SUBMITTALS

A. Submit the following in accordance with Division 1 requirements:
   1. Manufacturer’s Literature: Catalog cuts, materials and installation instructions for each item.
2. Samples for Verification: If requested by the Landscape Architect provide full size representative samples of each item for verification.
3. Maintenance Data: For site furnishing to include in maintenance manuals.

PART 2  PRODUCTS

2.01 SITE FURNISHINGS

A. Wall-Top Mount Bench (Forms+Surfaces is basis of specification):
   1. Forms+Surfaces, Bench Top-Ipe-Backless with Front Return, 72"L X 24"D;
      a. SS Tube Color: Argento Texture powder coated finish.

D. Landscape Border Edge:
   1. Powder Coated steel landscape border edging Col-Met #1012-6, 10' x 12GA commercial edging,
      a. Available: www.colmet.com
      b. Color: Black powder coated finish.

E. Cast Iron Grate Cover:
   1. Trench Drain: Urban Accessories, Inc., Model - Title Waves, width – see site plan. Equivalent products will be considered for approval.

F. Bike Rack (Forms+Surfaces is basis of specification):
   1. OLYMPIA Bike Rack.

G. Bollard:
   1. Fixed Security Bollard (for use with Selux MTR light bollard):
      a. Material: SCH 80 steel
      b. Zinc coated finish

H. Concrete Planter:
   1. Dura Art Stone (basis of specification) Model: Round Spanish Planter, 36" x 22", with light sandblast finish (S3S22S-7LSB)
      a. Color: S-7, Sand Buff
      b. Available: Dura Art Stone, 1324 Southern Road, Morrow, GA 30260, Phone: (770) 960-9550, Fax: (770) 960-9535.

PART 3  EXECUTION

3.01 INSTALLATION

A. Examine areas and conditions, to receive site equipment, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
B. Comply with manufacturer’s written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

C. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

D. Landscape Architect will approve staked locations of all site furnishings prior to installation.

E. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.

F. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

G. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and ¾” larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink grout, mixed and placed to comply with anchoring material manufacturer’s written instructions, with top smoothed and shaped to shed water.

H. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink grout, mixed and placed to comply with anchoring material manufacturer’s written instructions, with top smoothed and shaped to shed water.

3.02 CLEANING

A. After completing site furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION
SECTION 13 48 23

FABRICATED SOUND AND VIBRATION CONTROL ASSEMBLIES

PART 1 GENERAL

1.01 RELATED WORK

A. Requirements: Provide sound and vibration isolated floors, walls and ceilings in accordance with Contract Documents.

B. Related Sections.
   1. Section 09 2116 – Gypsum Board Assemblies.
   2. Section 09 2213 – Metal Furring Channels.
   3. Section 09 2216 – Non-Structural Metal Framing

1.02 SUBMITTALS

A. General: Submit the following in accordance with Section 013000 – Submittals.

B. Product Data: Each type of isolation material.

C. Shop Drawings: Lay out drawings indicating floating concrete floor reinforcement, and vibration isolator and sway brace mount locations.

D. Vibration Isolator hanger and resilient clip load and deflection curves.

1.03 QUALITY ASSURANCE

A. Set isolation hangers and resilient clips under manufacturer’s supervision.

B. Pre-Installation Conference: Prior to commencement of sound and vibration isolation work, schedule meeting at mutually agreeable time to include Owner, Architect, Contractor, Contractor’s field superintendent, sound and vibration isolation installer, materials manufacturer’s representative, and other interested parties to review methods and procedures to be used to achieve end result.

1.04 DELIVERY AND STORAGE

A. Delivery: Deliver in manufacturer’s unopened containers fully identified with manufacturer’s name, trade name, type, class, grade, and size.

B. Storage: Store in unopened containers, off ground and protected from damage.
PART 2 PRODUCTS

2.01 MATERIALS

A. Unfaced Mineral/Glass Fiber Blanket/Batt Acoustical Insulation: Three-inch thick (minimum) unfaced semi-rigid mineral fiber or glass fiber blankets. Acoustical insulation to comply with ASTM C665, Type I, with maximum flame spread of 25 and smoke development of 50 per ASTM E 84.

1. Johns Manville Unfaced Fiber Glass Insulation
2. Owens Corning Sound Attenuation Batt Insulation
3. Certainteed NoiseReductor Insulation
4. or approved equal.

B. Acoustical Sealant: Non-drying, non-hardening, non-skinning, non-staining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.

1. USG Sheetrock Brand Acoustical Sealant.
2. Tremco Acoustical Sealant.
4. or approved equal.

C. Moldable Sheet Caulk or Firestop Putty Pads for Electrical Outlet Boxes: Putty pads should consist of a non-hardening, intumescent compound 1/8-inch thick minimum sheet caulk designed to seal the back and sides of electrical outlet boxes.

1. Harry A Lowry Outlet Box Pads.
2. 3M Fire Barrier Moldable Putty Pads MPP+.
3. Kinetics Noise Control IsoBacker Putty pads
4. or approved equal.

PART 3 EXECUTION

3.01 INSPECTION

A. Examination: Examine substrates, adjoining construction and condition under which
Work is to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected.

3.02 OUTLET BOX PADS (WALL AND SOUND CONTROL CEILINGS)

A. Ensure that the surface of the electrical outlet box is clean of dirt, rust, oil, release agents, repellants and any other substances that may affect proper adhesion.

B. All wiring shall be completed prior to the installation of the moldable putty pads.

C. Wrap the back and sides of the electrical outlet boxes located within acoustic walls and ceilings with 1/8-inch moldable putty pads. The pads shall provide an airtight seal around the perimeter of the boxes.

D. Caulk the joint between the electrical outlet box and adjacent gypsum board with acoustical sealant.

END OF SECTION
SECTION 14 21 23

ELECTRIC TRACTION PASSENGER ELEVATORS
MACHINE ROOMLESS

PART 1       GENERAL

1.01  WORK INCLUDED

A. Provide all labor, materials, equipment and services necessary to furnish and install two (2) machine roomless passenger elevators. The elevator systems as described shall be installed with all needed accessories as required to provide a complete installation.

1.02  RELATED SECTIONS

A. The following Sections contain requirements that relate to this Section.
   1. Section 05 50 00 - Metal Fabrications; pit ladder, divider beams, lintels for door support.
   2. Division 26 - Electrical; electrical service to main disconnect including electrical power for elevator installation and testing; shaft and pit GFIC convenience outlets; non-GFIC outlet dedicated for sump pump, lighting in elevator pit; wiring for telephone service. If electrical requirements differ from those indicated on the Electrical Drawings, the Elevator Supplier must pay the Electrical Contractor for costs to accommodate this change. Power changes should be brought to the Architect's attention during bidding for inclusion in an Addendum.
   3. Division 26 - Fire Alarm Systems; fire and smoke detectors and interconnecting devices.
   4. Division 26 - Telephone System.

1.03  QUALITY ASSURANCE

A. Manufacturer
   1. Regularly engaged in designing, engineering, manufacturing, installing and servicing elevators of the type and character specified.
   2. Have a history, during the last ten (10) years, of not less than 50 successful installations and satisfied Owners where continuous maintenance service was performed. Such history to be fully documented, upon request, listing project name, date of installation, address, architect, owner, name and phone number of owner's facilities manager or maintenance superintendent.

B. Installer: Manufacturer or an authorized agent of the manufacturer with not less than 5 years of successful experience installing similar elevators.

D. Codes and Standards: Perform all work in accordance with the American National Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks (ASME A17.1), the National Electrical Code and the OBC.

E. Regulatory Requirements
   1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
   2. OBBC.

F. Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware and operation shall comply with ASTM E152, UL 10B and NFPA Standard 80. Provide entrance assembly units bearing UL Class B labels.

G. Obtain and pay for all required permits, inspections and fees. Arrange for and make required inspections and tests. Obtain certificates and operating permits and turn over to University upon acceptance of work.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer’s product specifications and installation instructions for each principal component or product, and include certified test reports on required testing. List and describe features of the control system, performances and operating characteristics.

B. Shop Drawings: Submit plans, elevations and details of car enclosures and hoistway entrances. Include:
   1. A comparison of maximum loads imposed on the building structures at points of support and all similar considerations of the elevator work.

C. Maintenance Manuals: Submit bound maintenance manual for each elevator or type of elevator with operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing, emergency instructions and similar information.

D. Samples: Submit samples of exposed finishes of car enclosures, hoistway entrances, and signal equipment; 8” squares of materials and 12” lengths of running materials.

E. Inspection certificates and operating permits required by governing authorities to allow normal, unrestricted use of elevator.

F. Deliver permit to operate elevator to Architect.

1.05 DELIVERY, STORAGE AND HANDLING

A. Do not deliver materials to the site until areas in which they are to be installed are ready to receive them in place for final installation.
B. Wrap, carton and crate factory finished materials in a manner to protect finishes.

C. Store, protect and handle materials in accordance with manufacturer’s recommendations to prevent damage, soiling or deterioration.

D. Fully protect movable and operating equipment from weather damage.

1.06 PROJECT CONDITIONS

A. Painting: Provide all ferrous metals installed in the hoistway shop primed with a rust inhibitive primer.

B. Temporary Use
   1. Provide all necessary protection to prevent damage to elevator used for construction purposes before and after Contract Completion.
   2. Provide temporary enclosures, coverings, guards, barriers and other devices required to protect the elevator car enclosures, hoistway entrances and frames, signal fixtures and related materials, components and finishes from damage. Protective materials, methods and procedures shall be approved by the elevator manufacturer and Architect and paid for by the user.
   3. Maintenance during use, including cleaning, lubricating and adjusting equipment and components for proper elevator operation shall be performed only by the elevator manufacturer. Cost for maintenance shall be paid by the user.
   4. Elevators shall be free of damage or deterioration at time of Contract Completion. Cost to repair damaged materials and finishes and replace worn or defective components to restore elevators to their original condition shall be paid by the user.

1.07 MAINTENANCE

A. Provide full preventative maintenance for a period of one year beginning on the date of final acceptance of work.
   1. Frequency: Regular and systematic inspections not less than once per month.
   2. Duration: One hour per visit.
   3. Personnel: Competent and trained employees of the elevator manufacturer.
   4. Maintenance: Includes necessary adjustments, greasing, oiling, cleaning, supplies and parts to keep equipment in proper operation, except such parts made necessary by misuse, accidents or negligence not caused by the manufacturer.
   5. Work Period: Perform all work during regular working hours of the manufacturer's maintenance personnel.

B. Maintenance Service: To be performed solely by the successful elevator manufacturer and not assigned or transferred to any agent or subcontractor.

C. Provide twenty-four emergency callback service as part of the maintenance service. Respond to all calls within 45 minutes after notification, including evenings and weekends. Trapped passengers require immediate response and are to be
treated at the highest emergency level. Failure to respond promptly or to provide competent service will be cause to hire another contractor to perform the work at the expense of the installing contractor.

D. Contractor to have a service office and full-time service personnel within a 50 mile radius of project site. Service office shall have been functioning with full-time personnel for a minimum period of 5 years before the bid date.

1.08 WARRANTY

A. Provide special project guaranty, signed by the Contractor, Installer and Manufacturer, agreeing to replace/repair/restore defective materials and workmanship of the elevator work for a period of one year after date of Contract completion.

B. "Defective" is hereby defined to include, but not be limited to, operation or control system failures, performances below required minimums, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unusual, unexpected and unsatisfactory conditions.

C. Repairs to be made at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 GENERAL DESCRIPTION

A. Manufacturer

1. Basis of Design: This specification is based on the Monospace 500 Series gearless traction elevator by KONE.
2. Similar products/models by THYSSEN KRUPP, OTIS ELEVATOR or SCHINDLER are acceptable providing they meet the requirements specified herein and include in their scope all changes to building physical dimensions or electric service beyond what is indicated on the drawings.

B. Elevator 1 & 2: Performance Requirements for elevators are defined as follows:

1. Type: Passenger, center opening
2. Capacity: 4000 lbs.
3. Speed: 150 fpm; Variation above or below the referenced speed is permitted depending upon load.
4. Travel Distance: 29'-6".
5. Landings and Openings: 3; front
6. Operation: Duplex
7. Car Size: 5’ – 6” Deep x 7’ – 6” Wide [inside clear]
8. Hoistway Entrances: 4'-0" wide by 7'-0" high
9. Door Type: As indicated
10. Power Supply: 480 Volt +5% / 3 Phase/60 Hertz
11. Lighting Power Supply: 120 Volts/1 Phase/60 Hertz
12. Signal Fixtures: Standard
13. Machine Location: Inside the hoistway mounted on car guide rail
   Control Space Location: Integrated Control System (ICS)

2.02 MATERIALS, GENERAL

A. Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.

B. Steel
   1. Shapes and Bars: ASTM A 36.
   2. Sheet: ASTM A 366, cold-rolled steel sheet, commercial quality, Class 1, matte finish, stretcher leveled.
   3. Finish: Shop primed.

C. Stainless Steel
   1. Shapes and Bars: ASTM A 276, Type 304 (18-8).
   2. Tubing: ASTM A 269, Type 304 (18-8).
   3. Sheet: ASTM A167, Type 304 (18-8).
   4. Finish: NAAMM No. 4 satin finish.

D. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.

E. Fire Retardant Treated Particleboard Panels: Minimum 3/4" thick backup for plastic laminate veneered panels, provided with suitable anti-warp backing; to meet ASTM E84 Class "A" rating with flame-spread rating of 25 or less.

F. Plastic Laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness.
   1. Color/Pattern: As selected by Architect.

2.03 EQUIPMENT/COMPONENTS

A. Mechanical Equipment
   1. General: Incorporate all necessary standard components required for such application all in accordance with applicable code(s).
   2. Motor Horsepower: In accordance with the duty specified.
   3. Machine Brake: Electrically released and spring applied. The drive sheave shall be accurately turned and grooved for the quantity and size of Hoist Ropes applicable to this service.
   4. Governor ropes: Size and number appropriate to insure proper wearing qualities, shall be provided. As a minimum, the number and size of ropes shall comply with the factor of safety requirements of the ASME/ANSI A17.1 Safety Code for Elevators.
   5. Elevator System shall include a car frame, car safety, overspeed governor and pit buffers for both car and counterweight; all integrated into this system in accordance with application criteria.
      a. Located within the hoistway and mounted on the car guideway.
b. Mounting of the Hoisting Machine: Incorporate isolation to minimize the transmission of noise and/or vibration to the building structure.

7. Guide Rails and Attachments: Guide rails shall be steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual-purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.

8. Coated-Steel Belts: Polyurethane coated belts with high-tensile-grade, zinc-plated steel cords and a flat profile on the running surface and the backside of the belt. All driving sheaves and deflector sheaves should have a crowned profile to ensure center tracking of the belts. A continuous 24/7 monitoring system using resistance based technology has to be installed to continuously monitor the integrity of the coated steel belts and provide advanced notice of belt wear.

B. Additional Equipment

1. Guide Rails: Provide elevator car and counterweight guide rails erected plumb, and securely fastened to the hoistway framing. Design and provision of hoistway framing shall be of adequate strength and properly positioned to withstand loads applied in conjunction with data provided by the elevator contractor.

2. Roller Guides: Provide mounted to the top and bottom of both the car and counterweight frame. Each roller guides assembly shall be arranged to maintain constant contact on the rail surfaces.

C. Power and Operational Controls

1. Power Control: A microcomputer based control system shall be provided to perform all of the functions of safe elevator operation. The system shall also perform car and group operational control.
   a. Design power control system to vary the alternating current power supply to the AC hoist motor providing smooth acceleration and deceleration regardless of elevator load, and shall use I.G.B.T. technology in the power stage in order to deliver power to the motor in a quiet mode, minimizing the need for external power filters for quiet operation.
   b. Solid state load/torque balancing circuitry shall be incorporated to automatically monitor car load prior to start and adjust the hoist motor torque to assure smooth car start-up.
   c. Power control shall be fully factory pre-set, minimizing the need for field adjustment. Computer inputs shall tailor the power control to the specific elevator design parameters. Provision shall be made for minor field adjustment. Such adjustments shall generally be non-interacting.

2. Up-Fall Protection: Provide a system which monitors for unintended upward movement of the elevator system. In the event unintended upward movement occurs the system shall engage a braking system to stop a car with up to 125% of rated capacity. The main car brake, rope brakes and sheave wedges are not acceptable alternatives.

3. Passenger Rescue Feature: Provide a device in the machine room to move the elevator car to a floor landing in the event of controller or power
failure. This device must be speed controlled to prevent an overspeed condition. A line of sight must also be provided between the Passenger Rescue Feature and the elevator car.

4. Emergency Power Operation: In the event of cessation of normal building power, the elevator(s) shall brake to an emergency stop. After a predetermined time interval, emergency power shall be provided to the elevator(s) through the normal disconnect switch(s). The elevator shall start and return non-stop to the emergency power recall floor where it will stop and automatically open its doors.

5. Auxiliary Operations and Controls include the following:
   a. Independent Service
   b. Fireman's Control Phase I and Phase II
   c. Home Landing
   d. Zoned Access at bottom floor
   e. Sequence starting (under emergency power)

2.04 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening.
   1. Manufacturer's standard entrance design, bearing Underwriters' Laboratories "B" labels, and consisting of 14 gauge frames with 2 inch profile, 16 gauge doors, hangers, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
   2. Elevator wall interface with hoistway entrance assembly shall comply with elevator manufacturer's requirements.
      a. Stainless steel: ASTM A 167, Type 304 stainless steel panels, No. 4 satin finish.
      a. Stainless steel: ASTM A 167, Type 304 formed stainless steel sheet, No. 4 satin finish.

B. Interlocks: Equip each hoistway entrance with an Underwriters' Laboratories "B" label approved type interlock tested as required by code. Design interlock to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by code and prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing.

C. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway sliding door.
   1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
   2. Hangers: Provide an adjustable slide to accommodate the up-thrust of the doors.
   3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

D. Hoistway Sills: Extruded, with grooved surface, 1/4 inch (6.4 mm) thickness.
   1. Aluminum: ASTM B 221 aluminum, mill finish.
2.05 CAR ENCLOSURE

A. Car Enclosure

1. Walls: Reinforced 16 gauge cold-rolled steel with two coats factory applied baked enamel finish, with applied vertical wood core panels covered on all six sides with high pressure plastic laminate.
   a. Provide wall pads for complete wall coverage.

2. Canopy: Reinforced 14 gauge cold-rolled steel with hinged exit. Finish: Two coats factory applied reflective baked enamel.

3. Ceiling: Downlight type, 16 gauge metal pans with six (6) LED downlights suspended and dimmer switch 7'-4" above the finished floor.
   a. Metal pans: Stainless steel, No. 4 satin finish.


5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic shoes sliding in a smooth threshold groove.
   b. Cab Sills: Extruded, with grooved surface, 1/4 inch (6.4 mm) thickness.
      1) Aluminum: ASTM B 221 aluminum, mill finish.

6. Handrail: Segmented type metal bar handrail with ends curved to the wall, nominal 1/4" x 2", stainless steel, satin finish, lacquered. Provide at rear and side walls.

7. Ventilation: Two speed exhaust fan mounted on the car top.

8. Pad Buttons: Provide pad buttons on cab front(s) and walls.
   a. Provide one set of vinyl protection pads for the project.


10. Finished Floor: LVT. Provide subfloor for future finished floor.

2.06 DOOR OPERATION

A. Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Direct drive geared operators, AC controlled units with oil checks, or other deviations are not acceptable.

1. No Un-Necessary Door Operation: Car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as the next car up.

2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.

3. Limited Door Reversal: If the doors are closing and an infra-red beam is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.
B. Electronic Passenger Sensing Device with Nudging: Provide at each entrance a solid state electronic detector and an electro-mechanical reversal edge as follows:

1. After a stop is made, doors shall remain open for an adjustable time interval. Closing may be initiated instantaneously by registration of a car call, operation of load weighing device or signal from the service demand integrator.

2. Doors will remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door movement is obstructed for a predetermined time, a buzzer will sound and doors will close at a reduced speed. If the reversal edge contacts a person or object while closing, doors will immediately stop and resume closing after the obstruction has been removed.

3. Arrange circuitry to inactivate the electronic detector should it fail to operate. However, the electro-mechanical reversing edge will not be deactivated by failure of the electronic detector or its removal from the circuitry by means of a manual switch.

4. Electronic Passenger Sensing Device (Light Ray Device)
   a. Provide infra-red light ray device in elevator car entrance. Provide complete, operational system.
      1) Light Curtain: Minimum 40 beam, evenly spaced from floor to 6'-0" above floor.
      2) Control Module: Top of car mounting.
      3) Transmitter: Mounted in housing on left or right door jamb.
      4) Receiver: Mounted in housing on door jamb opposite transmitter.
      5) Housing: Gage as recommended by manufacturer.
      6) Electrical: 110 VAC 6VA.

2.07 CAR OPERATING STATION

A. Car Operating Panel: Flush mounted stainless steel panels, containing call button for each landing served, and containing other buttons, switches and controls required for specified car operation and control. These include, but are not limited to, emergency lighting and alarm bell, key operated stop switch, key operated lights and key operated single-speed fan switch, key operated car top inspection switch, key operated independent service key switch, and all necessary safety functions.


2. Provide operating device symbols as required by code. Mark other buttons and switches with manufacturer’s standard identification, including Braille next to buttons, for required use or function.

3. Mount controls at height complying with ANSI A117.1 requirements for handicapped.

4. Provide illuminated buttons, which light up when activated and remain illuminated until call or other function has been fulfilled. Provide non-illuminated buttons with brushed stainless steel finish.

5. Fire Service Instructions for Phase II are to be permanently engraved in the car operating panel.

6. Position Indicator: An electronic dot matrix position indicator mounted in a module matching the control panel. As the car travels, its position in the hoistway shall be indicated by the illumination of the alpha/numeric
character corresponding to the landing which the elevator is stopped or passing.

7. Emergency Light: An emergency light and capacity plate shall be integrated into a module. Emergency light shall illuminate automatically upon loss of the building's normal power supply.

B. In-Car Travel Direction Lanterns: Mounted in car entrance jamb visible from corridor. Illuminates to indicate direction of car travel. Provide with chime which sounds once for “UP” direction and twice for “DOWN” direction as doors are opening.

2.08 CAR OPERATION SYSTEM

A. Duplex Collective Operation: Using a microprocessor-based controller, the operation shall be automatic by means of the car and hall buttons. In the absence of system activity, one car can be made to park at the pre-selected main landing. The other (free) car shall remain at the last landing served. Only one car shall respond to a hall call. If either car is removed from service, the other car shall immediately answer all hall calls, as well as its own car calls.

2.09 HALL STATIONS

A. Hall Stations, General: Illuminated buttons indicating a call has been registered at that floor for the indicated direction. Faceplates shall be No. 4 satin finish stainless steel.
   1. Each terminal station shall contain one illuminating pushbutton.
   2. Each intermediate station shall consist of two illuminating pushbuttons, one for the up direction and one for the down position.
   3. Phase 1 firefighters service keyswitch, with instructions, shall be permanently engraved into the hall station at the designated level.

B. Floor Identification Pads: Provide metal door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

PART 3 EXECUTION

3.01 PREPARATION

A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed.
   1. Do not proceed with work until unsatisfactory conditions are corrected.
   2. Coordinate hoist beam size and location with General Contractor

3.02 INSTALLATION

A. Install elevators as specified in accordance with all governing codes, manufacturer's written direction and ASME A17.1.

B. Lubricate all equipment in accordance with manufacturer's written instructions.
3.03 CLEAN-UP

A. Remove all unused materials and leave cab and all related areas clean.

3.04 DEMONSTRATION

A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

END OF SECTION