

**PROJECT MANUAL  
OWNER REVIEW SET**



**REI – GLENWOOD SPRINGS  
3216 S, GLEN AVENUE  
GLENWOOD SPRINGS, CO 81601**

**REI STORE #235**

Project No. 006-132964.81

November 09, 2021

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NOT USED

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NOT USED

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**SECTION 001116 – INVITATION TO BID**

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**1.1 REPRESENTATION: By responding to this Invitation to Bid, the Contractor represents that:**

- A. Respondent has visited the site and has become generally familiar with the building, site, and utility work and other local conditions required to construct the project.
- B. Respondent has reviewed all bid documents including any addenda.
- C. Respondent's submittal in response to this Invitation to Bid is complete.
- D. Respondent is prepared to enter into a contract with Owner per the attached Form of Agreement.

**1.2 CONTENT OF REQUEST FOR PROPOSAL: This Invitation to Bid consists of:**

- A. BIDDING REQUIREMENTS
  - 1. Section 002113: Instructions to Bidders
  - 2. Section 002213: Supplementary Instruction to Bidders
  - 3. Section 004100: Bid Form
  - 4. Section 005200: Agreement Between Owner and Contractor
- B. CONTRACT REQUIREMENTS
  - 1. Section 007200: General Conditions of The Contract For Construction
  - 2. Section 007300: Supplementary Conditions

**1.3 EVALUATION OF BIDS:**

- A. REI intends to select its General Contractor based on experience, qualifications, delivery time, price and compatibility with REI objectives. Owner's assessment of respondent's ability to meet the schedule will be important. Owner reserves the right to select the Contractor which it, in its sole, subjective discretion, deems to be most responsive to this Invitation.

**1.4 QUESTIONS DURING BID PERIOD:**

- A. All questions or requests for additional information should be addressed in writing to the Architect. Faxes and Email are acceptable. Voicemail messages are not acceptable. The Architect will forward your question to the appropriate consultant. Questions will be answered by Addenda to all bidders.
- B. The General Contractor is required to notify the Architect of any discrepancy contained in the bidding documents. In the event of an unclarified discrepancy the Contractor is required to bid the item of greater quantity or cost.
- C. Questions received less than 72 hours before the time set for bid opening cannot be answered. Any questions after this time should be handled as exclusions or qualifications in your bid.

**END OF SECTION**

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**SECTION 002113 – INSTRUCTIONS TO BIDDERS**

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**1.1 GENERAL**

- A. This Invitation to Bid is designed to assist REI in selection of a General Contractor. REI requests respondents conform to the requirements in this Invitation as closely as possible in order that we'll be best able to review competing proposals on a comparable basis.
- B. REI appreciates your taking the time to respond to this Invitation.
- C. REI requires that all bidding contractors sign the "Mutual NonDisclosure Agreement" in Section 007400 at time of Invitation to Bid.
- D. REI intends to enter into a fixed price contract in accordance with the REI Agreement Between Owner and Contractor, Terms and Conditions of the Contract, General Conditions of the Contract For Construction as modified by REI and Supplementary Conditions.

**1.2 SUBMITTAL OF BIDS**

- A. Bids are due by Noon (Pacific Daylight Time) on: Confirm date with Owner.
- B. Submit one copy of your bid to:
  - 1. Upload to folder in Procore (or current web-based system).

**1.3 BID SETS (PRINTS)**

- A. A complete set of bid drawings and specifications may be obtained through Procore. Access to Procore will be given by REI. Additional sets may be obtained by General Contractors for the cost of the printing, shipping and handling. All copies of Drawings and Specifications to remain the property of the Owner and must be returned within seven (7) days of the Bid Opening.

**1.4 ORAL OR TELEGRAPHIC BIDS**

- A. Oral bids or modifications of bids will not be considered. Faxed bids and bids forwarded electronically via email will not be accepted.

**1.5 SUBSTITUTIONS**

- A. Bids shall be based on the articles and materials named in the Specifications. Substitutions will be considered based on the requirements of the General Conditions for the Contract For Construction, Supplementary Conditions, and Division 1 Section "Substitutions."

**1.6 ALTERNATE BIDS**

- A. Except as stated above, alternate bids, other than those listed in the bid form, if any, will not be considered. Failure to bid on all items listed in the bid form may be cause for rejection of the bid.

**1.7 BID FORM**

- A. Use REI's Bid Form located on Procore. Complete entire form and submit at bid time. REI may distribute a revised custom bid form during the bidding period. In the event this is issued the REI Custom Bid Form must be used for final submission. An electronic copy of the bid form can be requested from REI.

**1.8 EVIDENCE OF QUALIFICATIONS**

- A. A bidder whose proposal is under consideration shall, upon request, promptly furnish satisfactory evidence of their financial resources, their experience, and the organization they have available for the performance of the contract.

**1.9 WITHDRAWAL OF BIDS**

- A. Any bidder may withdraw their bid, either personally or by written request, at any time prior to the hour set for the bid opening. No bid may be withdrawn or modified after the time set for opening unless and until the award of contract is delayed for a period exceeding 30 days.

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**SECTION 002113 – INSTRUCTIONS TO BIDDERS**

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**1.10 CONSTRUCTION SETS**

- A. A complete set of construction drawings and specifications may be obtained through Procore or purchased from Pantera through Procore. Additional sets will be at Contractor's own expense. All copies of Drawings and Specifications to remain the property of the Owner.

**1.11 CONTRACT BONDS**

- A. The Contractor shall, at the Owner's request, secure and pay for the Performance Bond and Material Payment Bond issued by a bonding company licensed to transact business in the locality of the project, on AIA form A311. Liability under each of the bonds shall be 100% of the contract sum. Deliver bonds in accordance with Paragraph 11.4 of the General Conditions. The bond amount shall be increased with each Change Order increase so that final bond amount reflects final contract total.

**1.12 ACCESS TO SITE**

- A. The site is presently unoccupied tenant space. Bidders must view the site prior to submitting a bid. Access can be arranged to view the premises by contacting the REI Construction Manager listed in the Project Directory on the Drawings.

**END OF SECTION**

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**SECTION 002213 – SUPPLEMENTARY INSTRUCTIONS TO BIDDERS**

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**1.1 PROJECT SUMMARY**

- A. This project is an interior tenant improvement of a [24,000 s.f.] retail store. Scope of work includes, but is not limited to, renovation of the tenant space.

**1.2 OWNER**

- A. Recreational Equipment Inc. (REI) 6750 South 228th Street Kent, Washington 98032-4803

**1.3 PRELIMINARY SCHEDULE**

- A. Written Notice to Proceed
  - 1. See Section 004100 for construction dates.
  - 2. Contractor to anticipate and allow for normal construction delays due to normal weather conditions, construction period will not be extended for such normal weather conditions.

**1.4 PERSONNEL**

- A. Contractor to provide names, position description, and resumes of project manager, superintendent, and other key personnel assigned to the project with project bid. Include current commitments of all personnel.

**1.5 WORK BY OWN FORCES**

- A. Clearly describe which portions of the work you will complete with your own forces.

**1.6 INTERNET AS MEANS OF COMMUNICATION**

- A. Contractor will supply a computer for the project site, internet enabled and with an internet connection. Project Manager and superintendent will learn how to use and communicate via the internet prior to start of Construction.

**1.7 BID**

- A. Bid to be broken down per REI's Bid Form.
- B. Have submittal signed by a duly authorized representative of your firm, bind and transmit by the due date stated in this Invitation to Bid.
- C. All bids to include appropriate quantities, unit costs and total costs.
- D. Incomplete bids will not be considered and automatically disqualified.

**1.8 PROJECT SCHEDULE**

- A. Provide preliminary project schedule (bar chart) within 7 days of bid award.

**1.9 SUBCONTRACTOR LIST AND SUBCONTRACTS**

- A. The successful bidder is required to submit a list of all chosen subcontractors within 72 hours of the bid due date and copies of all executed contracts within 2 weeks of written Notice to Proceed.

**1.10 LABOR RATES**

- A. The apparent successful bidder will be required to submit a list of all chosen subcontractors labor rates within 72 hours of the bid due date.

**END OF SECTION**

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SECTION 006323 - AGREEMENT FOR PAYMENT AND USE OF ELECTRONIC DATA

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Agreement made as of the \_\_\_\_\_ day of \_\_\_\_\_, 201\_\_\_\_\_

by and among

**"CallisonRTKL"**

and

\_\_\_\_\_  
(Name of User) (the **"User"**)

and each of the following transferees of the User, if any, to whom the User intends to transfer a copy of the Electronic Data referred to below (individually, the **"Transferee"** and collectively, the **"Transferees"**)

\_\_\_\_\_  
(Name of Transferee)

\_\_\_\_\_  
(Name of Transferee)

\_\_\_\_\_  
(Name of Transferee)

\_\_\_\_\_  
(Name of Transferee)

in connection with

\_\_\_\_\_  
(Name of Project) (the **"Project"**)

The **Agreement Amount** is \_\_\_\_\_ dollars (\$ \_\_\_\_\_).  
(State the amount, if any, the User is to pay for the Electronic Data - if none, then state "none.")

In consideration of CallisonRTKL's preparation, translation (if necessary and agreed by CallisonRTKL), and delivery to the User and/or Transferees of copies of, and of the benefits to be obtained by the User and/or Transferees in their use of, the information, data, calculations, communications, reports, documents, models (including BIM or other computer readable format, and any files derived therefrom), drawings (including CAD or other computer readable format), specifications, and designs, created or stored in digital form (the **"Electronic Data"**) prepared by CallisonRTKL in connection with the Project, User and each Transferee hereby acknowledges and agrees to the following terms and conditions:

1. As a condition precedent to the User's and each Transferee's exercise of any rights conferred upon it pursuant to this Agreement, the User and each Transferee shall first deliver an executed copy of this Agreement to CallisonRTKL, and the User shall pay to CallisonRTKL the Agreement Amount, if any, referred to above.

2. CallisonRTKL grants to the User and each Transferee a non-exclusive license to use, alter and reproduce the Electronic Data solely in connection with the Project.

3. CallisonRTKL will send the User the Electronic Data via either electronic data transfer, on CD ROM or DVD. The User and each Transferee acknowledge that CallisonRTKL makes no guarantee of the integrity of the data or the completeness and form of any translation of the Electronic Data, and will not be held responsible for any of the data or file clean-up required to make the Electronic Data or any files derived therefrom usable, nor for any error or malfunction in the translation, interpretation or use of the Electronic Data.

4. The Electronic Data are instruments of CallisonRTKL's services in connection with the Project. CallisonRTKL is the sole and exclusive author of the Electronic Data and shall retain all common law, statutory and other reserved rights, including the copyright, in and to the Electronic Data.

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**SECTION 006323 - AGREEMENT FOR PAYMENT AND USE OF ELECTRONIC DATA**

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5. The Electronic Data were prepared and developed by CallisonRTKL solely to assist CallisonRTKL in connection with CallisonRTKL's design obligations under its agreement with the Owner for the Project. They are intended by CallisonRTKL for use solely and exclusively in connection with the Project; they were not prepared and are not intended or represented by CallisonRTKL to be suitable or adaptable for use by the User or any Transferee for any other purpose.
6. The User and each Transferee acknowledge that the Electronic Data do not necessarily represent the most current deliverables, design information, existing conditions information, as-built conditions, or any other information they purport to represent, and that the User or any Transferee remains responsible to determine the currency and accuracy of such information and conditions and to comply with them. CallisonRTKL is not responsible to send amended or updated versions of the Electronic Data.
7. CallisonRTKL shall not be responsible for alterations made to the Electronic Data by the User, any Transferee or anyone other than CallisonRTKL; alterations to the Electronic Data by the User, any Transferee or others shall be at the User's and Transferee's sole risk and expense and without liability to CallisonRTKL.
8. To the fullest extent permitted by law, the User and each Transferee shall release, defend, hold harmless, and indemnify CallisonRTKL from and against all claims, liabilities, losses, damages, judgments, awards and costs, including, but not limited to, court costs and attorneys' fees, arising from, related to, or in any manner in connection with such party's respective use or alteration of the Electronic Data.
9. Under no circumstance shall the transfer of ownership of the physical media upon which the Electronic Data exist be deemed to be a sale by CallisonRTKL. CallisonRTKL makes no representation or warranty, express or implied, of **MERCHANTABILITY**, of fitness for a particular purpose, or with respect to the Electronic Data's quality, adequacy, completeness, or sufficiency, or with respect to any results to be or intended or anticipated to be achieved with respect to the User's or any Transferee's use or alteration.
10. Because of the possibility that information and data delivered in computer readable form may be altered, whether inadvertently or otherwise, and whether by CallisonRTKL, User, any Transferee or others, hard copy originals of the Electronic Data shall be retained by CallisonRTKL which hard copy originals shall govern in the event of any inconsistency between such hard copy originals and any computer readable copies of the Electronic Data delivered to the User or any Transferee.
11. The User and each Transferee acknowledge that even though CallisonRTKL has computer virus scanning software to detect the presence of computer viruses, there is no guarantee that computer viruses are not present in the Electronic Data or any transfer medium. The User and each Transferee therefor agree not to hold CallisonRTKL responsible for such viruses or their consequences, and shall defend and hold CallisonRTKL harmless against any costs, losses or damage the User and each Transferee may incur by the presence of a computer virus in the Electronic Data, any other electronic files derived therefrom, or in any transfer medium provided.
12. If CallisonRTKL translates the information and data on the Electronic Data from CallisonRTKL's system and format to that of the User's or any Transferee's, then the User and such Transferee acknowledges that such translation cannot be accomplished without the possible introduction of inexactitudes, anomalies, or errors, and that the Electronic Data as so translated and delivered to the User or Transferee may not necessarily show the same information and data, or in the same format, as the hard copy originals thereof. The User and such Transferee each agrees to assume all risks associated with such translation of the Electronic Data, and to the fullest extent permitted by applicable law, to release, defend, hold harmless, and indemnify CallisonRTKL from and against all claims, liabilities, losses, damages, judgments, awards and costs, including, but not limited to, court costs and attorneys' fees, arising from, related to, or in any manner in connection with the User's or such Transferee's respective use or alteration of the Electronic Data as so translated.

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13. The User warrants to CallisonRTKL that it shall cause each Transferee to execute and deliver to CallisonRTKL a copy of this Agreement prior to the User's transfer of all or any portion of the Electronic Data to the Transferee. In the event of a Transferee not listed in this Agreement, CallisonRTKL, the User and the additional Transferee shall execute an agreement in substantially the same form as this Agreement.

Without limiting the foregoing in any respect, if the Electronic Data contains or includes BIM files, whether in Revit form or otherwise, then the following provisions shall also apply.

14. The User and each Transferee understand and acknowledge that information contained in the BIM files indicates design intent only, and shall not be used for purposes of construction.

15. The User and each Transferee shall be responsible for all dimensions, quantities, and co-ordination among all trades.

16. The User and each Transferee acknowledge that CallisonRTKL has not described each and every material, element and component required for the Project in the BIM files.

17. The User and each Transferee understand and acknowledge that the BIM files are not to be used as construction documents in any way.

18. The hard copy deliverables, signed and sealed where required, take precedence over conflicting information in the BIM files and CAD documents.

19. The User and each Transferee acknowledge that the BIM files' program source information (generally Autodesk Revit) used to generate the BIM files was not prepared by CallisonRTKL and, therefore, CallisonRTKL is not responsible for the accuracy of the information contained in the BIM files. The User and each Transferee agree that their use of the BIM files is solely at their own risk, and CallisonRTKL does not warrant the accuracy of the BIM files. The User and each Transferee acknowledge and agree that receiving the BIM files does not relieve each of them of the responsibility for determining Project measurements, dimensions and quantities, which responsibilities are set forth in the deliverables for the Project as applicable, and in their respective contracts for the Project. In the event of any ambiguity, discrepancy or conflict between the information in the BIM files and the information contained in any of the deliverables, the User and each Transferee shall bring the discrepancy to CallisonRTKL's attention in writing and the information in the hard copy drawings, specifications and other documents shall govern.

Choose an entity  
Authorized Signature

**{Name of User}**  
Authorized Signature

\_\_\_\_\_  
(Printed Name and Title)

\_\_\_\_\_  
(Name of Transferee)

**{Name of Transferee}**  
Authorized Signature

**{Name of Transferee}**  
Authorized Signature

\_\_\_\_\_  
(Printed Name and Title)

\_\_\_\_\_  
(Name of Transferee)

**{Name of Transferee, same as above}**  
Authorized Signature

**{Name of Transferee, same as above}**  
Authorized Signature

\_\_\_\_\_  
(Printed Name and Title)

\_\_\_\_\_  
(Name of Transferee)

END





650 E. Algonquin Road  
Suite 250  
Schaumburg, IL 60173  
847.756.4180

250 S. Wacker Drive  
Suite 400  
Chicago, IL 60606  
847.756.4180

### **Electronic Drawing Disclaimer**

We are providing you with original AutoCad plans, although it is not our policy to share or release our engineering plans in electronic format such as .DWG files. This policy is because of professional liability and proprietary standards that can be manipulated or copied. By signing this disclaimer you are entering an agreement to use the AutoCad plans in the limitation as described below. These plans are not to be copied or used for any other project than the project stated below. These plans may not be given to any other person or firm not listed on this disclaimer. Any changes to the plans not approved by RTM Engineering Consultants will be at the risk of the recipient of these file and they will assume all professional and monetary liability.

**PROJECT:**            **REI- Sumner**

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**PURPOSE:**            **For your records, not to be modified or copied**

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Sincerely,

Jessica Iversen  
RTM Engineering Consultants

Accepted By (signature): \_\_\_\_\_

Printed Name: \_\_\_\_\_

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



# Armour Unsderfer Engineering Inc., P.S.

555 116<sup>th</sup> Avenue NE, Suite 118, Bellevue, WA 98004-5233  
Phone (425) 614-0949 Fax (425) 614-0950

DATE:

AUE Job No: \_\_\_\_\_

Project Name: \_\_\_\_\_

Dear Contractor:

At your request, AUE will provide electronic files for the subject project per the following terms and conditions: Our electronic files may be provided in the following formats: .DWG, compatible with AutoCAD. We make no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.

Data contained on these electronic files are part of our instruments of service and shall not be used by you or anyone else receiving these data through or from you for any purpose other than as a convenience in providing your service for the referenced project. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or subconsultants that may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold AUE or consultants harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from your use of these electronic files.

These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed or sealed hard-copy construction documents prepared by AUE and the electronic files, the signed or sealed hard-copy construction document shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because information presented on the electronic files can be modified, unintentionally or otherwise, we reserve the right to remove all indicia of ownership and/or involvement from each electronic display.

Under no circumstances shall we deem delivery of the electronic files for your use a sale, and we make no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall AUE be liable for any loss of profit or any consequential damages as a result of your use or reuse of these electronic files.

\_\_\_\_\_  
Consultant/Contractor Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

# HOLD HARMLESS AGREEMENT

## NRG CAD RELEASE FORM

### Request of Documents(s)/ Information

Project Name	_____
Address	_____
City	_____
State/ Province/ Zip/ Country	_____
Project Number	_____
CAD Files Requested	_____

Per the Recipient's request, NRG Fire Consulting LLC will provide the requested document(s) and/or information subject to the following terms, conditions and restriction. Possession of the requested document(s) and/or information is evidence of the Recipient's acceptance of, and agreement with, these restrictions:

1. Liability Release: NRG Fire Consulting LLC, and its associates are not liable for the project drawings files, their details, notes, or content, once they are released. Contractor takes full responsibility for preparation of complete submittal documentation in compliance with all applicable codes and standards for permitting and construction, AHJ approvals, city fees, etc. Contractor shall remove NRG Logo and contact information and install their logo, contact info, and licensing information.
2. Due to the potential that electronic information can be modified unintentionally or otherwise, NRG Fire Consulting LLC reserves the right to remove all indices of its ownership, name, and/or involvement from electronic information not in its possession.
3. The use of this electronic information is restricted to the original site and project for which it was prepared. Material prepared from the electronic information shall NOT be used for other projects, or be transferred to any other party or entity for use on this or other projects.
4. The information is proprietary and is to be used only as an aid toward the successful completion of the Recipient's project at the above noted site and project.
5. All drawing information contained in the electronic information including, but not limited to, symbol libraries, blocks, details, etc. may not be reproduced, sold, distributed or utilized in any form on any other project or by anyone else.
6. Drawings shall not be interpreted to be true scale documents or represent "as-built" conditions of the proposed work, nor shall they be utilized for fabrication unless written approval is first obtained from NRG Fire Consulting.
7. The Recipient recognizes and acknowledges that the use of such electronic information will be at their sole risk and without any liability or legal exposure to NRG Fire Consulting LLC, or its associates. No warranties of any nature, whether expressed or implied, shall attach to the electronic information. Furthermore, the Recipient hereby releases and shall, to the fullest extent permitted by law, defend, indemnify and hold harmless NRG Fire Consulting LLC, and its associates from any and all claims, damages, losses and expenses (Claims) including attorney's fees arising out of or resulting from the use of such electronic information, including, but not limited to, Claims involving the completeness or accuracy of any data or information contained therein.
8. NRG Fire Consulting LLC is providing the electronic information solely for the Recipient's convenience. This does NOT eliminate or reduce the Recipient's responsibility to verify any and all information relevant to the Recipient's work and responsibility on this project.

This Agreement incorporates and supersedes any and all prior understandings, and contains the entire agreement between NRG Fire Consulting LLC and Recipient, and shall be binding upon and inure to the benefit of the representatives, successors and assigns of each.

Any Amendments to this Agreement shall be by written agreement between NRG Fire Consulting LLC and Recipient.

**Recipient Authorizing Persons**

General Contractor (GC) Signature		Fire Sprinkler/ Alarm Contractor Signature	
<i>Sign and Date</i>		<i>Sign and Date</i>	
Print Signee Name		Print Signee Name	
Company Name		Company Name	
Address		Address	
City		City	
State/ Province/ ZIP		State/ Province/ ZIP	
Country		Country	
Phone		Phone	
Email		Email	

REI – GLENWOOD SPRINGS  
GLENWOOD SPRINGS, CO  
REI STORE #235

NO. \_\_\_\_\_  
(CALLISON use only)

SECTION 006325 - SUBSTITUTION REQUEST FORM

TO: CALLISONRTKL

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

ATTN: \_\_\_\_\_

We hereby submit the following for your consideration in lieu of the specified item(s) for the above project:

Specification Section \_\_\_\_\_ Paragraph \_\_\_\_\_ Referenced Drawing(s) \_\_\_\_\_

Specified Item: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_

Reason for Substitution: \_\_\_\_\_

COMPLETE THE FOLLOWING (Use back or additional sheets if necessary).

1. Does the substitution affect dimensions shown on Drawings? Yes \_\_\_\_\_. No \_\_\_\_\_.  
If yes, indicate changes: \_\_\_\_\_

2. What effect does the substitution have on other trades? \_\_\_\_\_

3. What effect do applicable code requirements have on substitution? \_\_\_\_\_

4. Describe the differences between the proposed substitution and the specified item(s):  
\_\_\_\_\_  
\_\_\_\_\_

5. How do manufacturer guarantees compare between proposed and specified items?

☐ Same

☐ Different (Explain on back.)

Attachments: \_\_\_\_\_

What is projected lump sum installed cost difference between proposed substitution and least expensive specified item? \$ \_\_\_\_\_. [ Ø; (decrease); increase ]

The undersigned hereby

- Certifies that the proposed substitute item has been fully investigated and has been determined to be equal or superior to that specified in all respects; that the same or greater warranty will be furnished, that required maintenance service and source for replacement parts are available, and that incorporation of the proposed substitute item will not affect functional clearances.
- Warrants that coordination, installation, and changes to the project as necessary to accommodate the proposed substitution shall be the Contractor's responsibility, that use of the substitute item(s) will not delay project completion, and that claims for additional costs related to its incorporation which may become subsequently apparent will be borne by the Contractor.

Approved For Architect Review: \_\_\_\_\_

Signature

Title

Signature shall be by a person having authority to legally bind the Contractor to the above terms.

☐ Substitution Recommended  
Subject to Owner's Consent

☐ Substitution Recommended  
As Noted  
Subject to Owner's Consent

☐ Substitution Not  
Recommended

☐ Substitution Returned –  
Insufficient Information

Date: \_\_\_\_\_

By: \_\_\_\_\_ CRTKL

Signature

Title

Owner's Consent

☐ Yes

☐ No

Date: \_\_\_\_\_

By: \_\_\_\_\_ OWNER

Signature

Title

END OF SUBSTITUTION REQUEST FORM

SECTION 007400 – MUTUAL NONDISCLOSURE AGREEMENT

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**MUTUAL NONDISCLOSURE AGREEMENT**

This NONDISCLOSURE AGREEMENT ("Agreement"), dated as of \_\_\_\_\_, 20\_\_\_\_, is made between RECREATIONAL EQUIPMENT, INC. ("REI") and \_\_\_\_\_ ("Vendor"). For purposes of this Agreement, the party receiving Confidential Information is a "Recipient" and the party disclosing the information is the "Disclosing Party."

REI and Vendor are or may be engaged in business dealings with one another during the course of which each will have access to or will receive certain confidential and proprietary information belonging to the other. Each party desires to protect the confidentiality of its information. Therefore, REI and Vendor hereby agree as follows:

1. Confidential Information. As used in this Agreement, "Confidential Information" means all information of any kind and in any format disclosed by or relating to REI or Vendor that is marked as confidential or that, given the nature of the information or the circumstances surrounding its disclosure, should, in the exercise of reasonable business judgment, be recognized as proprietary or be treated as confidential. Confidential Information may include, but is not limited to, trade secrets, computer code, data, designs, techniques, methodologies, marketing plans, and customer, supplier, and financial information. Confidential Information does not include any information that (i) is or becomes publicly available without breach of this Agreement, (ii) has been developed independently by the Recipient (as evidenced by the Recipient's written records) before or after execution of this Agreement; or (iii) is furnished or made known on a non-confidential basis to Recipient by a third party who has a lawful right to disclose the information.

2. Use of Confidential Information. Confidential Information may be used by the Recipient only in connection with evaluating, negotiating, or implementing a business relationship with the Disclosing Party or performing contractual duties owed to the Disclosing Party. Each party agrees that it will not disclose Confidential Information to anyone except (i) its employees and agents who need to know the Confidential Information in connection with their performance of services for that party and who are bound by a confidentiality obligation or agreement at least as restrictive as this one, or (ii) as, and only to the extent, required by law or court order. In the case of a legal requirement for disclosure, the Recipient must give the Disclosing Party prompt notice of the legally-required disclosure to enable the Disclosing Party to seek a protective order. Each party also agrees to take all reasonable measures to avoid unauthorized disclosure or use of Confidential Information, including, at a minimum, measures it takes to protect its own confidential information of a similar nature. Both parties acknowledge that Confidential Information may constitute material insider information under applicable securities laws and regulations.

3. Ownership of Confidential Information. Each Recipient acknowledges and agrees that Confidential Information is proprietary to the Disclosing Party. Disclosure of Confidential Information by a Disclosing Party will not constitute an express or implied grant to the Recipient of any rights in or to any of the Disclosing Party's intellectual property. At the Disclosing Party's written request, the Recipient will promptly return all tangible materials that constitute or contain Confidential Information or certify that the materials have been destroyed.

REI – GLENWOOD SPRINGS  
GLENWOOD SPRINGS, CO  
REI STORE #235

SECTION 007400 – MUTUAL NONDISCLOSURE AGREEMENT

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4. Miscellaneous.

4.1 The protections afforded to Confidential Information in this Agreement are in addition to, and not in lieu of, the protections afforded under any applicable trade secrets laws, including the Uniform Trade Secrets Act.

4.2 Each party's obligations hereunder are in addition to its other obligations in fact or in law. Failure by either party to enforce strict performance of any provision of this Agreement will not constitute a waiver of that party's right to subsequently enforce such provision. Each party has the right, in addition to its other remedies, to seek injunctive relief for any violation of this Agreement. If a provision of this Agreement is held invalid under any applicable law, that invalidity will not affect any other provision.

4.3 This Agreement (i) constitutes the entire understanding and agreement between the parties relating to the matters addressed, (ii) may be amended or modified only with the written consent of both parties, (iii) does not create any joint venture, employment, partnership, or agency relationship between the parties, (iv) does not obligate either party to provide any Confidential Information to, or to enter into a business relationship with, the other party, and (v) is binding on the parties and their respective successors and assigns.

4.4 This Agreement is governed by the laws of the State of Washington without giving effect to any conflict of law principle that would cause the substantive law of another jurisdiction to apply. Any dispute arising under this Agreement will be resolved exclusively in the federal (or if unavailable, the state) courts located in King County, Washington, and each party irrevocably submits to jurisdiction in those courts. This does not affect a party's right to seek injunctive relief in other courts.

4.5 In any action to enforce any right or remedy under this Agreement or to interpret any provision of this Agreement, the prevailing party will be entitled to recover its costs, including attorneys' fees.

4.6 This Agreement may be executed in counterparts, which may be evidenced by facsimile or PDF-formatted documents.

"REI"

RECREATIONAL EQUIPMENT, INC.

By: \_\_\_\_\_

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

Title: \_\_\_\_\_

Address:

P.O. Box 1938

Sumner, WA 98390-0800

Attn: \_\_\_\_\_

"Vendor"

\_\_\_\_\_

By: \_\_\_\_\_

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

Title: \_\_\_\_\_

Address:

\_\_\_\_\_

Attn: \_\_\_\_\_

END OF SECTION

**REI – GLENWOOD SPRINGS  
GLENWOOD SPRINGS, CO  
REI STORE #235**

**SECTION 011100 – SUMMARY OF WORK**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Sustainable design & construction.
  - 2. Work covered by contract documents.
  - 3. Work under Other contracts.
  - 4. Contractor use of premises.
  - 5. Owner-furnished products.
  - 6. Schedule of Owner-furnished Contractor installed products.
  - 7. Design team.

**1.2 SUSTAINABLE DESIGN & CONSTRUCTION**

- A. A primary goal for the Owner is to promote and carry out sustainable design and construction on the project.
  - 1. Sustainable design and construction is defined as the materials and methods that preserve landscape, conserve energy, use materials efficiently, enhance environmental quality, and safeguard water.
- B. The Contractor is encouraged to research and select materials, building systems, methods and construction procedures that provide the greatest use of recycled materials, environmentally safe building materials and construction technologies, and to enhance energy efficiency and water conservation.

**1.3 RELATED SECTIONS**

- A. Section 012200 – Unit Prices
- B. Section 013100 – Coordination
- C. Section 013200 – Project Meetings
- D. Section 013300 – Submittals
- E. Section 014200 – Reference Standards and Definitions
- F. Section 016000 – Product Requirements
- G. Section 017329 – Cutting and Patching
- H. Section 017419 – Construction Waste Management and Disposal
- I. Section 017700 – Close-Out Procedures
- J. Section 018119 – Indoor Air Quality Requirements

**1.4 WORK COVERED BY CONTRACT DOCUMENTS**

- A. The Project consists of, but is not limited to, the exterior modification and interior tenant improvement of a 20,111 SF existing retail store as described within these contract documents including drawings and specifications. The Work will be constructed under a single prime contract.

**1.5 WORK UNDER OTHER CONTRACTS**

- A. Separate Contracts: The Owner will award separate contracts for performance of certain construction operations at the site. Those Contracts include the following:
  - 1. Low Voltage System: Telephone, data, security, and audio-visual systems. Conduits boxes, and wall penetrations by Contractor where indicated within these documents.
  - 2. Signage: Provision of exterior and interior signage. Electrical by Contractor where indicated within these documents.
  - 3. FF&E: Store fixtures, furnishings and equipment.



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**SECTION 011100 – SUMMARY OF WORK**

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4. Testing: Soil and construction material testing as required by building department, code, and as contained within these construction documents.
  5. Water Filter Test Station: Water filter test structure. Coordinate with electrical for water pump power connections.
  6. Storage Racking System: Stock shelving storage system, including shelving units, and accessory components necessary for system installation. Blocking by contractor.
- B. Cooperate fully with separate contractors so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.
- C. Coordinate light fixture layout with all vendor provided shop drawings and with contracts noted above.

**1.6 CONTRACTOR USE OF PREMISES**

- A. During the construction period the Contractor shall have full use of the premises for construction operations. The Contractor's use of the premises is limited only by the Owner's right to perform work or to retain other contractors on portions of the Project. Construction is to be coordinated with the Owner and Landlord to minimize disturbance of other tenants and the public.

**1.7 OWNER-FURNISHED PRODUCTS**

- A. The Owner will furnish some products. The Work includes providing support systems to receive Owner's equipment, and mechanical and electrical connections.
1. The Owner will arrange for and deliver necessary shop drawings, product data, and samples to the Contractor.
  2. The Owner will arrange and pay for delivery of Owner-furnished items according to the Contractor's Construction Schedule.
  3. Following delivery, the Contractor will inspect items delivered for damage. Immediately notify the Owner of damage.
  4. If Owner-furnished items are damaged, defective, or missing, the Owner will arrange for replacement. Contractor assumes financial responsibility to replace damaged items if Owner is not notified within 24 hours of receipt of material.
  5. The Owner will arrange for manufacturer's field services and for the delivery of manufacturer's warranties to the appropriate Contractor.
  6. The Contractor shall designate delivery dates of Owner-furnished items in the Contractor's Construction Schedule.
  7. The Contractor shall review shop drawings, product data, and samples and return them to the Architect noting discrepancies or problems anticipated in use of the product.
  8. The Contractor is responsible for receiving, unloading, and handling Owner-furnished items at the site.
  9. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements. The Contractor shall repair or replace items damaged as a result of his operations.

**1.8 SCHEDULE OF OWNER FURNISHED - CONTRACTOR INSTALLED ITEMS (FOIC):**

- A. Schedule: See responsibility matrix on drawings for complete list of FOIC items.

**1.9 DESIGN TEAM**

- A. Architect's Consultants: Refer to Project Directory on the Drawings.
- B. Owner's Consultants:
1. Mechanical Equipment: Lennox; 17385 Hawkwood Dr., Riverside, CA 92503; Tel: (951) 241-2890; Fax: (801) 447-4732; Contact: Cory Hicken.
  2. Novar Controls; 6060 Rockside Woods Blvd., Suite 400, Cleveland, OH 44131; Contact Joe Borders, Tel: (800) 348-1335.
- C. Owner's Vendor Contacts:

**017419 – Construction Waste Management and Disposal**

Owner's National Vendor for Hauling and Disposal of Construction Waste

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SECTION 011100 – SUMMARY OF WORK

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Vendor: Rock-Tenn  
Contact: Steve Curley  
Phone: (860) 280-1679  
Email: [scurley@wm.com](mailto:scurley@wm.com)

**033000 – Cast-In-Place Concrete**

Product: Under Slab Vapor Barrier  
Vendor: Stego Industries  
Contact: Bret Houck  
Phone: (877) 464-7834  
Email: [brethouck@stegoindustries.com](mailto:brethouck@stegoindustries.com)

**083819 – Double-Acting Doors**

Product: Double-Acting Doors  
Vendor: Chase Doors  
Contact: Ann Spandrel  
Address: 10021 Commerce Park Drive, Cincinnati, OH 45246  
Phone: (513) 603-2925  
Fax: (513) 386-2300  
Email: [asprandel@chasedoors.com](mailto:asprandel@chasedoors.com)

**093000 – Ceramic Tile**

Product: Tile for Restroom And Shower Room  
Vendor: Architectural Systems, Inc.  
Contact: Andrew Cooper – VP of National Accounts  
Address: 150 W 25<sup>th</sup> St – 8<sup>th</sup> Floor, New York, NY 10001  
Phone: (646) 460-8226 – ext. 226  
Website: [www.archsystems.com](http://www.archsystems.com)

**096813 – Tile Carpeting**

Product: Tile Carpeting  
Vendor: Interface FLOR  
Contact: Sarah Ray - Store Manager; Lynn Allen - Representative  
FLOR Store - Seattle  
2000 1st Avenue  
Seattle, WA 98121  
S: 206.448.3365  
C: 206.418.9044

**097700 – Fiberglass Reinforced Plastic Panel**

Product: FRP Panel  
Vendor: Crane Companies  
Contact: Gary Kennedy  
Phone: (541) 504-9850  
Fax: (815) 467-8666  
Email: [gkennedy@cranecomposites.com](mailto:gkennedy@cranecomposites.com)

**102800 – Toilet & Bath Accessories**

Product: Toilet Accessories & Partitions  
Vendor: Bobrick Washroom Equipment, Inc.  
Contact: Maya Muzurovic  
Phone: (303) 539-8337  
Fax: (303) 374-5442  
Email: [mmuzurovic@koalabear.com](mailto:mmuzurovic@koalabear.com)

**105613 – Metal Storage Shelving**

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SECTION 011100 – SUMMARY OF WORK

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Product: Provided and Install of Racking System  
Vendor: Display Technology International  
Contact: Bill Lile  
Address: 17700 NE 143<sup>rd</sup> Place, Woodinville, WA 98072  
Phone: (425) 424-2440  
Mobile: (206) 910-1059  
Fax: (425) 424-2442  
Email: [dtibill@gmail.com](mailto:dtibill@gmail.com)

**124813 – Floor Mats**

Product: Anti-Fatigue Mats  
Vendor: Satech  
Contact: Barbara Robinson  
Phone: (253) 218-4863  
Email: [brobinson@smartcellsusa.com](mailto:brobinson@smartcellsusa.com)

**211011 – Fire Protection Systems**

Insurance Provider: Lexington Insurance Company/Chartis  
Contact: Anthony P. Dickert, APM Zonal Engineering manager Global Loss Prevention  
Phone: (415) 836-7502  
Email: [Anthony.dickert@chartisinsurance.com](mailto:Anthony.dickert@chartisinsurance.com)  
Plan Reviewer: Michelle Czarnecki, Senior Consultant – Global Risk Consultants  
Phone (269) 857-8189  
Email: [michell.czarnecki@globalriskconsultants.com](mailto:michell.czarnecki@globalriskconsultants.com)

**230911 – Environmental Controls**

Vendor: Novar  
Contact (Project Manager): Joe Borders  
Phone: (216) 272-8201  
Email: [joe.borders@novar.com](mailto:joe.borders@novar.com)  
Contact: Jason Nobbe  
Phone: (216) 682-1326  
Email: [jason.nobbe@novar.com](mailto:jason.nobbe@novar.com)

**237533 – Heating/Cooling Units**

Vendor: Lennox  
Contact: Cory Hicken – Lennox National Account Manager  
Phone: (951) 241-2890  
Fax: (801) 447-4732  
Email: [cory.hicken@lennoxind.com](mailto:cory.hicken@lennoxind.com)

**265000 – Lighting**

Vendor: Capitol Light  
Contact: Joe Sacquitne  
Phone: (425) 861-0200  
Mobile: (206) 948-3005  
Email: [joe.sacquitne@capitollight.com](mailto:joe.sacquitne@capitollight.com)

**272000 – Data Communications**

REI Contact: Todd Mapile  
Address 6750 South 228<sup>th</sup> St., Kent, WA 98032  
Phone: (253) 395-8222  
Email: [tmapile@rei.com](mailto:tmapile@rei.com)

**280000 – Electronic Safety and Security**

Product: Traffic Counter

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SECTION 011100 – SUMMARY OF WORK

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Vendor: Prodcot International, Inc.  
Contact (Project Coordinator Installations): Meling Kelly  
Phone: (514) 324-9796 – ext. 103  
Fax: (514) 324-1214  
Email: [mkelly@prodcotech.com](mailto:mkelly@prodcotech.com)  
Contact (Managing Director): Luc Berlinguette  
Phone: (514) 324-9796 – ext. 113  
Fax: (514) 324-1214  
Email: [lberlinguette@prodcotech.com](mailto:lberlinguette@prodcotech.com)  
Website: [www.prodcotech.com](http://www.prodcotech.com)

**283100 – Addressable Reporting Fire Detection System**

Vendor: Stanley Black & Decker  
Contact: Terry Smith  
Address 2700 Richards Road – Suite 202, Bellevue, WA 98005  
Phone: (425) 957-7000  
Mobile: (206) 510-7986  
Email: [terry.smith@sbdinc.com](mailto:terry.smith@sbdinc.com)

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION (Not Applicable)**

**END OF SECTION**

**REI – GLENWOOD SPRINGS  
GLENWOOD SPRINGS, CO  
REI STORE #235**

**SECTION 012200 -UNIT PRICES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Administrative and procedural requirements for unit prices including identification and description.

**1.2 DEFINITIONS**

- A. Unit price is an amount proposed by bidders as a price per unit of measurement for materials or services added to or deducted from the Contract Sum, if estimated quantities of Work required by the Contract Documents are increased or decreased.

**1.3 GENERAL REQUIREMENTS**

- A. Unit Prices will be exercised at the option of Owner.
- B. Unit Prices shall be valid for the duration of the Contract.

**1.4 PROCEDURES**

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
  - 1. Provide a cost breakout for the following:
    - a. Overhead.
    - b. Profit.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A list of unit prices is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

**1.5 UNIT PRICE SCHEDULE**

- A. No. 1 - KNOX BOXES
  - 1. Provide and install knox boxes as required by authorities having jurisdiction.
  - 2. Unit of Measure: Per each.
- B. No. 2 - ACCESS PANELS
  - 1. Provide and install access panels as required for access to various portions of the Work.
  - 2. Unit of Measure: Per each.
- C. No. 3 - FIRE EXTINGUISHERS AND MOUNTING BRACKETS
  - 1. Provide and install fire extinguishers and mounting brackets as required by authorities having jurisdiction.
  - 2. Unit of Measure: Per each.

**END OF SECTION**

**REI – GLENWOOD SPRINGS  
GLENWOOD SPRINGS, CO  
REI STORE #235**

**SECTION 012500 - SUBSTITUTIONS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for handling substitution requests during bidding process and for substitutions made after award of the Contract.
- B. Related Section: Division 01 Section "Materials and Equipment" specifies requirements governing the Contractor's selection of products and product options.

**1.2 SUBSTITUTIONS DURING BIDDING**

- A. During Bidding, Architect will consider written requests for substitutions, with the exception of Divisions 22, 23 and 26, that are received at least seven days prior to Bid Date (at 5:00 p.m.); requests received after that time will not be considered. Substitution requests for Divisions 22, 23 and 26 will be reviewed as part of the Submittal Review Process. Submit on Substitution Request Form per Section 006325. If proposed substitution is approved, such approvals will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

**1.3 SUBSTITUTIONS AFTER AWARD OF CONTRACT**

- A. Substitution Request Submittal: The Architect will consider requests for substitution if received within 30 days after commencement of the Work. Requests received more than 30 days after commencement of the Work may be considered or rejected at the discretion of the Architect. Substitutions should exceed the standards of quality of the originally specified item.
  - 1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.
  - 2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
  - 3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
    - a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors, that will be necessary to accommodate the proposed substitution.
    - b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified.
    - c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
    - d. Samples, where applicable or requested.
    - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
    - f. Cost information, including the net change, if any in the Contract Sum.
    - g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
    - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
  - 4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.

SECTION 012500 - SUBSTITUTIONS

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**PART 2 - PRODUCTS**

**2.1 SUBSTITUTIONS AFTER AWARD OF CONTRACT**

- A. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect.
1. Extensive revisions to the Contract Documents are not required.
  2. Proposed changes are in keeping with the general intent of the Contract Documents.
  3. The request is timely, fully documented, and properly submitted.
  4. The specified product or method of construction cannot be provided within the schedule.
  5. The request is directly related to an "or-equal" clause or similar language.
  6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
  7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
  8. The specified product or method of construction cannot be provided in a manner that is compatible or coordinated with other materials and where the Contractor certifies that the substitution will overcome the incompatibility or can be coordinated.
  9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
  10. The specified product does not meet specified percent of recycled material content, exceeds allowable levels of toxic material content, or falls below specified energy efficiency.
- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

**PART 3 - EXECUTION (Not Applicable)**

**END OF SECTION**

**REI – GLENWOOD SPRINGS  
GLENWOOD SPRINGS, CO  
REI STORE #235**

**SECTION 012600 – CONTRACT MODIFICATION PROCEDURES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Administrative and procedural requirements for handling and processing Contract modifications.

**1.2 MINOR CHANGES IN THE WORK**

- A. Architect's Supplemental Instructions (ASI): Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

**1.3 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
1. Proposal Requests are for information only and not instructions either to stop work in progress or to execute the proposed change.
  2. Within 5 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish additional data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include an updated Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: Contractor may propose changes by submitting a request for a change for the following reasons:
1. If latent or unforeseen conditions require modifications to the Contract.
  2. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  3. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  5. Include an updated Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

**1.4 ALLOWANCES**

- A. Allowance Adjustment: For allowance-cost adjustment, base each Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place. Where applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
1. Include installation costs in the purchase amount only where indicated as part of the allowance.
  2. Submit substantiation of a change in scope of work claimed in the Change Orders related to unit-cost allowances.
  3. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.



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**SECTION 012600 – CONTRACT MODIFICATION PROCEDURES**

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- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or the Contractor's handling, labor, installation, overhead, and profit. Submit claims within 5 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. The Owner will reject claims submitted later than 5 days.
  - 1. Do not include the Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in Contract Documents.
  - 2. No change to the Contractor's indirect expense is permitted for selection of higher or lower-priced materials or systems of the same scope and nature as originally indicated.

**1.5 CHANGE ORDER PROCEDURES**

- A. On Owner's approval of a Proposal Request, Construction Manager will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.
- B. Change Orders will be processed in the manner described in AIA document A201.

**1.6 CONSTRUCTION CHANGE DIRECTIVE**

- A. Construction Change Directive: When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

**PART 2 - PRODUCTS**

- A. Not Used.

**PART 3 - EXECUTION**

- A. Not Used.

**END OF SECTION**

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**SECTION 013100 - COORDINATION**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, general project coordination procedures, conservation, administrative and supervisory personnel, cleaning and protection.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section "Project Meetings" for progress meetings, coordination meetings, and pre-installation conferences.
  - 2. Division 01 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
  - 3. Division 01 Section "Materials and Equipment" for coordinating general installation.
  - 4. Division 01 Section "Contract Closeout" for coordinating contract closeout.

**1.2 COORDINATION**

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation. Schedule construction operations in the 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. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair. Make provisions to accommodate items scheduled for later installation. Coordinate with Owner's vendors and suppliers.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of schedules.
  - 2. Installation and removal of temporary facilities.
  - 3. Delivery and processing of submittals.
  - 4. Progress meetings.
  - 5. Project closeout activities.
- D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials; and maximize recycling of all construction debris.

**1.3 REQUEST FOR INTERPRETATION (RFI)**

- A. Allot time in construction scheduling for liaison with Owner and Architect. Establish procedures for handling queries and clarifications. Use Owner's "Request for Information" protocol to initiate clarifications. Provide complete information as requested in the Owner's RFI tool. Include a detailed description of the differing conditions along with recommendations for changing the Contract Documents. Assign each RFI number to next available sequential number, limiting each RFI to one subject only. Allow sufficient time in construction schedule for Architect's response to the request.
- B. Requests for Information (RFI) submitted via phone call or email will not be considered valid without proper follow up documentation through the Owner's RFI tool. The Architect may supply an answer verbally if it is a simple clarification so as not to delay the schedule, but it is the responsibility of the Contractor to submit all questions and clarifications through the Owner's RFI tool. The Architect will not be responsible for any verbal answers that are not followed up with an RFI through the Owner's

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**SECTION 013100 - COORDINATION**

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RFI tool. Submittals/approvals given via other Request for Information (RFI) forms or verbal approvals are not valid substitutions.

- C. Field Condition Reports – Immediately upon discovery of a discrepancy between field conditions and the Contract Documents, Contractor is to prepare and submit a detailed report and Request for Information (RFI) via the Owner's RFI tool to the Owner and Architect for review.
- D. The Architect will review all Requests for Information to determine whether they are Requests for Information within the meaning of this term. If the Architect determines that the document is a Request for Information, a response will be issued in the form of an interpretation or Architect's Supplemental Instruction. If the Architect determines that the document is not a Request for Information, it will be returned, unreviewed as to content.
- E. Responses to Requests for Information shall be issued within 5 working days of receipt from Contractor unless the Architect determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary the Architect will, within five 5 working days of receipt of the request, notify Contractor of the anticipated response time.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION**

**3.1 GENERAL COORDINATION PROVISIONS**

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

**3.2 CLEANING AND PROTECTION**

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
  - 1. Excessive static or dynamic loading; Excessive internal or external pressures; Excessively high or low temperatures; Thermal shock; Excessively high or low humidity; Water or ice; Solvents or Chemicals; Punctures or Abrasion; Heavy traffic; Soiling, staining, and corrosion; Rodent and insect infestation; Combustion; Electrical current; High-speed operation; Improper lubrication; Unusual wear or other misuse; Contact between incompatible materials; Destructive testing; Misalignment; Excessive weathering; Unprotected storage; Improper shipping or handling.

**END OF SECTION**

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**SECTION 013200 – PROJECT MEETINGS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, preconstruction conference and progress meetings.
- B. Related Section: Division 01 Section "Coordination" for procedures for coordinating project meetings with other construction activities.

**1.2 PRECONSTRUCTION CONFERENCE**

- A. Schedule a preconstruction conference before starting construction, at a time convenient to the Owner and the Architect, but no later than 15 days after execution of the Agreement. Hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: Authorized representatives of the Owner and Architect; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. Include a representative from the landlord to cover requirements pertinent to the regulations of the shopping center. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including the following:
  - 1. Tentative construction schedule and critical work sequencing.
  - 2. Designation of responsible personnel.
  - 3. Procedures for processing field decisions and Change Orders.
  - 4. Procedures for processing Applications for Payment.
  - 5. Submittal of Shop Drawings, Product Data, and Samples.
  - 6. Office, work, and storage areas.
  - 7. Equipment deliveries and priorities.
  - 8. Safety procedures and First Aid.
  - 9. Security.
  - 10. Working hours.
  - 11. Environmental priorities.
  - 12. Recycling effort.

**1.3 PROGRESS MEETINGS**

- A. Conduct progress meetings at the Project Site or via Telephone Conference call at regular weekly intervals. Notify the Owner and the Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request. Progress schedules and required digital photos are to be e-mailed to owner and architect prior to each meeting.
- B. Attendees: In addition to representatives of the Owner and the Architect, appropriate subcontractors, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
  - 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.

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**SECTION 013200 – PROJECT MEETINGS**

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2. Review the present and future needs of each entity present, including the following:
  - a. Interface requirements.
  - b. Time.
  - c. Sequences.
  - d. Status of submittals.
  - e. Deliveries.
  - f. Off-site fabrication problems.
  - g. Access.
  - h. Temporary facilities and services.
  - i. Hours of work.
  - j. Hazards and risks.
  - k. Change Orders.
  - l. Documentation of information for payment requests.
  - m. Recycling
- D. Reporting: No later than 7 days after each meeting, the Contractor will distribute minutes of the meeting to each party present. Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule to Owner and Architect.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION (Not Applicable)**

**END OF SECTION**

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**SECTION 113100 - APPLIANCES**

**SECTION 113100 - APPLIANCES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Front load washer.
  - 2. Front load dryer.
- B. Related Requirements:
  - 1. Division 22 "Plumbing" for connection to domestic water system.
  - 2. Division 26 "Electrical" for connection to power supply.

**1.2 ACTION SUBMITTALS**

- A. Product Data: Provide product data on appliances showing materials, finishes, characteristics, limitations, and electrical characteristics.
- B. Shop Drawings: Show locations of appliances, dimensions, required clearances, rough-in requirements, power requirements, and wiring diagrams.
- C. Warranty: Sample warranty form.

**1.3 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data.

**1.4 QUALITY ASSURANCE**

- A. Major appliances must meet the Appliance Standards Program set by the US Department of Energy (DOE). Manufacturers must use standard test procedures developed by DOE to prove the energy use and efficiency of their products. ENERGY STAR® Qualified appliance must carry the label. Test results are printed on yellow Energy Guide label, which manufacturers are required to display on many appliances.

**1.5 DELIVERY, STORAGE AND HANDLING**

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

**PART 2 - PRODUCTS**

**2.1 MANUFACTURED UNITS**

- A. Appliances: Scheduled at end of Section or approved substitute.
- B. Substitutions: Under provisions of Section 012500.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

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**SECTION 113100 - APPLIANCES**

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- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

**3.2 INSTALLATION**

- A. Install appliances in accordance with manufacturer's instructions and approved Shop Drawings.  
B. Set plumb, level, and aligned.  
C. Connect to domestic water systems.  
D. Connect to power supply.

**3.3 ADJUSTING**

- A. Adjust appliances for proper operation.

**3.4 SCHEDULE**

<b>APPLIANCE DESCRIPTION</b>	<b>MANUFACTURER</b>	<b>MODEL</b>	<b>FINISH</b>
Front Load Washer	GE Appliances	GFW450SPMDG	-
Front Load Dryer	GE Appliances	GFD45ESPMDG	-

**END OF SECTION 113100**

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**SECTION 013300 - SUBMITTALS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work.
- B. Administrative Submittals: Refer to other Division 01 Sections and other Contract Documents for requirements for administrative submittals.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section "Project Meetings" for submittal and distribution of meeting and conference minutes.
  - 2. Division 01 Section "Quality Control" for submittal of inspection and test reports.
  - 3. Division 01 Section "Closeout Procedures" for submittal of Project Record Documents and warranties at project closeout.
  - 4. Divisions 22, 23 and 26 Sections for additional submittal requirements.

**1.2 SUBMITTAL PROCEDURES**

- A. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay. Allow 2 weeks for initial review and for reprocessing when necessary. No extension of Contract Time will be authorized because of failure to transmit submittals sufficiently in advance of the Work to permit processing. Maintain a submittal log which shall be made available upon Owner or Architect request.
- B. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination. Action may be withheld on a submittal requiring coordination with other submittals until all related submittals are received.
- C. Submittal Preparation: Record the Contractor's review and approval markings and the action taken. Include the following information on the label for processing and recording action taken:
  - 1. Project name, date, Architect, and Contractor.
  - 2. Name and address of the subcontractor, and/or supplier, and/or manufacturer.
  - 3. Specification section, drawing number and detail references, as appropriate.
- D. Submittal Transmittal: Transmit each submittal using a transmittal form. The Architect will not accept submittals received from sources other than the Contractor. Assign an identification number to each submittal, consisting of:
  - 1. A three digit submittal number starting with 001 and continuing in sequence;
  - 2. The five digit specification number;
- E. Submittal of documents directly to appropriate consultant will be approved provided a copy of transmittal letter is simultaneously sent to the Architect.

**1.3 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 15 days after the written Notice to Proceed.
  - 1. Provide a separate time bar for each significant construction activity.
  - 2. Within each time bar, indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
  - 3. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.
  - 4. Coordinate the Schedule with the list of subcontracts, progress reports, payment requests, and other schedules.



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**SECTION 013300 - SUBMITTALS**

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5. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.

- B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, and all other parties required to comply with scheduled dates. Post copies in the field office. When revisions are made, update the schedule and re-distribute.
- C. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

**1.4 SUBMITTAL SCHEDULE**

- A. Prepare a complete schedule of submittals. Submit within 15 days after the date established for written Notice to Proceed. Coordinate Submittal Schedule with other schedules. Prepare the schedule in chronological order. Provide the following information:
  1. Scheduled date for the first submittal.
  2. Related Section number.
  3. Submittal category (Shop Drawings, Product Data, or Samples).
  4. Name of the subcontractor.
  5. Description of the part of the Work covered.
  6. Scheduled date for the Architect's final release or approval.
- B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner and all parties required to comply with submittal dates indicated. Post copies in the field office. When revisions are made, update schedule and re-distribute.

**1.5 SHOP DRAWINGS**

- A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Rejected documents that do not comply with the requirements of this section will not be allowed additional time for review by the Owner and/or Architect.
- B. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
  1. Dimensions.
  2. Identification of products and materials included by sheet and detail number.
  3. Compliance with specified standards.
  4. Notation of coordination requirements.
  5. Notation of dimensions established by field measurement.
  6. Sheet Size: Submit on sheets at least 8-1/2" x 11" but no larger than 30" x 42".
  7. Submit digitally for review through the project's FTP platform. Comments will be returned digitally via the same FTP platform.

**1.6 PRODUCT DATA**

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves. Submit 3 copies of each required submittal; submit 4 copies where required for maintenance manuals. Mark each copy to show applicable choices and options. Include MSDS for each of the following: paint, adhesives, insulation and acoustic tile. These shall become part of the Owners operation manual at substantial completion.

**1.7 SAMPLES**

- A. Submit (3) sets of full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Submit Samples for review of size, kind, color, pattern,

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**SECTION 013300 - SUBMITTALS**

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and texture. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.

**1.8 QUALITY ASSURANCE SUBMITTALS**

- A. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
- B. Certifications: Where Specification Sections require certifications, submit a notarized certification from the manufacturer certifying compliance with specified requirements. Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.

**1.9 ARCHITECT'S ACTION**

- A. Except for submittals for the record or information, the Architect will review each submittal, mark to indicate action taken, and return promptly. Compliance with specified characteristics is the Contractor's responsibility. Unsolicited submittals will be returned without action.
- B. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp.
  - 1. When the Architect marks a submittal "Approved," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents.
  - 2. When the Architect marks a submittal "Approved as Corrected," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
  - 3. When the Architect marks a submittal "Revise and Resubmit," do not proceed with Work covered by the submittal. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
  - 4. When the Architect marks a submittal "Rejected," do not proceed with Work covered by the submittal. Prepare a new submittal and resubmit without delay. Repeat if necessary to obtain different action mark.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION (Not Applicable)**

**END OF SECTION**

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**SECTION 014000 – QUALITY CONTROL**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for quality-control services including inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect. Inspection and testing services are required to verify compliance with requirements specified or indicated.
- B. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products. 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. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Section: Division 01 Section "Cutting and Patching" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.

**1.2 RESPONSIBILITIES**

- A. Contractor Responsibilities: Contractor is responsible to make a record of site conditions everyday work is taking place using a digital format camera. Photo locations will be determined by the REI CPM at the beginning of the project and are required to be uploaded to Sitefolio on a daily basis.
- B. Owner Responsibilities: Unless otherwise indicated, the Owner will employ testing agencies, directly and pay for any inspections, tests or approvals other than those conducted by public authorities. Costs for these services are not to be included in the Contract Sum.
- C. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.
- D. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.
- E. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
  - 1. Provide access to the Work.
  - 2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
  - 3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
  - 4. Provide facilities for storage and curing of test samples.
  - 5. Deliver samples to testing laboratories.
  - 6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
  - 7. Provide security and protection of samples and test equipment at the Project Site.
- F. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

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**SECTION 014000 – QUALITY CONTROL**

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**1.3 SUBMITTALS**

- A. The testing agency shall submit a certified written report of each inspection, test, or similar service to the Architect, Owner, and Consultant responsible for the respective test section. Submit additional copies directly to the governing authority, when the authority so directs. Written reports include, but are not limited to, the following:
1. Date of issue, project title and number.
  2. Name, address, and telephone number of testing agency.
  3. Dates and locations of samples and tests or inspections.
  4. Names of individuals making the inspection or test including laboratory personnel.
  5. Designation of the Work and test method.
  6. Identification of product and Specification Section.
  7. Complete inspection or test data, test results and an interpretation of test results.
  8. Ambient conditions at the time of sample taking and testing.
  9. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
  10. Recommendations on retesting.

**1.4 QUALITY ASSURANCE**

- A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION**

**3.1 REPAIR AND PROTECTION**

- A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Protect construction exposed by or for quality-control service activities, and protect repaired construction. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

**END OF SECTION**

SECTION 014200 – REFERENCE STANDARDS AND DEFINITIONS

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**PART 1 - GENERAL**

**1.1 DEFINITIONS**

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. “Indicated” refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as “shown”, “noted”, “scheduled”, and “specified” are used to help the reader locate the reference. Location is not limited.
- C. “Directed”, “requested”, “authorized”, “selected”, “approved”, “required”, and “permitted” mean directed by the Architect, requested by the Architect, and similar phrases.
- D. “Approved”, when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. “Regulations” includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. “Furnish” means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. “Install” describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. “Provide” means to furnish and install, complete and ready for the intended use.
- I. “Installer” is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
  - 1. The term experienced, when used with the term Installer, means having a minimum of 5 previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
  - 2. Trades: 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 tradespersons of the corresponding generic name.
- J. “Project Site” is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. Testing Agencies: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

**1.2 SPECIFICATION FORMAT AND CONTENT EXPLANATION**

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format and MASTERFORMAT numbering system.

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**SECTION 014200 – REFERENCE STANDARDS AND DEFINITIONS**

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- B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
  2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted. The words "shall be" are implied wherever a colon (:) is used within a sentence or phrase.

**1.3 INDUSTRY STANDARDS**

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.
- C. Conflicting Requirements: Where compliance with 2 or more standards is specified and where the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different but apparently equal and uncertainties to the Architect for a decision before proceeding. Minimum 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 the requirements. Refer uncertainties to the Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

**1.4 SUBMITTALS**

- A. Permits, Licenses, and Certificates: For the 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 in conjunction with compliance with standards and regulations bearing upon performance of the Work.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION (Not Applicable)**

**END OF SECTION**

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**SECTION 015000 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, security and protection, and project sign.

**1.2 SUBMITTALS**

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

**1.3 QUALITY ASSURANCE**

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including building code, health and safety, utility company, police, fire, and rescue squad rules, and environmental protection regulations.
- B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities." Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Lumber and Plywood: Comply with requirements in Division 06 Section "Rough Carpentry."
  - 1. Job-built structures: UL-labeled, fire-treated lumber and plywood.
  - 2. Signs, directories: Exterior Grade B-B high-density concrete form overlay plywood.
  - 3. For safety barriers and similar uses, provide minimum 5/8-inch thick exterior plywood.
- B. Roofing: UL, Class A standard-weight asphalt shingles or Class C mineral-surfaced roll roofing.
- C. Paint: Comply with requirements of Division 09 Section "Painting." Structures and fences: Exterior, acrylic-latex over primer. Signs: Exterior, alkyd gloss enamel over primer.
- D. Tarpaulins: Waterproof, fire-resistant, UL-labeled, flame-spread 15 or less, translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride.
- E. Water: Provide potable water approved by local health authorities.
- F. Galvanized Fencing: 0.120" thick, 2" chain-link fabric fencing, 8' high with barbed-wire top strand and steel pipe posts, 1-1/2" I.D. for line posts and 2-1/2" I.D. for corner posts.

**2.2 EQUIPMENT**

- A. Water Hoses: 3/4", heavy-duty, abrasion-resistant, flexible hoses 100' long, pressure rating per system rating. Provide adjustable shutoff nozzles at hose discharge.
- B. Electrical: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment. Provide grounded extension cords; hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords. Do not exceed safe length-voltage ratio. Provide lamps of wattage required for adequate illumination, with guard cages or tempered-glass enclosures where exposed to breakage; exterior fixtures where exposed to moisture.

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- C. Heating Units: Provide temporary heating units that have been Tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- D. Temporary Offices: Prefabricated or similar job-built construction, lockable entrances, operable windows, insulated, heated, air-conditioned units on foundations adequate for normal loading.
- E. Temporary Toilets: Self-contained; chemical, aerated recirculation, or combustion type, properly vented; fully enclosed with reinforced polyester shell or similar nonabsorbent material.
- F. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

**PART 3 - EXECUTION**

**3.1 TEMPORARY UTILITY INSTALLATION**

- A. General: Engage the local utility companies to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Cost or use charges are not chargeable to the Owner or Architect.
- B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use. Sterilize piping prior to use.
- C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
- D. Lighting: Provide temporary lighting with local switching that will fulfill security requirements. Provide adequate illumination for construction and traffic conditions.
- E. Temporary Heat: As required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy. Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel-oil heaters with individual space thermostatic control. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.
- F. Temporary Telephones: Provide service throughout construction for all personnel engaged in construction activities. Provide additional telephone line for a fax machine in the field office.
- G. Sanitary facilities: Include toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, operation, and maintenance. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material. Provide separate containers for recycling.

**3.2 SUPPORT FACILITIES INSTALLATION**

- A. Field Offices: Provide weather-tight temporary offices of sufficient size to accommodate office personnel at the Project Site. Keep the office clean and orderly for use for progress meetings. Provide use of phone, fax and desk for Architect and/or Owner's Representative.
- B. Storage and Fabrication Sheds: Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved.
- C. Temporary Enclosures: Provide enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
- D. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees.



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- E. Temporary Signs: Support on posts of preservative-treated wood or painted steel. Do not permit installation of unauthorized signs.
  - 1. Project Sign: Provide one sign 4' x 8' x 3/4" immediately after construction has started. Design per the "Project Sign" detail supplied by the Owner. Engage an experienced sign painter to apply graphics. Submit proposed graphic layout to Owner for approval. Sign must be installed prior to the approval of the first payment request.
  - 2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
- F. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.
- G. Recycling, Waste, and Hazardous Material Collection and Disposal: On a daily basis collect waste materials. Comply with requirements of NFPA 241 for removal of combustible material. Enforce requirements strictly. Do not hold materials more than seven days. Segregate hazardous material and lawfully dispose of. Segregate recyclable materials and distribute to recycling businesses. Segregate remaining waste and debris and dispose of in lawful manner.
- H. Stairs: Provide temporary scaffold stairs for access to second floor on two-level buildings. For all other conditions, provide temporary stairs where ladder access is not adequate.

**3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION**

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Architect.
- B. Fire Protection: Install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses and as required by local authorities. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
  - 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
  - 2. Store combustible materials in containers in fire-safe locations.
  - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
  - 4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- C. Permanent Fire Protection: At the earliest feasible date, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- D. Barricades: Comply with standards and code requirements for erection of structurally adequate barricades. Provide warning paint, signs and lighting where appropriate and needed to inform personnel and public of the hazard being protected against.
- E. Enclosure Fence: Before excavation, demolition and construction begins, install an enclosure fence with lockable entrance gates. Enclose the entire site. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
- F. Security Enclosure and Lockup: Limit access to the site to persons involved in the work. Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
  - 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup.
  - 2. If the building is not secure and lockable, the Contractor shall hire a security guard to protect the building during the night-time hours as necessary, or upon Owner's request.

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3. After turnover of the building and during the completion of the "Punch List" work, Contractor access to the building will be limited to a single entrance. The Owner will have the right to perform random bag and toolbox searches if necessary.
  - G. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.
- 3.4 OPERATION, TERMINATION, AND REMOVAL**
- A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
    1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
    2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
  - B. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
    1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
    2. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
      - a. Replace air filters and clean inside of ductwork and housings.
      - b. Replace significantly worn parts and parts subject to unusual operating conditions.
      - c. Replace lamps burned out or noticeably dimmed by hours of use.

**END OF SECTION**

SECTION 016000 – MATERIALS AND EQUIPMENT

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. Related Section: Division 01 Section "Substitutions" specifies administrative procedures for handling requests for substitutions made after award of the Contract.

**1.2 DEFINITIONS**

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
  - 1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature that is current as of the date of the Contract Documents.
  - 2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
  - 3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

**1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
  - 1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces. Coordinate with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 2. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
  - 3. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction. Store products subject to damage by the elements above ground, under cover in a weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

**PART 2 - PRODUCTS**

**2.1 PRODUCT SELECTION**

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and new at the time of installation. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
- B. Product Selection Procedures: Procedures governing product selection include the following:
  - 1. Proprietary Specification: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.

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**SECTION 016000 – MATERIALS AND EQUIPMENT**

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2. Semi-proprietary Specification: Where Specifications name 2 or more products or manufacturers, provide 1 of the products indicated. No substitutions will be permitted. Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" or "or approved equal," comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
  3. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
  4. Descriptive Specification: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that complies with Contract requirements.
  5. Performance Specification: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
  6. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
  7. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
  8. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
- C. Alternates:
1. The contractor shall investigate proposed substitutions with respect to the following:
    - a. All Substitutions shall be accompanied with documentation that indicates that the pertinent environmental performance criteria of the substitute material are equal or superior to the specified material.
    - b. All substitutions must be approved.

**PART 3 - EXECUTION**

**3.1 INSTALLATION OF PRODUCTS**

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

**END OF SECTION**

**SECTION 016100 – WARRANTIES AND BONDS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
  - 1. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
  - 2. General closeout requirements are included in Section "Project Closeout."
  - 3. Specific requirements for warranties for the Work and products and installations, are included in the individual Sections of Divisions-22 through -32.
  - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

**1.2 WARRANTY REQUIREMENTS**

- A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies. The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

**1.3 SUBMITTALS**

- A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Owner.
- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution. Refer to individual Sections of Divisions-02 through -32 for specific content requirements, and particular requirements for submittal of special warranties.

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**SECTION 016100 – WARRANTIES AND BONDS**

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- C. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- D. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
  - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
  - 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS, the Project title or name, and the name of the Contractor.
  - 3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

**PART 2 - PRODUCTS (not applicable).**

**PART 3 - EXECUTION (not applicable).**

**END OF SECTION**

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SECTION 017300 - EXECUTION**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. General installation of products.
  - 2. Manufacturer's instructions.
  - 3. Protection of installed construction.
  - 4. Correction of the Work.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

**3.1 COMPLIANCE**

- A. Unless otherwise specified in individual Sections, comply with manufacturer's requirements, including printed instructions and product data sheets, regarding examination and preparation of surfaces to receive Work, protection of surfaces adjacent to Work, and installation, cleaning, adjusting and protection of Work.

**3.2 EXAMINATION OF CONDITIONS**

- A. Examine substrates and conditions under which Work is to be performed. Do not commence work over unsatisfactory conditions detrimental to proper and timely execution of Work.
  - 1. Verify layout of work before beginning installation.
  - 2. Do not proceed with Work until unsatisfactory conditions have been corrected.
  - 3. Commencement of installation constitutes acceptance of conditions and cost of corrective measures are responsibility of Contractor.
- B. Pre-Installation Conferences: See Section 013200.
- C. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems, points of connection, and other construction affecting the Work.
- D. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- E. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
    - a. Description of the Work.
    - b. List of detrimental conditions, including substrates.
    - c. List of unacceptable installation tolerances.
    - d. Recommended corrections.
  - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

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**SECTION 017300 - EXECUTION**

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3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

**3.3 PREPARATION**

- A. Existing Utility Information: Furnish to local utility and to Owner information needed to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a Request for Information [Interpretation] to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.
- E. Except as otherwise specified, require compliance with manufacturer's printed installation instructions, including each step in sequence. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.
- F. Maintain one set of complete instructions at Project site during installation and until completion.
- G. Should Project conditions or specified requirements conflict with manufacturer's instructions, request clarification in writing from Architect before proceeding.

**3.4 PRODUCT INSTALLATION**

- A. General: Install, erect, connect, condition, use, adjust, and clean products in accordance with manufacturer's instructions and in conformity with specified requirements.
  1. Verify and coordinate clearances, dimensions and installation of adjoining construction, equipment, piping, ducts, conduits, or other mechanical or electrical items or apparatus.
  2. Prior to fabrication, field measure actual existing conditions to ensure proper fit.
  3. Inspect each item of material or equipment immediately prior to installation. Reject damaged and defective items.
  4. Recheck measurements and dimensions of Work, as an integral step of starting each installation. Whenever stock manufactured products are specified, verify actual space requirements for setting or placing into allotted space. No extra cost will be allowed for adjustment of Work to accommodate particular product.
- B. Attachment: Provide attachment and connection devices and methods for securing work to withstand stresses, vibration, physical distortion, disfigurement, or racking.
  1. Secure work true to line and level, and within specified tolerances, or if not specified, industry recognized tolerances.
  2. Physically separate, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
  3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Architect for final decision.
- C. Allow for expansion of materials and building movement.
- D. Climatic Conditions and Project Status: Install each unit of work under conditions to ensure best possible results in coordination with entire project.



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1. Isolate each unit of work from incompatible work as necessary to prevent deterioration.
  2. Coordinate enclosure of work with required inspections and tests to minimize necessity of uncovering work for those purposes.
- E. Mold Prevention: Take precautions to keep mold growth products dry during and after installation until time of Substantial Completion.
1. Sequence and schedule construction operations to properly protect mold growth products from moisture.
  2. Wet Areas Adjacent to mold growth products: Immediately remove water and dry areas.
  3. Protect mold growth products from excessive humidity.
  4. Ensure components of exterior enclosure assemblies with exception of exterior skin component are dry at time of assembly closure. This includes exterior wall and roof assemblies.
  5. Remove wet or dirty mold growth products from project site.
- F. Mounting Heights: Where not indicated, mount individual units of work at industry recognized standard mounting heights for particular application indicated.
1. Refer questionable mounting heights choices to Architect for final decision.
  2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.
- G. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components to ensure operability without damaging effects.
- H. Adjust operating products and equipment to ensure smooth and unhindered operation.

**3.5 MANUFACTURER'S INSTRUCTIONS**

- A. Compliance: Comply with manufacturer's printed installation instructions, including each step in sequence. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.
1. Maintain one set of complete instructions at Project site during installation and until completion.
  2. Should Project conditions or specified requirements conflict with manufacturer's instructions, request clarification in writing from Architect before proceeding.

**3.6 PROTECTION OF INSTALLED WORK**

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.
- C. Protect installed Work in manner to prevent damage from subsequent construction operations.
1. Provide special protection where specified in individual Specification sections.
  2. Provide temporary and removable materials for protection of installed products. Control activity in immediate work area to minimize damage.
  3. Ensure materials, systems, and components will be without damage or deterioration at time of Substantial Completion.
  4. Protect finished Work from damage, defacements, stains, scratches, and wear.
  5. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
  6. Protect finished floors, stairs, and other surfaces from traffic dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- D. Prohibit traffic or storage upon waterproofed or roofed surfaces.
1. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
  2. Prohibit traffic from lawn and landscaped areas.
- E. Mold Prevention:
1. Provide protection to keep mold growth products dry during construction operations until time of Substantial Completion.
  2. Provide temporary protection if permanent protection is not provided in timely manner by sequencing and scheduling of construction operations.

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**3.7 CORRECTION OF THE WORK**

- A. Repair or remove and replace defective construction.
  - 1. Restore damaged substrates and finishes. Comply with requirements in Section 017329 - Cutting and Patching.
  - 2. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to acceptable condition.
- C. Remove and replace damaged materials and surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

**END OF SECTION**

**SECTION 017329 – CUTTING AND PATCHING**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for cutting and patching.
- B. Related Sections: Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work. Refer to Division 22, 23 and 26 Sections for other requirements and limitations applicable to mechanical and electrical installations.

**1.2 QUALITY ASSURANCE**

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner. If possible, retain the original Installer or fabricator to cut and patch the exposed Work. If it is impossible to engage the original Installer or fabricator, engage another recognized, experienced and specialized firm.

**1.3 WARRANTY**

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

**PART 2 - PRODUCTS**

**2.1 MATERIALS, GENERAL**

- A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.

**PART 3 - EXECUTION**

**3.1 INSPECTION**

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

**3.2 PREPARATION**

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

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**3.3 PERFORMANCE**

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition. Contractor to provide Owner and Architect with a cutting and patching plan for approval.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations. In general, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances. Where feasible, inspect and test patched areas to demonstrate integrity of the installation. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

**3.4 CLEANING**

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

**END OF SECTION**

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**SECTION 017419 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Construction Waste Management (CWM) during construction to salvage and/or divert construction, demolition and land clearing debris from this project from landfill disposal and incineration, as tracked through Construction Waste Management Reports.

**1.2 PROCEDURES**

- A. Owner has a national vendor to provide hauling and disposal services for construction waste. Owner will contract directly with vendor for these services.
- B. Contractor is responsible for management of all on site construction waste and coordination with Owner's vendor for removal.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION (Not Applicable)**

**END OF SECTION**

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**SECTION 017700 – CLOSEOUT PROCEDURES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Inspection procedures.
  - 2. Project Record Documents.
  - 3. Operation and maintenance manuals.
  - 4. Warranties.
  - 5. Instruction of Owner's personnel.
  - 6. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 02 through 32.
- C. Related Sections:
  - 1. 015000 - Construction Facilities and Temporary Controls: Cleaning during construction.

**1.2 REFERENCES**

- A. Green Seal website [www.greenseal.org/certproducts.htm](http://www.greenseal.org/certproducts.htm) for a list of approved products.

**1.3 SUBMITTALS**

- A. Submit all certificates of approval issued by the governing authorities, including, without limitation, the following:
  - 1. Certificate of occupancy.
- B. Prior to final payment, submit the following affidavits using the forms listed below:
  - 1. Contractor's Affidavit of Payment of Debts and Claims AIA Document G706.
  - 2. Consent of Surety to Final Payment AIA Document G707.
  - 3. Contractor's lien release, and lien releases from each subcontractor; Contractor's Affidavit of Release of Liens AIA Document G706A
- C. Submit final Application for Payment identifying total adjusted contract sum, previous payments, and sum remaining due.

**1.4 SUBSTANTIAL COMPLETION**

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Advise Owner of pending insurance changeover requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 5. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
  - 6. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 7. Complete startup testing of systems.
  - 8. Submit test/adjust/balance records.
  - 9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  - 10. Advise Owner of changeover in heat and other utilities.
  - 11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

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- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Completion.

**1.5 FINAL COMPLETION**

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Contract Closeout."
  2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
  3. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
  5. Submit a final liquidated damages settlement statement.
  6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  7. Obtain temporary certificate of occupancy from city.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

**1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)**

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
1. Organize list of spaces in sequential order, starting with exterior areas first] [and] [proceeding from lowest floor to highest floor.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Page number.

**1.7 PROJECT RECORD DOCUMENTS**

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's and Construction Manager's reference during normal working hours.

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- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
  - 1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
    - b. Accurately record information in an understandable drawing technique.
    - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
    - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
  - 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
  - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
  - 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
  - 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  - 1. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  - 2. Note related Change Orders where applicable.
  - 3. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
  - 4. Note related record drawing information and Product Data.
- D. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.
  - 1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
  - 2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
  - 3. Incorporate Record Product Data with architect's review stamp and signature into respective tabs in Maintenance Manual.
- E. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes.
- F. Submittal Log: Submit one copy of submittal log listing each item submitted and when they were reviewed/approved.
- G. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.



**SECTION 017700 – CLOSEOUT PROCEDURES**

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**1.8 OPERATION AND MAINTENANCE MANUALS**

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
  - 1. Operation Data:
    - a. Emergency instructions and procedures.
    - b. System, subsystem, and equipment descriptions, including operating standards.
    - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
    - d. Description of controls and sequence of operations.
    - e. Piping and wiring diagrams.
  - 2. Maintenance Data:
    - a. Manufacturer's information, including list of spare parts.
    - b. Name, address, and telephone number of Installer or supplier.
    - c. Maintenance procedures.
    - d. Maintenance and service schedules for preventive and routine maintenance.
    - e. Maintenance record forms.
    - f. Sources of spare parts and maintenance materials.
    - g. Copies of maintenance service agreements.
    - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

**1.9 WARRANTIES**

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

**PART 3 - EXECUTION**

**3.1 DEMONSTRATION AND TRAINING**

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Provide instructors experienced in operation and maintenance procedures.
  - 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.

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3. Schedule training with Owner with at least seven days' advance notice.
  4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
1. System design and operational philosophy.
  2. Review of documentation including Maintenance manuals and Record documents, and Identification systems.
  3. Operations.
  4. Control sequences.
  5. Cleaning and hazards.
  6. Adjustments.
  7. Troubleshooting.
  8. Spare parts, materials, tools, lubricants and fuels.
  9. Maintenance.
  10. Repair.
  11. Warranties and bonds; maintenance agreements and similar continuing commitments.
- C. As part of instruction for operating equipment, demonstrate the following procedures:
1. Startup and Shutdown.
  2. Emergency operations and safety procedures.
  3. Noise and vibration adjustments.
  4. Economy, efficiency adjustments and effective energy utilization.

**3.2 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.
1. Cleaning Materials: Only Green Seal cleaning materials shall be used in the final cleanup.
    - a. Refer to Green Seal website [www.greenseal.org/certproducts.htm](http://www.greenseal.org/certproducts.htm) for a list of approved products.
  2. Recycle, salvage, and return construction and demolition waste from Project in accordance with requirements with the Waste Management Plan in Section 017419.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Final Completion:
    - a. 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.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove temporary protection and facilities installed for protection of the Work during construction.
    - f. Remove snow and ice to provide safe access to building.
    - g. 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 their original condition.
    - h. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - i. Sweep concrete floors broom clean in unoccupied spaces.

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- j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
  - k. 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.
  - l. Remove labels that are not permanent.
  - m. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
  - n. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - o. Replace parts subject to unusual operating conditions.
  - p. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - q. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - r. Clean ducts, blowers, and coils if units were operated without filters during construction.
  - s. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
  - t. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

**3.3 FINAL PAYMENT**

- A. Final Construction Waste Management Report: Include a summary of information required by Construction Waste Management Reports for the Project with the Final Report. Submit with Final Application for Payment.

**3.4 POST CONSTRUCTION INSPECTION**

- A. The Owner will conduct an inspection just prior to one year following the date of final completion. The Contractor will be asked to be present. The purpose of this inspection is to identify any warranty items or material failures. A report will be issued with determination by the Owner as to the Contractor's responsibility. Contractor is required to make necessary repairs or corrections within thirty (30) days following notification.

**END OF SECTION**

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**SECTION 018119 – INDOOR AIR QUALITY REQUIREMENTS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. The Contractor shall create and implement a construction indoor air quality management plan to maintain indoor air quality by controlling dust and pollutants.
- B. Related Sections:
  - 1. 011100 - Summary of Work.
  - 2. 015000 - Construction Facilities and Temporary Controls.
  - 3. 016000 - Materials and Equipment.
  - 4. Divisions 2 - 23: Individual sections that involve finish materials that are located inside the vapor barrier as well as auxiliary finishing materials installed within the vapor barrier. This includes, but is not limited to, adhesives, sealants, paints, primers, carpets and composite wood products.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to all work of this Section.

**1.2 REFERENCES**

- A. Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings Under Construction, 1995.
- B. Filtration media: ASHRAE 52.2-1999.
- C. Adhesives, Sealants and Sealant Primers: South Coast Air Quality Management District (SCAQMD) Rule #1168 requirements in effect on January 1, 2003 and rule amendment dated October 3, 2003.
- D. Aerosol Adhesives: Green Seal Standard for Commercial Adhesives GS-36, Requirements in effect on October 19, 2000.
- E. Topcoat Paints: Green Seal Standard GS-11, Paints, First Edition, May 20, 1993
- F. Anti-Corrosive and Anti-Rust Paints applied to interior ferrous metal substrates: Green Seal Standard GC-03, Anti-Corrosive Paints, Second edition, January 7, 1997.
- G. All Other Architectural Coatings, Primers, Undercoats: South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.
- H. Carpet: Carpet and Rug Institute's Green Label Plus program.
- I. Carpet Cushion: Carpet and Rug Institute's Green Label program.
- J. Carpet Adhesive: South Coast Air Quality Management District (SCAQMD) Rule #1168 requirements, Rule in effect on July 1, 2005.
- K. Indoor Air Quality Testing: United States EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air.

**1.3 REQUIREMENTS**

- A. Develop and implement an Indoor Air Quality Management Plan during construction that meets or exceeds the minimum requirements of the SMACNA IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3. The required Best Management Practices are summarized in Part 3 of this Section.
- B. Protect stored on-site or installed absorptive materials from moisture damage.
- C. Use specific filtration media at each return air grill during construction, after construction, during flush-out and prior to occupancy.
- D. Conduct a building flush-out or a baseline indoor air quality test procedure consistent with Part 3 of this section.

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- E. Use low- or no-emitting adhesives, sealants, paints, primers, carpets and composite wood products within the vapor barrier.
1. Product requirements are specified in Divisions 2-16.
  2. Where specific products are not called out, refer to the Requirements within this Section.

**1.4 SUBMITTALS**

- A. Make submittals in accordance with Section 01 33 00.
- B. Provide cut sheets of filtration media used during construction and installed immediately prior to occupancy with MERV values highlighted.
- C. Submit one of the following.
1. A description of the building flush-out procedures (may be included in the IAQ Management Plan), calculations demonstrating how the number of days of flush-out was determined, and dates of flush-out. Provide cut sheets of filtration media installed during flush-out and replaced immediately prior to occupancy, with MERV values highlighted.
  2. A copy of the indoor air quality testing results demonstrating that the IAQ testing protocol has been met.

**1.5 BUILDING FLUSH-OUT MILESTONE DATE**

- A. The General Contractor shall include a separate milestone date on the CPM Schedule that indicates targeted date for the start of building flush-out process or contractor shall comply with the IAQ Testing requirements in Part 3 of this Section. Requirements for preparation, form, etc. for CPM Schedule are specified in Section 01 33 00 – Submittal Procedures.

**PART 2 - PRODUCTS**

**2.1 PRODUCT REQUIREMENTS**

- A. If air handlers must be used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill.
- B. After construction ends, and prior to occupancy, replace filtration media with new Minimum Efficiency Reporting Value (MERV) of 8 filtration media.
- C. Use low-emitting adhesives, sealants, paints, primers, carpets and composite wood products within the vapor barrier. This includes, but is not limited to:
1. Low or no-VOC adhesives and sealants such as multipurpose construction, glazing, pvc, carpet and pad, sheet flooring, tile floor, wood floor, cove base, countertop, tile countertop, grout sealant, cabinetry, laminate, sub-base, ductwork, fire caulk, acoustical and plumbing. VOC maximum limits are as follows:

**SCAQMD Rule 1168, Adhesive & Sealant Application**

<b>Architectural Applications</b>	<b>VOC Limit [g/L less water]</b>
Indoor Carpet Adhesive	50
Carpet Pad Adhesive	50
Outdoor Carpet Adhesives	150
Wood Flooring Adhesive	100
Rubber Floor Adhesive	60
Subfloor Adhesive	50
Ceramic Tile Adhesive	65
VCT & Asphalt Adhesive	50
<b>Architectural</b>	<b>VOC Limit</b>

**SCAQMD Rule 1168, Architectural Coatings**

<b>Architectural Finishes &amp; Coatings</b>	<b>VOC Limit [g/L less water]</b>
Bond Breakers	350
Clear Wood Finishes:	
Varnish	350
Sanding Sealers	275
Lacquer	550
Clear Brushing Lacquer	680
Concrete-curing compounds	350
Dry-fog coatings	400
<b>Architectural Finishes &amp;</b>	<b>VOC Limit</b>

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<b>Applications</b>	<b>[g/L less water]</b>
Drywall & Panel Adhesive	50
Cove Base Adhesive	50
Multipurpose Construction Adhesive	70
Structural Glazing Adhesive	100
<b>Substrate Specific Applications</b>	<b>VOC Limit [g/L less water]</b>
Metal to Metal	30
Plastic Foams	50
Porous Material (except wood)	50
Wood	30
Fiberglass	80
<b>Sealant Primers</b>	<b>VOC Limit [g/L less water]</b>
Architectural Non Porous	250
Architectural Porous	775
Other	750
<b>Specialty Applications</b>	<b>VOC Limit [g/L less water]</b>
PVC Welding	510
CPVC Welding	490
ABS Welding	400 <b>[325 Retail]</b>
Plastic Cement Welding	350 <b>[250 Retail]</b>
Adhesive Primer for Plastic	650 <b>[550 Retail]</b>
Contact Adhesive	80
Special Purpose Contact Adhesive	250
Structural Wood Member Adhesive	140
Tom & Trim Adhesive	250
Sheet Applied Rubber Lining Operations	850

<b>Sealants</b>	<b>VOC Limit</b>
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<b>Coatings</b>	<b>[g/L less water]</b>
Fire-proofing exterior coatings	350
Fire-retardant coatings:	
Clear	650
Pigmented	350
Floor coatings	100
Graphic arts (sign) coatings	500
Industrial maintenance (IM) coat-	250
High temperature IM coatings	420
Zinc-rich IM Primers	100
Japans/faux finishing coatings	350
Magnesite cement coatings	450
Mastic coatings	300
Metallic pigmented coatings	500
Multi-color coatings	250
Pigmented lacquer	550
Pre-treatment wash primers	420
Primers, sealers and undercoaters	200
Quick-dry enamels	250
Quick-dry primers, sealers and undercoaters	200
Recycled coatings	250
Rust preventative coatings	400
Shellac-Clear	730
Shellac-Pigmented	550
Specialty primers	350
Stains	250
Waterproofing sealers	250
Waterproofing concrete/masonry sealers	400
Wood preservatives	350

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	<b>[g/L less water]</b>
Architectural	250
Nonmembrane Roof	<b>[300 Retail]</b>
Roadway	<b>[250 Retail]</b>
Single Ply Roof Membrane	<b>[450 Retail]</b>
Other	420

**Green Seal GS-11, Paints**

<b>Architectural Paints &amp; Primers</b>	<b>VOC Limit [g/L minus water]</b>
Flats	50
Non-Flats	150

**Green Seal GS-36, Commercial Adhesives**

<b>Aerosol Adhesives</b>	<b>VOC Limit [g/L minus water]</b>
General Purpose Mist Spray	65% VOC by weight
General Purpose Web Spray	55% VOC by weight
Special Purpose Aerosol Adhesive	70% VOC by weight

**Green Seal GC-03, Anti-Corrosive Paints**

<b>Anti-Corrosive Paints</b>	<b>VOC Limit [g/L minus water]</b>
Gloss, Semi-gloss, Flat	250

2. Carpet systems shall meet or exceed the requirements of the Carpet and Rug Institute's Green Label Plus Indoor Air Quality Test Program.
3. Composite wood and agrifiber products, including core materials shall contain no added urea-formaldehyde resins. Laminate adhesives used in field and shop-fabricated assemblies containing these products must contain no urea-formaldehyde. Products may include millwork, composite and solid doors, cabinetry, crown moldings, wood paneling and built-in furnishings.

**PART 3 - EXECUTION**

**3.1 GENERAL**

- A. Many Best Management Practices are available to maintain IAQ during construction or demolition. The pros, cons, and limitations of each available option should be considered to identify the most effective and most efficient approaches for a particular job. When designing the Plan, the Contractor may use more than one of these practices (simultaneously or phased in) as work progresses. In general, the steps include:
  1. Containing the work area
  2. Modifying HVAC operation
  3. Reducing emissions
  4. Intensifying housekeeping
  5. Scheduling material delivery to avoid contamination
  6. Protecting stored and installed absorptive materials from contamination.

**3.2 REQUIRED IAQ MANAGEMENT BMPS**

- A. Mechanical Systems
  1. Protection: All HVAC equipment must be protected from collecting dust and contaminants that can be collected in the system and later be released. Specific HVAC protection requirements generally apply to the return side, central filtration, or supply side of the system.

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2. Return Side: The return side of an HVAC system is, by definition, under negative pressure and thus capable of drawing in nearby construction dust and odor. Special attention must be paid to the location of any return vents, return ducts, ceiling plenums, return shafts, VAV plenum intakes, window units, and transfer vents as well as that portion of the air handler which is upstream of the central fan. When possible, the entire system should be shut down during heavy construction or demolition that generates dust and airborne particles.
  - a. All return system openings in or immediately adjacent to, the construction area should be sealed with plastic.
  - b. When the system must remain operational during construction, temporary filters should be added where necessary (e.g. on grills to return air shaft). Filters used during construction must have a minimum rating of MERV 8 and must receive frequent periodic maintenance.
  - c. Replace the filters at the end of the project with MERV 8 filters. Provide MERV 8 filters to process both return and outside air that is to be delivered as supply air. Verify that equipment is capable of accepting MERV 8 filters.
  - d. When the general system must remain operational, the heaviest work areas should be dampered off or otherwise blocked if temporary imbalance of the return air system does not create a greater problem.
  - e. The mechanical room should not be used to store construction or waste materials.
3. Supply Side:
  - a. Diffusers, terminal units, and ducts may be adequately protected in most cases where the above measures are implemented. When the system is off for the duration of construction, diffusers and window units should also be sealed with plastic for further protection.
  - b. Ducts, diffusers, and window units should be inspected upon completion of the work for the amount of deposited particulate present and cleaned where needed. If significant dust deposits are observed in the system during construction, some particulate discharge can be expected during start-up. When such a discharge is only minor, delaying re-occupancy long enough to clean up the dust may be sufficient. In more severe cases, installing temporary coarse filters on diffusers or cleaning the ducts may be necessary. The condition of the main duct should be checked whenever visible particles are discharged from the system.
- B. Materials Handling: Protect construction materials from contamination and pollution from contact with construction dust, debris, fumes, solvents, and other pollutants.
  1. The design of each system must be evaluated in detail to determine how it may be affected by odor and dust from the project (including site egress, staging areas, etc.).
  2. Designate receiving/storage areas for incoming material to be delivered according to installation schedule and to be placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
  3. Protect stored on-site or installed absorptive materials from moisture damage.
  4. Hazardous wastes shall be separated, stored, and disposed of according to local regulations.
  5. Schedule delivery of materials to minimize the duration of on-site storage.
- C. VOC Control: Schedule installation of materials to minimize contamination of absorptive materials with VOCs, solvents, dust, etc. (For example, install carpet after painting has been completed, since carpet can absorb VOCs released while the paint dries).
  1. All dry furnishings and materials (such as carpet, floor tile, acoustical tile, textiles, office furniture, wood shelving, etc.) shall be allowed to "air-out" or pre-condition prior to installation.
  2. "Bake-out" of furnishings and construction materials is not recommended due to questionable effectiveness and potential for damage.
  3. Reduce exposure to VOCs as follows:
    - a. An enclosed tanker is preferable to an open kettle for roofing.
    - b. Containers of wet products should be kept closed as much as possible.
    - c. Waste materials that can release odor or dust should be covered or sealed.
    - d. Applying a sealer may control a surface that is a persistent odor source.
- D. Inspection: Conduct regular inspection and maintenance of indoor air quality measures including ventilation system protection.
  1. Ductwork and appurtenances should be inspected upon completion of the work for the amount of deposited particulate present and cleaned where needed.



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2. Both highly specialized equipment and professional expertise may be required to ensure that dust is effectively removed and contained.
  3. The sequence in which duct cleaning occurs in the overall construction process needs to be carefully considered to avoid recontamination.
- E. **Modifying Equipment Operation:** Use of equipment may need to be restricted in order to meet IAQ objectives. This could involve substituting cleaner equipment or simply changing operating procedures. Examples of such controls include:
1. Restricting traffic volume or prohibiting idling of motor vehicles where emissions could be drawn into occupied areas.
  2. Switching from diesel to biodiesel or bottled gas for equipment such as generators or fork lifts (emissions are cleaner but still potentially harmful under some circumstances). Use of electric forklifts and other equipment should be considered when feasible, since they do not burn fossil fuels, thus eliminating exposure to combustion gas emissions.
- F. Use low-toxic cleaning supplies for surfaces, equipment and worker's personal use. Options include Green Seal certified, citrus-based or soy-based solvent cleaners. Refer to Green Seal website for a list of approved products at [www.greenseal.org/certproducts.htm](http://www.greenseal.org/certproducts.htm)
- G. **Changing Work Practices:** For some demolition tasks (e.g., paint stripping) there may be techniques available that produce less airborne dust. Some painting techniques release fewer odors. Some cleaning practices raise less dust.
- H. Use wet sanding for gypsum assemblies. Exception: Dry sanding allowed subject to Owner approval of the following measures.
1. Full isolation of space under finishing.
  2. Plastic protection sheeting is installed to provide air sealing during the sanding
  3. Closure of all air system devices and ductwork
  4. Sequencing of construction precludes the possibility of contamination of other spaces with gypsum dust
  5. Worker protection provided
- I. **Local Exhaust:** Pollution sources can be directly exhausted to the outside. This may be done through an exhaust system already available in the building or more often by a portable fan vented to the outside and attached to the work site by flex duct. Depending on the nature of the material and the location of the exhaust, special filtration of the exhaust may or may not be necessary. Any emissions to the outside must be in compliance with applicable regulations and should be directed well away from intakes.
- J. **Air Cleaning:** Where exhaust is not feasible, local re-circulation of air through a portable air cleaner may be effective. The type of filter should be suitable for the material being controlled (e.g., charcoal or potassium permanganate for many odors, a moderate to high efficiency filter for dust).

### **3.3 BUILDING FLUSH-OUT OR IAQ TESTING**

- A. At the option of the Contractor conduct either one of the following:
1. **Building Flush-out:** Conduct a building flush-out after construction ends, and prior to occupancy. Remove all temporary filtration media installed during construction. After the flush-out, replace the MERV 8 filtration media in the HVAC systems with new MERV 8 filtration media.
    - a. After point of substantial completion, but prior to occupancy, conduct a building flush-out, as follows:
      - 1) Install all interior finishes.
      - 2) Complete dust- or chemical- producing activities such as painting, sealing, and sanding prior to initiating flush-out. Punch list items must be complete prior to commencement of flush-out.
      - 3) Install new MERV 8 filtration media. If equipment is not designed to accommodate MERV 8, create temporary fitting.
    - b. Use ONE of the following flush-out methods:
      - 1) Provide a total volume of 14,000 ft<sup>3</sup> of outdoor air per ft<sup>2</sup> of floor area while maintaining an internal temperature of at least 60°F and relative humidity no higher than 60%.

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- 2) The space may only be occupied following delivery of a minimum of 3,500 ft<sup>3</sup> of outdoor air per ft<sup>2</sup> of floor area to the space. Until a total of 14,000 ft<sup>3</sup>/ft<sup>2</sup> has been delivered, provide a minimum of 0.30 cfm/ft<sup>2</sup> of outside air ventilation to the space for three hours prior to each occupancy and 0.30 cfm/ft<sup>2</sup>, or the design minimum of outside air ventilation, whichever is greater, during occupancy, for the duration of the flush-out period.
  - 3) Note: Temporary fans may be used to accomplish this flush-out, as long as the required air quality, temperature and humidity targets are maintained.
- c. Flush-out may be conducted in lieu of IAQ Testing.
2. IAQ Testing: Conduct a baseline indoor air quality testing procedure consistent with United States EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air. After point of substantial completion, but prior to occupancy, conduct IAQ Testing, as follows:
  - a. Randomly select sampling points in each portion of the building that is served by a separate ventilation system, with at least one sampling point for every 25,000 square feet, or for each contiguous floor area, whichever is larger.
  - b. Collect the air samples between 3 feet and 6 feet from the floor, with all samples collected over a minimum 4-hour period.
  - c. From the air samples collected, measure the maximum concentration levels for the chemical contaminants listed below:
    - 1) Carbon Dioxide (CO<sub>2</sub>) 50 parts per billion.
    - 2) Formaldehyde 50 parts per billion.
    - 3) Particulates 150 micrograms per cubic meter.
    - 4) TVOC 500 micrograms per cubic meter.
    - 5) 4-PCH 6.5 micrograms per cubic meter. This test is required only if carpets and fabrics with styrene butadiene rubber (SBR) latex backing material are installed in the building.
  - d. For each building area where the maximum concentration limits are exceeded, conduct a partial building flush-out, and then retest the specific parameter(s) exceeded to demonstrate that the requirements are achieved. Repeat procedure until all requirements have been met. When retesting, test samples should be taken from the same location as the first test.
  - e. Provide a copy of the IAQ testing results indicating that the maximum chemical contaminate concentration requirements are not exceeded.
  - f. Testing may be performed in lieu of the building flush-out.

**END OF SECTION**

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**SECTION 024119 – SELECTIVE DEMOLITION**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Demolition and removal of selected portions of a building.
  - 2. Patching and repairs.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section "Construction Facilities and Temporary Controls" for temporary utilities, construction and support facilities, security and protection facilities, and environmental protection measures for selective demolition operations.

**1.2 MATERIALS OWNERSHIP**

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

**1.3 SUBMITTALS**

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 01 Sections, for information only, unless otherwise indicated.
  - 1. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.
  - 2. Record drawings at Project closeout. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.
- B. Submit certification that temporary shoring, support, and restraining systems have been designed by a structural engineer licensed to practice in the State of the Project.

**1.4 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Obtain and pay for all permits required for the demolition work.
- C. The design of shorings, temporary supports, and restraining systems shall be the responsibility of the Contractor. Such elements shall be designed and stamped by a Structural Engineer licensed to practice in the State of the Project.

**1.5 PROJECT CONDITIONS**

- A. Owner assumes no responsibility for actual condition of buildings to be selectively demolished. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

**1.6 WARRANTY**

- A. Existing Special Warranty: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

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**PART 2 - PRODUCTS**

**2.1 REPAIR MATERIALS**

- A. Use repair materials identical to existing materials. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible. Use materials whose installed performance equals or surpasses that of existing materials.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- B. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Architect.
- C. Survey the condition of the building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.
- D. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

**3.2 UTILITY SERVICES**

- A. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.

**3.3 PREPARATION**

- A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
  - 1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
  - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain and are exposed during selective demolition operations.
- D. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of building to be selectively demolished. Strengthen or add new supports when required during progress of selective demolition.

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**3.4 POLLUTION CONTROLS**

- A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

**3.5 SELECTIVE DEMOLITION**

- A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
  - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition work above each floor or tier before disturbing supporting members on lower levels.
  - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  - 5. Maintain adequate ventilation when using cutting torches.
  - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  - 8. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 9. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
  - 10. Neatly cut steel beams and columns at construction to remain to be plumb, square and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Remove excess plates and welds.
  - 11. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.
  - 12. Break up and remove concrete slabs on grade, unless otherwise shown to remain.
  - 13. Provide shoring as required prior to removal of any structural material.
- B. Provide all necessary new structural members, supports and connections as required. Provide Contractor designed shoring as required prior to installation of any new structure.
- C. Electrical Demolition Requirements:
  - 1. Remove electrical system components as indicated on the electrical drawings. In addition, remove the following items:
    - a. Sound system.
    - b. Security and fire alarm systems.
    - c. Energy Management and control conduit, wiring, and hardware.
    - d. Telephone conduit and cable.
    - e. Point of sales data cables from each register to terminal backboards.

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2. Abandoned underslab conduit shall be cut off below the finished surface line. Patch and fill the opening flush with the finish.
  3. Abandoned electrical conductors shall be removed back to the branch circuit panel, unless indicated otherwise. Abandoned conduit which is exposed and readily accessible shall be removed. Leave abandoned conduit which is concealed in existing construction to remain.
  4. Existing electrical equipment that is not shown on the Drawings shall be brought to the immediate attention of the Architect. Such equipment shall remain unless required to be removed or relocated to accommodate the remodel work.
  5. All existing low voltage cabling disconnected and abandoned shall be fully removed from the project.
  6. Electrical demolition drawings are generally diagrammatic. Complete extent of required electrical demolition which effects completion of work is not shown. In addition to verification of existing site conditions, coordinate with new and existing Architectural, Structural, Mechanical, Fire Protection, Stock Shelving, and Casework Drawings.
  7. All electrical services to equipment which is indicated to be removed shall be fully removed.
  8. Retain removed light fixtures for relocation and reuse as indicated. All light fixtures not to be reused shall be delivered to the Owner.
- D. Plumbing Demolition Requirements:
1. Abandoned underslab piping shall be cut off flush with the floor line and sealed. Patch flush with the floor.
  2. Abandoned piping which is exposed and readily accessible shall be removed.
  3. Leave abandoned piping which is concealed in existing construction to remain.
- E. Removal of Bonded Floor Finishes:
1. Scrape, grind and otherwise remove existing floor finish and bonding materials as necessary to receive new floor finishes.
  2. For removal of resilient floor coverings, comply with RFCI Recommended Practices for Removal of Resilient Floor Coverings.
  3. Prepared surface shall present a uniform flat surface ready to receive the new floor finishes free from irregularities and adhesive residue which would impair installation of subsequent finishes.
  4. New floor finishes shall not be installed over existing floor finish materials unless specified or approved otherwise.

**3.6 DISPOSAL OF DEMOLISHED MATERIALS**

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site. Transport demolished materials off Owner's property and legally dispose of them.
- B. Recycling: Establish program on site for recycling of demolished materials including but not limited to steel, masonry, concrete, glass, aluminum, gypsum board, paper, and asphalt. Maintain recycling bins throughout the length of construction.

**3.7 PATCHING, REPAIRS AND CLEANING**

- A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.
- B. Repair cut edges, replace damaged construction, and fit new work as required to match and mate with existing construction. Make joints smooth, even and invisible.
- C. Sweep the building broom clean on completion of selective demolition operation.

**END OF SECTION**

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**SECTION 033053 – CAST-IN-PLACE CONCRETE (LIMITED APPLICATION)**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Patching existing slabs where damaged by demolition or trenching, slab pour-backs, or other causes.
  - 2. Concrete reinforcement.
  - 3. Underslab vapor retarder.
  - 4. Finishing interior slabs on grade.
- B. Related Sections:
  - 1. 014000 – Quality Control: Owner paid testing and inspections.
  - 2. 033500 – Concrete Finishing.

**1.2 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.

**1.3 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- C. Comply with ACI 301, "Specifications for Structural Concrete," including the following sections, unless modified by requirements in the Contract Documents:
  - 1. "General Requirements."
  - 2. "Concrete Mixtures."
  - 3. "Handling, Placing, and Constructing."
- D. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- E. Concrete work is subject to special testing and inspection as specified in 014000.

**PART 2 - PRODUCTS**

**2.1 REINFORCING**

- A. Reinforcing Steel: ASTM A615, grade 60, unless indicated otherwise on the drawings.
- B. Chairs, Bolsters, Bar Supports, and Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete.

**2.2 CONCRETE MATERIALS**

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I.
- B. Normal-Weight Aggregate: ASTM C 33, graded, 3/8 inch nominal maximum aggregate size. Combined aggregate gradation for slabs and other designated concrete shall be 8% to 18% for large top size aggregates (1 ½ in.) or 8% to 22% for smaller top size aggregates (1 in. or ¾ in.) retained on each sieve below the top size and above the No. 100.
- C. Water: ASTM C 94/C 94M; potable.

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**SECTION 033053 – CAST-IN-PLACE CONCRETE (LIMITED APPLICATION)**

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- D. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.
- E. Epoxy Adhesive: ASTM C 881, Type V, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements.

**2.3 ADMIXTURES**

- A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding 0.05%. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

**2.4 ACCESSORIES**

- A. Bonding Agent: Acrylic type; one of the following, or approved.
  - 1. BASF Corporation "MasterEmaco A660."
  - 2. W.R. Grace "Duraweld C."
  - 3. Euclid Chemical Co. "Flex-con."
- B. Water Curing Materials:
  - 1. Waterproof Sheet Material: Waterproof paper in accordance with ASTM C171; reinforced waterproof kraft paper; white color at exterior applications; Burke Kraft Curing Paper Type I-SK-30, or approved.
  - 2. Mats and Burlap: Fabric covering composed of quilted polyethylene sheeting laminated to outer covering of burlap, cotton, or other approved fabric; outer covering shall weigh not less than 6 ounces per square yard. Approved covering materials:
    - a. Reef Industries Inc. (Houston TX; 713-507-4251) "Transguard 4000."
    - b. McTech Group (Atlanta GA; 866-913-8363) "UltraCure NCF."
- C. Underslab Vapor Retarder: Material to match existing at areas where trenching of existing slab has occurred..

**2.5 CONCRETE MIXTURES**

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
  - 1. Minimum Compressive Strength: 3000 psi at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
- C. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate but not less than a rate of 1.0 lb/cu. yd.

**2.6 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
  - 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
  - 2. For mixer capacity larger than 1 cu. yd, increase mixing time by 15 seconds for each additional 1 cu. yd.
  - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

**2.7 REINFORCEMENT FABRICATION**

- A. Fabricate as indicated and in accordance with ACI 315.



**SECTION 033053 – CAST-IN-PLACE CONCRETE (LIMITED APPLICATION)**

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**PART 3 - EXECUTION**

**3.1 REINFORCEMENT**

- A. Place, support, and secure reinforcement against displacement.
- B. Locate reinforcing splices not indicated on the drawings at points of minimum stress.
- C. Provide laps and concrete cover as indicated in the Drawings.
- D. Reinforcement at Patching of Concrete at Utility Trenches.: Place as indicated on the structural drawings.

**3.2 BEDDING AND BACKFILL FOR UTILITY TRENCHES**

- A. Place a minimum of 6 inches of bedding material in the trench to fully support the utility line
- B. Place fill surrounding the utility line.
- C. Hand tamp fill materials.

**3.3 UNDERSLAB VAPOR RETARDER**

- A. Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 and manufacturer's written instructions under all interior slabs-on-grade.
- B. Lap and seal all seams a minimum of 6 inches, seal around all penetrations, lap and seal against foundation walls and footings with manufacturer's recommended sealing tape or mastic.
- C. A trenching locations in existing floor slabs, lap and seal to existing vapor retarder.

**3.4 CONCRETE PLACEMENT**

- A. Comply with ACI 301 for measuring, batching, mixing, transporting, and placing concrete.
- B. Do not add water to concrete during delivery, at Project site, or during placement.
- C. Placing Concrete At Utility Trenches: Use bonding agent at interface with existing slab edge

**3.5 FINISHING**

- A. General: Comply with ACI 302.1R for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
  - 1. Utility Trenches: Unless indicated otherwise on the Drawings provide the following:
    - a. Finish concrete slabs level and even with existing floor.
    - b. Full trowel finish interior floor slab surfaces, unless specified otherwise or to match existing concrete floor finishes adjacent to utility trench.
    - c. Light steel trowel finish interior floor slab surfaces scheduled to receive tile.

**3.6 CONCRETE PROTECTING AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 305.1 for hot-weather protection during curing.
- B. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

**END OF SECTION**

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**SECTION 033500 – CONCRETE FINISHING**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Concrete finishing as scheduled at the end of this Section.
  - 1. Concrete Grinding and Sealing.
    - a. Grinding of existing concrete slab surfaces.
    - b. Filling and densifying of prepared slab surfaces.
    - c. Filling of control joints.
    - d. Sealing of slab surfaces.
  - 2. Concrete Floor Sealers:
    - a. Single application cure-seal-hardener for new concrete slabs
    - b. Single application sealer-hardener for existing concrete slabs.
- B. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- C. Substitutions: No substitutions allowed.

**1.2 SYSTEM DESCRIPTION**

- A. Full Mechanical Grind Finish:
  - 1. Start with 35 grit metal diamond grit.
  - 2. Grind to level slab, break surface, and expose aggregate.
  - 3. Fill holes in slab.
  - 4. Apply hardener/densifier/sealer.
  - 5. Polyurea treated control joints.

**1.3 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product Data: For each product indicated including product specifications, preparation instructions and recommendations, storage and handling requirements and recommendations, and installation instructions.
- C. Installation Procedures: Hardening/sealing agent manufacturer's recommended installation procedures for specific site conditions.
- D. Certificate: Written certification, signed by manufacturer's representative, stating applicator as trained and qualified to perform work of this Section using manufacturer's products. Include qualification criteria.
- E. Closeout Submittals:
  - 1. Conform to provisions of Section 017700.
  - 2. Maintenance Instructions: Include instructions for maintaining flooring.

**1.4 QUALITY ASSURANCE**

- A. Concrete Grinding and Sealing:
  - 1. Use adequate numbers of 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 the performance of the work of this Section.
  - 2. Use a subcontractor who is certified by the manufacturer of the concrete hardening/sealing agent as an approved applicator and been regularly engaged in similar finishing of concrete slabs for not less than two years immediately prior to this work.
  - 3. Certified Applicator: Contact RetroPlate System (Provo UT; 888-942-3144) for list of certified applicators ([www.retroplatesystem.com](http://www.retroplatesystem.com)).
  - 4. Mock-up:
    - a. At an area of the site approved by the Architect and in an area to be covered by finished flooring, provide one mock-up of concrete slab, approximately 6'-0" wide x 9'-0" long.
    - b. Grind mock-up area of concrete slab as specified.

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- c. Apply mock-up for application of floor finish system specified by this Section.
- d. Maintain approved mock-up as standard for work of this Section.
- e. Locate where designated by Architect. Remove at completion of work of this Section.
- 5. Pre-Installation Conference:
  - a. Conduct conference at project site to comply with requirements in Section 013200 - Project Meetings.
- B. Concrete Floor Sealers:
  - 1. Installer Qualifications: Applicator experienced with installation of product and certified by manufacturer, or applicator experienced with similar products and providing manufacturer's field technician on site to advise on application procedures; and providing adequate number of skilled workers trained and familiar with application requirements.

**1.5 PRODUCT HANDLING**

- A. Comply with pertinent provisions of Section 016000.
- B. Deliver product in factory numbered and sealed drums.
- C. Store products in manufacturer's unopened drums until ready for installation.

**1.6 ENVIRONMENTAL REQUIREMENTS**

- A. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting performance.
- B. Concrete Grinding and Sealing:
  - 1. Concrete shall be cured a minimum of 28 days or as directed by the manufacturer before application can begin.
  - 2. Application shall take place prior to installation of slab-mounted equipment, thus providing a complete, uninhibited concrete slab for application.
- C. Concrete Floor Sealers:
  - 1. No satisfactory procedures are available to remove petroleum or rust stains from concrete. Prevention is therefore essential. Take precautions to prevent staining of concrete prior to application of cure-seal-hardener and for minimum of three months after application:
    - a. Prohibit parking of vehicles on concrete slab.
    - b. If vehicles must be temporarily parked on slab, place drop cloths under vehicles during entire time parked.
    - c. If construction equipment is used for application, diaper all components that might drip oil, hydraulic fluid, or other liquids.
    - d. Prohibit pipe cutting using pipe cutting machinery on concrete slab.
    - e. Prohibit temporary placement and storage of steel members on concrete slab.
  - 2. Do not install products under environmental conditions outside manufacturer's absolute limits.
  - 3. Do not use frozen material; thaw and agitate prior to use.

**1.7 WARRANTY**

- A. Conform to Warranty provisions specified Section 016100.
- B. Contractor: 10 year labor Warranty that floor treatment will remain water-repellant, hardened, abrasion-resistant, and not subject to dusting of concrete surface.

**PART 2 - PRODUCTS**

**2.1 REQUIREMENTS**

- A. Refer to VOC limit tables in Section 018119 for VOC limits for finish products in this section.

**2.2 MATERIALS AND MANUFACTURERS**

- A. Hardening/Sealing/Water Repellant Agents:
  - 1. Hardener/Sealer: L&M Construction Chemicals "Seal Hard".

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- 2. Oil and Water Repellent: L&M Construction Chemicals “Petrotex”.
- B. Diamond Grinding and Polishing Discs: Grinding and polishing discs distributed by Advanced Floor Product, Husqvarna Construction Products, or approved.
- C. Portland Cement-Based, Trowelable Topping: Ardex “Grey SD-M”.
- D. Semi-Rigid Joint Sealant: Polyurea type; Metzger/McGuire, “Spal-Pro RS88”, VersaFlex Inc, “SL 7”, or approved.

**2.3 ACCESSORY MATERIALS**

- A. Water: Potable.

**PART 3 - EXECUTION**

**3.1 SURFACE CONDITIONS**

- A. Examine the areas and conditions under which work of Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Examine substrate, with installer present, for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.
- C. Verify that base slab meet requirements of Environmental Requirements paragraph above.
- D. Prior to application, verify that floor surfaces are free of construction defects.

**3.2 CONCRETE GRINDING AND SEALING**

- A. Application:
  - 1. At locations indicated on the Drawings, scrape and grind existing slab using the following guidelines.
    - a. Grind, fill and seal existing concrete slab as recommended by hardening/sealing agent manufacturer to achieve finish matching approved mock-up. The following sequence of work is general only and may be modified by hardening/sealing agent manufacturer as required to match finish of approved mock-up.
      - 1) Start each floor finish application in presence of manufacturer’s technical representative.
      - 2) Remove the existing flooring using a Panther or Terminator demo equipment.
      - 3) Grind the concrete using 32” planetary grinder (such as Husquvarna 820) and vac system.
      - 4) Grind in successive passes, starting as low as 35 grit and each pass should not exceed double the grit used in previous passes. Final pass shall be done with grit greater than 100, but less than 200. For example, an acceptable progression would be 35 grit, 70 grit, and finally 140 grit. This will require grinding to expose some aggregate. Extend the ground area six inches past the line of the carpet shown per drawings in both directions.
  - 2. Concrete Slab Filling: Once grinding is completed, fill holes with portland cement-based, trowelable topping.
  - 3. Control Joint Filling: Polyurea treated control joints.
  - 4. Hardener/Sealer:
    - a. Apply seal-hardener only to clean bare concrete.
    - b. Saturate surface with cure-seal-hardener; respray or broom excess onto dry spots.
    - c. Keep surface wet with cure-seal-hardener for minimum soak-in period of 30 to 40 minutes.
    - d. If, after the 30 minute soak-in period, most of the material has been absorbed, remove all excess material using broom or squeegee, especially from low spots.
    - e. If, after the 30 minute soak-in period, most of the material remains on the surface, wait until it becomes slippery and then flush entire surface with water removing all residue of cure-seal-hardener and squeegee completely dry, flushing any remaining slippery areas until no residue remains.

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- f. If water is not available, remove residue using squeegee.
- 5. Oil and Water Repellent Sealer: Install at concrete previously treated with hardener/sealer in accordance with the manufacturers written instructions. Refer to schedule at the end of this Section.

**3.3 CONCRETE FLOOR SEALERS**

- A. Preparation:
  - 1. Clean surfaces thoroughly prior to installation.
  - 2. Prepare surfaces using the methods recommended by the manufacturer.
- B. Installation:
  - 1. Install in accordance with manufacturer's instructions.
  - 2. Prevent contact of sealer to adjacent work.
  - 3. New Concrete: Apply cure-seal-hardener to new concrete as soon as the concrete is firm enough to work on after troweling.
    - a. Spray on at rate of 200 square feet per gallon.
    - b. Keep surfaces wet with cure-seal-hardener for minimum soak-in period of 30 minutes, without allowing drying out or becoming slippery. In hot weather slipperiness may appear before the 30 minute time period has elapsed. If that occurs, apply more cure-seal-hardener as required to keep entire surface in a non-slippery state for the first 15 minutes. For the remaining 15 minutes, mist the surface as needed with water to keep the material in a non-slippery state.
    - c. After this period, when treated surface becomes slippery lightly mist with water until slipperiness disappears.
    - d. Wait for surface to become slippery again and then flush entire surface with water removing all residue of cure-seal-hardener.
    - e. Squeegee surface completely dry, flushing any remaining slippery areas until no residue remains.
    - f. Wet vacuum or scrubbing machines may be used to remove residue, provided manufacturer's instructions are followed.
  - 4. Existing Concrete: Apply cure-seal-hardener only to clean bare concrete.
    - a. Thoroughly remove previous treatments, laitance, oil, and other contaminants.
    - b. Saturate surface with cure-seal-hardener; respray or broom excess onto dry spots.
    - c. Keep surface wet with cure-seal-hardener for minimum soak-in period of 30 to 40 minutes.
    - d. If, after the 30 minute soak-in period, most of the material has been absorbed, remove all excess material using broom or squeegee, especially from low spots.
    - e. If, after the 30 minute soak-in period, most of the material remains on the surface, wait until it becomes slippery and then flush entire surface with water removing all residue of cure-seal-hardener and squeegee completely dry, flushing any remaining slippery areas until no residue remains.
    - f. If water is not available, remove residue using squeegee.

**3.4 CLEANING UP**

- A. Promptly upon completion of application in each area, clean up all rebound and debris resulting from operations and remove from site.

**3.5 PROTECTION**

- A. General:
  - 1. Close areas to traffic during Work of this section and after application, for time period recommended in writing by manufacturer.
  - 2. The completed slab shall be covered as recommended by manufacturer to prevent damage by the other trades during store completion.
- B. Special Procedures:
  - 1. All hydraulic powered equipment shall be diapered to avoid staining of the concrete.
  - 2. Allow no trade to park vehicles on the inside slab. If necessary, to complete their scope of work, drop cloths shall be placed under vehicles at all times.

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3. Allow no pipe cutting machine to be used on the inside floor slab during Work of this section.
4. Allow no steel to be placed on interior slab during Work of this section to avoid rust staining.
5. All equipment must be equipped with non-marking tires during Work of this section.
6. Do not drag or drop equipment or material across the slab which will scratch or chip it.

**3.6 SCHEDULE**

1. Provide the following concrete finishes at locations indicated on the drawings:
  - a. **C-1:** Grind and apply hardener/sealer to existing concrete slab.
  - b. **C-2:** Apply hardener/sealer to existing or new concrete slabs (no grinding).
  - c. **C-3:** Grind and apply hardener/sealer to existing concrete slab, followed by application of oil and water repellent.
  - d. **C-4:** Apply oil and water repellent to existing concrete slabs previously treated with hardener/sealer.

**END OF SECTION**

**SECTION 035416 – HYDRAULIC CEMENT UNDERLAYMENT**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Cementitious underlayments as necessary for leveling of new or existing concrete floor substrates, as necessary to meet specified tolerances.
  - 2. Cementitious toppings as necessary for leveling new or existing slabs at locations indicated to receive concrete sealer only.
  - 3. Ramps and tapers as necessary to correct levels between dissimilar finishes.
- B. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- C. Substitutions: Proposals for alternate products and methods for applications indicated may be considered by the Architect, subject to requirements of Section 016000, system performance requirements, and applicable requirements of this Section.

**1.2 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Manufacturer's product data and installation instructions.

**1.3 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials in their original unopened packages and protect from freezing, direct sun exposure, and exposure to moisture.

**1.4 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain surface and ambient temperature of between 50 and 80 degrees F for 24 hours before, during, and 24 hours after underlayment installation.
- B. Keep traffic out of area in which underlayment is being applied or cured.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Self Leveling Underlayment System: Self-leveling, pourable, cement based material, minimum 28 day compressive strength 2,000 psi; minimum bond strength 200 psi; one of the following.
  - 1. Mapei Corporation "Ultraplan 1 Plus".
  - 2. CTS Cement Manufacturing Corp. Rapid Set "LevelFlor" self-leveling underlayment.
  - 3. Ardex Inc. "K-15" Self-Leveling Underlayment Concrete.
  - 4. ProSpec "Level Set 300."
  - 5. Laticrete International, Inc. "Laticrete 86 LatiLevel Thin Pour Underlayment."
- B. Trowelable Underlayment System: One of the following.
  - 1. Mapei Corporation "Mapecem 100".
  - 2. Ardex Inc. "SD-P" Fast-Setting Underlayment.
  - 3. Ardex Inc. "SD-F Feather Finish" self-drying, cement-based finishing underlayment
  - 4. CTS Cement Manufacturing Corp. Rapid Set "Skim Coat" patch, skim coat, and underlayment.
  - 5. Laticrete International, Inc. "Laticrete 220 Medium Bed Mortar mixed with "Laticrete 3701 Latex Mortar Admix."
  - 6. Euclid Chemical "Tamms Thin Patch."
- C. Interior Traffic Bearing Topping System: Self-Leveling; minimum 28 day compressive strength 6,000 psi; one of the following.
  - 1. Ardex Inc. "SD-T" Self-Leveling Self-Drying Concrete Topping."
  - 2. Dayton Superior "Level Topping."
  - 3. ProSpec "Level Set Wear Topping."

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**SECTION 035416 – HYDRAULIC CEMENT UNDERLAYMENT**

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- D. Interior Traffic Bearing Topping System: Trowelable; minimum 28 day compressive strength 5,000 psi.
  - 1. Ardex Inc. "SD-M" Trowelable, Self-Drying, cement based, Concrete Topping"; Grey color.
- E. Accessories: Furnish primers, patching compounds, and sand fillers as recommended by the underlayment manufacturer for the conditions of the project.

**2.2 MIXING**

- A. Thoroughly mix underlayment materials for each type of product in proper proportions to achieve smooth homogeneous mix, free of lumps.

**PART 3 - EXECUTION**

**3.1 GENERAL**

- A. With the exception of areas where leveling can be accomplished by use of latex underlayment, as specified in other sections, install cementitious underlayment to concrete slabs as indicated on the Drawings, and as necessary to level slabs or bring substrates to proper elevation.

**3.2 PREPARATION**

- A. Inspect floor to verify that demolition is complete to the point where work may progress.
- B. Survey floor as necessary to set screeds and reference points. Identify construction joints, and control joints. Prepare for underlayment at all locations where floor does not meet specified tolerance requirements.
- C. Ensure that subfloor is clean, dry, hard, sound, and free of oils, or other substance which would affect proper bonding and curing. Verify that all areas to be leveled are at or below final design elevation.
- E. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of conditions and responsibility for defective installation caused by prior observable conditions.

**3.3 APPLICATION**

- A. Install trowelable underlayment at locations where slopes are indicated and at other locations as appropriate to installation conditions; install self-leveling underlayment at other locations as necessary to correct slab flatness and levelness.
- B. Set screeds, markers, and reference blocks. Set screeds at all construction and control joints to establish weakened plane joints in underlayment.
- C. Install patching compounds in accordance with the manufacturer's recommendations. Where subsequent finishing of the material is required, float to level surface. Do not trowel.
- D. Apply primer to all areas to receive underlayment; repeat application if necessary to achieve proper build.
- E. Mix materials and pour or pump and squeegee into place to achieve appropriate thickness. Finish to a smooth level surface within tolerances specified for concrete floors.
- G. Cure in accordance with the manufacturer's instructions.
- H. Tolerances:
  - 1. Slabs on Grade: 1/8 inch in 10 feet, or as required by finish flooring manufacturer.

**3.4 CLEANING**

- A. As work proceeds, clean up excess materials, rubbish, and splash.

**END OF SECTION**



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**SECTION 040100 – MAINTENANCE OF MASONRY**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Cleaning of existing masonry surfaces.
  - 2. Repointing mortar joints.
- B. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to all work of this Section.
- C. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 REFERENCES**

- A. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)):
  - 1. C270 - Mortar for Unit Masonry.
  - 2. E2260 - Standard Guide for Repointing (Tuckpointing) Historic Masonry

**1.3 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Submit product literature for each cleaning product proposed for use.

**1.4 QUALITY CONTROL**

- A. Mock-ups:
  - 1. In accordance with Section 014500.
  - 2. Clean and repoint a minimum 2 x 2 foot area of wall in a location as directed by the Architect. Clean and repoint additional 2 x 2 foot areas until mock-up is approved.
  - 3. Adjust solution strength and cleaning procedures as required to obtain the most effective cleaning with the specified cleaner.
- B. Preliminary Testing for Cleaning Agents: Unless testing has been performed prior to bid, submit to the masonry cleaning materials manufacturer samples of masonry units from stock of those to be used in the work.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. In accordance with Section 016000.

**1.6 ENVIRONMENTAL REQUIREMENTS**

- A. Do not repoint, or clean masonry surfaces when temperature may drop below 40 degrees F within 24 hours.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Masonry Cleaner: Prosoco "Sure Klean" Heavy Duty Restoration Cleaner, Fabrikleen "Type S", or approved.
- B. Mortar: ASTM C270, Type N; color to match existing; commercially prepared type.

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**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Prior to starting work carefully inspect the preparatory work of other sections and verify that such work is acceptable for the work of this section. Report unacceptable conditions to the Architect in writing. Do not begin work in areas of unacceptable conditions until the conditions have been resolved.
- B. Starting work under this section constitutes contractor acceptance of existing conditions and responsibility for unacceptable work caused by prior foreseeable conditions.

**3.2 PREPARATION**

- A. Carefully remove and store fixtures, fittings, finishing hardware, and other removable accessories.
- B. Cover and protect glass, aluminum, painted surfaces, plants and shrubs, doorways, trim, roof membranes and flashings, prefinished metal panels, and other surfaces not to be cleaned.
- C. Build up dams to divert flowing water to a safe disposal location.

**3.3 CLEANING EXISTING MASONRY**

- A. Clean masonry in strict accordance with the cleaner manufacturer's recommendations and in accordance with procedures approved in the mock-up.
- B. Immediately remove stains, efflorescence, overspray or spillage resulting from the work of this Section.
- C. Rinse in accordance with the cleaner manufacturer's recommendations.

**3.4 TUCK POINTING**

- A. Cut out loose or disintegrated mortar in joints to a 1/2 inch depth.
- B. Do not damage masonry units.
- C. When removal of mortar is complete remove dust and loose material by brushing.
- D. Apply mortar packed tightly in thin layers, leaving a compact joint to match existing.

**3.5 CLEAN UP**

- A. Promptly as work proceeds and upon completion, remove excess mortar, smears, droppings.
- B. Clean adjacent and adjoining surface of marks arising from performance of work of this Section.

**END OF SECTION**

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**SECTION 055000 – METAL FABRICATIONS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Miscellaneous framing and supports for the following:
    - a. Partition braces.
    - b. Applications where framing and supports are not specified in other sections.
  - 2. Miscellaneous steel trim.
  - 3. Channel support systems.

**1.2 SUBMITTALS**

- A. Submit the following according to the Conditions of the Contract and Division 01 Sections:
  - 1. Shop Drawings:
    - a. Detailing fabrication and erection of each metal fabrication indicated. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
  - 2. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
  - 3. Product Data: Provide product literature for manufactured components and systems.

**1.3 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code - Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel." Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

**PART 2 - PRODUCTS**

**2.1 FERROUS METALS**

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness. Do not paint or prime unless specifically directed for any interior steel exposed to view.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Steel Tubing: Cold-Formed: ASTM A 500. Hot-Formed: ASTM A 501.
- D. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

**2.2 PAINT**

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- B. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.
- C. Metal fabrications and angles exposed to public view are to be unpainted and unprimed.

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**2.3 FASTENERS**

- A. General: All interior items shall be uncoated and unprimed unless noted otherwise. Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A, with hex nuts, ASTM A 563, and, where indicated, flat washers.
- C. Machine Screws: ANSI B18.6.3.
- D. Lag Bolts: ANSI B18.2.1.
- E. Wood Screws: Flat head, carbon steel, ANSI B18.6.1.
- F. Plain Washers: Round, carbon steel, ANSI B18.22.1.
- G. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.
- H. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency. Group 1 alloy 304 or 316 stainless-steel bolts and nuts complying with ASTM F 593 and ASTM F 594.
- I. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.
- J. Threaded Rod: Regular un-plated threaded Rod, ASTM A 307, Grade A, with hex nuts, ASTM A 563, and, where indicated, flat washers.
- K. Carriage Bolts: ANSI B18.5

**2.4 GROUT**

- A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

**2.5 MANUFACTURED COMPONENTS**

- A. Channel Support Systems:
  - 1. Manufacturer:
    - a. Basis of Design: Unistrut Corporation (Wayne, MI; 313-721-4040).
    - b. Acceptable options from the following manufacturer (subject to compliance with Contract Document requirements and Architect's approval of conformance to design intent) will be considered:
      - 1) Cooper B-Line, Inc. (Highland, IL; 800- 851-7415[Mississauga, ON; 800-569-3660]).
      - 2) PHD manufacturing (Columbiana, Ohio; 800-321-2736).
  - 2. Steel Channels:
    - a. Basis of Design Product: Unistrut "P1001" double channel.
    - b. Configuration:
      - 1) Section shall be 'C' type.
      - 2) Width: 1 5/8 inches.
      - 3) Continuous slot width: 7/8 inch.
      - 4) Lips shall be in-turned.
      - 5) Minimum thickness: 3/32 inch.
    - c. Strut channel lengths and depths as required for configurations as indicated.
    - d. Provide non-perforated, non-punched channels. Penetrations through channels will be allowed where necessary for connections.
  - 3. Accessories: Furnish bolts, angles, brackets, rods, clamps, turnbuckles, and other accessories as necessary for rigid connections to meet the design loads specified.
  - 4. Factory Finish: Pre-galvanized; Unistrut finish "PG".

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**2.6 FABRICATION, GENERAL**

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Shear and punch metals cleanly and accurately. Remove burrs. Remove sharp or rough areas on exposed traffic surfaces.
- B. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss. Temperature Change (Range): 100 deg F.
- C. Ease exposed edges to a radius of approximately 1/32", unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- G. 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. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

**2.7 MISCELLANEOUS FRAMING AND SUPPORTS**

- A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive lightgauge metal framing, hardware, hangers, and similar items.
- C. Galvanize miscellaneous framing and supports at exterior locations and interior locations where indicated.

**2.8 MISCELLANEOUS STEEL TRIM**

- A. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
- B. Provide cutouts, fittings, and anchorages as required to coordinate assembly and installation with other work.

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**2.9 FINISHES**

- A. General:
  - 1. All interior items shall be uncoated, unprimed steel, including fasteners, unless noted to be galvanized or painted. For interior items noted to receive sealer, provide clear coating in accordance with Section 099000.
  - 2. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designing finishes.
  - 3. Finish metal fabrications after assembly.
- B. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process. ASTM A 153 for galvanizing iron and steel hardware. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299" thick or thicker.
- C. Preparation for Shop Priming: For those items indicated to be painted, prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
  - 1. Interiors (SSPC Zone 1A): SSPC-SP 3 "Power Tool Cleaning."
  - 2. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1 for shop painting.
- D. Exposed Interior Unfinished Items: Prepare ferrous metal surfaces using SSPC-SP-2 Hand Tool Cleaning.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages.

**3.2 INSTALLATION, GENERAL**

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- E. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.

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**SECTION 055000 – METAL FABRICATIONS**

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**3.3 CHANNEL SUPPORT SYSTEMS**

- A. Provide manufacturer's standard components; size to suit conditions.
- B. Include steel connecting hardware, bolts, nuts, lock washers, and additional components as necessary to securely attach to structure.

**3.4 ADJUSTING AND CLEANING**

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Section 099000 Painting.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing with zinc-based solder in accordance with ASTM A 780.

**END OF SECTION**

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**SECTION 055133 - PREFABRICATED LADDER**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Prefabricated ladder assembly.
- B. Related Section:
  - 1. 077233 – Roof hatches: roof access hatch and safety post.
- C. Drawings, the provisions of the Agreement, including bonds and certificates, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Shop Drawings. Indicate component details, materials, finishes, connection and joining methods, and the relationship to adjoining work.
- C. Product Data.

**1.3 QUALITY ASSURANCE**

- A. Ladder shall conform to all applicable code and safety requirements. Provide all calculations, engineering services, and other documentation required by the code authorities to obtain approval for the ladder assembly.

**PART 2 - PRODUCTS**

**2.1 LADDER ASSEMBLY**

- A. Manufacturer:
  - 1. Basis of Design: O'Keeffe's Inc. (San Francisco, CA; 888-653 3333; ).
  - 2. Acceptable Options (subject to compliance with Contract Document requirements and Architect's approval of conformance to design intent.):
    - a. Alaco Ladder Company (Chino, CA; 909-591-7561).
    - b. ACL Industries Inc. (Manchester, NH; 603-668-1281).
    - c. Precision Ladders LLC (Morristown, TN; 423-586-2265).
- B. Roof Hatch Access Ladder: Model. 531 "Heavy Duty Tubular Rail Aluminum Cage Ladder"; mill finish aluminum; safety cage; safety post; "Alternate Bottom Support"; mill finish
- C. Components
  - 1. Rungs: Aluminum; 1-1/4" square or 1-1/8" round tube; non-slip finish; able to resist 1000 lb point loading without failure.
  - 2. Side Rails: Aluminum; minimum 1/8 inch thick.
  - 3. Safety Hoops: Aluminum; 2" x minimum 3/16 thick.
  - 4. Ladder Fasteners: Stainless steel.
  - 5. Mounting Anchors: Minimum 1/2" diameter; type as appropriate to the installation; galvanized or stainless steel; low profile to prevent tripping, injury or other hazard; free of sharp edges.
- D. Fabrication
  - 1. Fabricate ladder assemblies to fit the conditions indicated. Surfaces shall be clean , smooth, and free of burrs.
  - 2. Structural joints shall be full penetration inert-gas heliarc welded.
  - 3. Fabricate assemblies with brackets and other components as necessary for mounting to adjacent construction.



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**SECTION 055133 - PREFABRICATED LADDER**

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**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

**3.2 INSTALLATION**

- A. Install in accordance with shop drawings and manufacturer's instructions.
- B. Erect roof hatch access ladder square and level, free from distortion or defects detrimental to performance.

**END OF SECTION**

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**SECTION 061000 – ROUGH CARPENTRY**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Sheathing.
  - 2. Wood furring, grounds, nailers, and blocking including blocking for items furnished by Owner but installed by Contractor.
  - 3. Display wall frames.
  - 4. Wall underlayment plywood.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. 062000 - Finish Carpentry: For nonstructural carpentry items exposed to view and not specified in this Section.

**1.2 SUBMITTALS**

- A. Submit the following in accordance with Conditions of Contract and Division 01 Sections:
  - 1. Product data for engineered wood products, metal framing anchors, power driven fasteners, construction adhesives, and preservative treatments.
  - 2. For each type of preservative treated wood product, include certification stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards. Include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site. Include Warranty of chemical treatment manufacturer for each type of treatment.

**PART 2 - PRODUCTS**

**2.1 REQUIREMENTS**

- A. Composite wood products used on the interior of the building must not contain any added urea-formaldehyde.
- B. Adhesives used for wood substrate within the vapor barrier shall have maximum VOC content of 30 grams per liter.
- C. Adhesives used for wood subfloors within the vapor barrier shall have maximum VOC content of 100 grams per liter.

**2.2 LUMBER, GENERAL**

- A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- B. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece; or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.
- C. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use. Provide dressed lumber, S4S, unless otherwise indicated. Provide lumber with 15% maximum moisture content at time of dressing and shipment for sizes 2" or less in nominal thickness, unless otherwise indicated.
- D. Refer to VOC limit tables in Section 018119 for VOC limits for adhesive and sealant products in this section.

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**2.3 MISCELLANEOUS LUMBER**

- A. Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members. "Standard" grade light-framing-size lumber of any species or board-size lumber as required. "No. 3 Common" or "Standard" grade boards per WCLIB or WWPB rules or "No. 2 Boards" per SPIB rules.

**2.4 CONSTRUCTION PANELS**

- A. General Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS 1 provisions, with APA PRP-108.
- B. Interior Concealed Wall Sheathing: Backing Panels for office equipment within walls, plywood panels, APA C-D PLUGGED EXPOSURE 1, in thickness not less than 17/32.
- C. Interior Exposed Wall Sheathing: Wall panels at stock areas, plywood panels, APA C-D PLUGGED EXPOSURE 1, in thickness not less than 15/32.
- D. Display Wall Sub-Frame Panels: Plywood panels, APA A-C Shop grade PLUGGED EXPOSURE 1, in thickness not less than 23/32". See finish carpentry for construction details.
- E. Backing Panels: For mounting electrical or telephone equipment, fire-retardant-treated plywood panels, APA C-D PLUGGED EXPOSURE 1, in thickness not less than 17/32".
- F. Wall and Roof Sheathing:
  - 1. APA Rated Sheathing; CD grade; Exterior; plywood, unless approved otherwise; thicknesses as indicated; fire-retardant-treated where indicated.

**2.5 MISCELLANEOUS MATERIALS**

- A. Fasteners: Where rough carpentry is exposed to weather, or in ground contact, provide a hot-dip zinc coating per ASTM A 153. At interior spaces, provide unfinished steel.
  - 1. Nails, Wire, Brads, and Staples: FS FF-N-105.
  - 2. Power Driven Fasteners: National Evaluation Report NER-272.
  - 3. Wood Screws: ANSI B18.6.1.
  - 4. Lag Bolts: ANSI B18.2.1.
  - 5. Steel Bolts: ASTM A 307, Grade A; with ASTM A 563 hex nuts and flat washers.
- B. Metal Framing Anchors: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified. Provide products for which manufacturer publishes allowable design loads that are demonstrated by comprehensive testing.
  - 1. Galvanized Steel Sheet: Steel sheet zinc-coated by hot-dip process on continuous lines prior to fabrication to comply with ASTM A 525 for Coating Designation G60 and with ASTM A 446, Grade A (structural quality); ASTM A 526 (commercial quality); or ASTM A 527 (lock-forming quality); as standard with manufacturer for type of anchor indicated.
- C. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturer.

**2.6 PRESERVATIVE WOOD TREATMENT BY PRESSURE PROCESS**

- A. General: Where lumber or plywood is indicated as preservative-treated wood or is specified herein to be treated, comply with applicable requirements of AWPB Standards C2 (Lumber) and C9 (Plywood). Mark each treated item with the AWPB or SPIB Quality Mark Requirements.
- B. Pressure-treat concealed above-ground items with water-borne preservatives to a minimum retention of 0.25 pcf. Incise and treat members using ACQ-Type B material (without arsenic or chromium). After treatment, kiln-dry lumber and plywood to a maximum moisture content of 15%. Treat indicated items 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.

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2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
- C. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces to comply with AWP A M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

**2.7 FIRE RETARDANT TREATMENT BY SURFACE APPLICATION**

- A. Fire Retardant Treatment:
  1. Fire retardant treat all interior concealed lumber and plywood, and other wood as indicated or specified.
  2. Provide exterior fireproofing at rooftop blocking, nailers, curbs, sheathing, and other locations subject to wetting during construction operations.
  3. All fire retardant treated wood materials shall bear a UL "FR-S" label, or a label from an approved inspection agency certifying the materials meet requirements of AWP A Standards-for lumber and plywood.
  4. Treated lumber shall be kiln dried to a maximum moisture content of 19%; treated plywood shall be kiln dried to a maximum moisture content of 15%.
  5. Approved Products:
    - a. Interior Concealed Fireproofing: Clear finish product; one of the following:
      - 1) Hickson Corporation "Dricon" <http://www.dricon.com/guide.htm>,
      - 2) Hoover Treated Wood Products "Pyro-guard."
      - 3) Kopper Performance Chemicals, "FirePRO."
      - 4) Shield Industries Inc. (Woodstock, GA; 800-332-6327, 770-517-6869) "FireGuard XL95."
    - b. Interior Exposed Fireproofing: For interior locations where plywood or lumber will be left exposed, use fire-retardant chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation:
      - 1) No reduction takes place in bending strength, stiffness, and fastener holding capacities below values published by manufacturer of chemical formulation that are based on tests by a qualified independent testing laboratory of treated wood products identical to those indicated for this Project under elevated temperature and humidity conditions simulating installed conditions.
      - 2) No other form of degradation occurs due to acid hydrolysis or other causes related to manufacture and treatment.
      - 3) No corrosion of metal fasteners results from their contact with treated wood.
      - 4) Performance Requirements: Flame spread 25, Smoke Developed 25, per UL 723.
      - 5) Acceptable Products: Flame-Stop-II, Ph: (877-397-7867) or [www.flamestop.com](http://www.flamestop.com).
    - c. Exterior Fireproofing: Hoover Treated Wood Products "Exterior Fire-X."

**PART 3 - EXECUTION**

**3.1 INSTALLATION, GENERAL**

- A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.
- E. Countersink nail heads on exposed carpentry work and fill holes.

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- F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

**END OF SECTION**

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**SECTION 062000 – FINISH CARPENTRY**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Interior standing and running trim.
  - 2. Paneling.
  - 3. Miscellaneous materials.

**1.2 RELATED SECTIONS**

- A. The following Sections contain requirements that relate to this Section:
  - 1. Division 06 Section "Rough Carpentry" for furring, blocking, shims, and hanging strips for installing finish carpentry.
  - 2. Division 06 Section "Interior Architectural Woodwork" for interior casework.
  - 3. Division 09 Section "Painting" for back priming and finishing of finish carpentry.

**1.3 SUBMITTALS**

- A. Submit the following according to Conditions of Contract and Division 01 Sections:
- B. Product Data:
  - 1. Product data including specifications and installation instructions.
- C. Shop Drawings:
  - 1. Comply with AWS Section 1.
  - 2. Interior Trim: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.
- D. Samples - Transparent Finishes:
  - 1. Submit samples of each wood species and transparent finish combination. Submit minimum 4 x 12 inch size for solid stock samples.
  - 2. Where color and graining variations will be significant, submit samples in sets illustrating the full range of these variations.

**1.4 PROJECT CONDITIONS**

- A. Environmental Conditions: Obtain and comply with finish carpentry manufacturer's and installer's coordinated advice for optimum temperature and humidity conditions for finish carpentry during its storage and installation.

**PART 2 - PRODUCTS**

**2.1 REQUIREMENTS**

- A. Composite wood products used on the interior of the building must not contain any added urea-formaldehyde.
- B. Refer to VOC limit tables in Section 018119 for VOC limits for finish, adhesive and sealant products in this section.

**2.2 MATERIALS, GENERAL**

- A. Lumber Standards: Comply with PS 20 "American Softwood Lumber Standard" for lumber and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee Board of Review.
- B. Plywood Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood and, for products not manufactured under PS 1, with APA PRP-108. Formaldehyde emission levels comply with HPMA FE.

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- C. Inspection Agencies: Inspection agencies referenced include the following:
  - 1. WCLIB - West Coast Lumber Inspection Bureau.
  - 2. WWPA - Western Wood Products Association.
- D. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements. No visible grade stamps are allowed on exposed lumber or paneling.

**2.3 INTERIOR TRIM**

- A. Wood - Transparent Finish: Provide finished lumber complying with the following:
  - 1. Species: Douglas Fir.
  - 2. Finish Grade: C & BTR FG.
  - 3. Texture: Surfaced (smooth), S4S, unless noted otherwise.
  - 4. Finish: Matte, water-based polyurethane.
- B. WB-1:
  - 1. Plywood Base; 1/2" Grade A-C Douglas Fir plywood, rotary cut, plugged and sanded.
  - 2. Finish: Matte, water-based polyurethane.

**2.4 PANELING**

- A. SP-1: Cementitious Backer Board:
  - 1. USG "Durock Brand Cement Board 1/4 inch Underlayment", 3'x5' sheets, 1/4 inch thick.
- B. WP-1: Pre-finished Masonite Hardboard:
  - 1. Type: ANSI/AHA 135.4 Class 2 tempered pressed wood fiber board, 4'x8' sheets, 1/4 inch thick; surfaced one side; UL listed flame spread index <200.
- C. WP-3: Not Used.
- D. WP-4: Not Used.
- E. WP-5: Pegboard Paneling:
  - 1. Type: ANSI/AHA 135.4 Class 2, UL listed flame spread index <200; 1/4 inch thick tempered pressed wood fiber board, 4'x8' sheets; white vinyl faced surface one side.
  - 2. Provide 9/32-inch diameter holes at 1-inch centers.
- F. WP-6: Tackboard. PINnacle by Homasote. Class A finish.
- G. WP-7:
  - 1. Plywood Paneling; 1/2" Grade A-C Douglas Fir plywood, rotary cut, plugged and sanded.
  - 2. Finish: Matte, water-based polyurethane.
- H. WP-8: Not Used.
- I. WP-9:
  - 1. Sound Fiber Board Paneling; Homasote "Sound Board, No Coating", 1/2" x 4' x 8' Class C fire rated.
  - 2. Provide holes at 12-inch centers along perimeter of boards.

**2.5 LAMINATE METAL PANEL**

- A. MTL-1: Chemetal 300 SERIES PANEL W/ phenolic backer.
  - 1. Color: Alu Medium #353; Thickness: .050
  - 2. Reference the manufacturer's brochure for installation standards.

**2.6 ENGINEERED WOOD PRODUCTS**

- A. Laminated Veneer Lumber: A composite of graded veneers bonded with exterior grade adhesives. Grade 2.0E. Architectural Finish Grade lumber suitable for clear stain. Refer to drawings for lumber sizes.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. LP Building Products.

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2. Georgia-Pacific.

**2.7 MISCELLANEOUS MATERIALS**

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
  1. Countersink nails, fill surface flush, and sand where face nailing is unavoidable.
  2. Where finish carpentry materials are exposed in areas of high humidity, provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A 153.
  3. See drawings for special fastening details.
- B. Adhesives:
  1. Comply with panel and adhesive manufacturer's recommendations for application of wood panels to substrates as noted on drawings.
  2. Construction Adhesive: Liquid Nails "Panel and Foam" or "Wood Projects Construction Adhesive". Confirm suitability of adhesive type with panel manufacturer.
- C. Finish Washers: Flanged finish washers, size as appropriate to screw size.

**2.8 FABRICATION**

- A. Wood Moisture Content: Comply with requirements of specified inspection agencies and manufacturer's recommendations for moisture content of finish carpentry in relation to relative humidity conditions existing during time of fabrication and in installation areas. Provide finish carpentry with moisture content that is compatible with Project requirements.
- B. Fabricate finish carpentry to dimensions, profiles and details indicated. Ease edges to radius:
  1. Lumber less than 1 inch in nominal thickness: 1/16 inch.
  2. Lumber 1 inch or more in nominal thickness: 1/8 inch.
- C. Standing and Running Trim:
  1. Wall Base: Solid lumber; kerfed on back side to minimum depth of 3/8 inch.
  2. Miscellaneous Trim: Solid Limber.
- D. Miscellaneous trim must receive light machine sanding prior to finish application.
- E. Panels typically provided in full-size 4' x 8' sheets, sanded where required. Fabricate and cut panels using tools appropriate to the material. Sand panels after cutting and/or installation as required.

**2.9 SHOP-APPLIED FINISHES**

- A. Sand exposed and semi-exposed wood surfaces smooth, always sanding in the direction of the wood grain.
- B. Sand exposed transparent finish wood surfaces to AWS Premium grade standards. Sand all semi-exposed transparent finish wood surfaces to AWS Custom grade standards.
- C. Fill depressions and imperfections with color matched putty, except imperfections shall not exceed AWS Premium grade standards.
- D. Transparent and opaque finish coatings for interior wood trim, and wall panels shall be shop-finished as a part of the work of Section 099000.

**PART 3 - EXECUTION**

**3.1 EXAMINATION AND PREPARATION**

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting installation and performance of finish carpentry. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Clean substrates of projections and substances detrimental to application.



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- C. Condition finish carpentry to average prevailing humidity conditions in installation areas before installation for a minimum of 24 hours unless longer conditioning recommended by manufacturer.

**3.2 INSTALLATION, GENERAL**

- A. Do not use finish carpentry materials that are unsound, warped, bowed, twisted, improperly treated or finished, not adequately seasoned, or too small to fabricate with proper jointing arrangements. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install finish carpentry plumb, level, true, and aligned with adjacent materials. Use concealed shims where required for alignment.
  - 1. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
  - 2. Install to tolerance of 1/8 inch in 8 feet for plumb and level. Install adjoining finish carpentry with 1/16 inch maximum offset for flush installation and 1/8 inch maximum offset for reveal installation.
  - 3. Coordinate finish carpentry with materials and systems that may be in or adjacent to standing and running trim and rails. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of trim and rails.
- C. Refer to Division 09 Sections for final finishing of finish carpentry.

**3.3 STANDING AND RUNNING TRIM**

- A. Install standing and running wood trim straight, true, level, plumb, square, and firmly anchored in place in accordance with good trade practice, approved Shop Drawings.
- B. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Stagger joints in adjacent and related standing and running trim and rails. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane back of casings to provide uniform thickness across joints if required.
  - 1. Match color and grain pattern across joints.
  - 2. Install trim after drywall joint finishing operations are completed.
  - 3. Drill pilot holes prior to nailing or fastening where required to prevent splitting. Fasten to prevent movement or warping. Countersink nail heads on exposed carpentry work and fill holes.
- C. Select wood for transparent finish to match approved samples, and select for uniformity of appearance, grain, and color match between adjacent pieces.
- D. Site Finishing:
  - 1. Set all exposed fasteners.
  - 2. Apply matching wood filler to exposed fastener indentations. and other minor imperfections.
  - 3. Retouch as necessary items which have been shop finished to conceal all damage and blemishes. Replace with new complying items those which cannot be successfully repaired.

**3.4 PANELS**

- A. Install panels using methods and fasteners recommended by the manufacturer or as indicated on the Drawings.
- B. Slot type display panels to be provided with inserts.
- C. SP-1 Cement Board Panel Installation:
  - 1. Provide 3/4 inch thick fire treated substrate.
  - 2. Install in a stack bond pattern; rear side exposed (no printing on exposed face).
  - 3. Install with exposed fasteners.
- D. WP-9 Sound Fiber Board Panel Installation:
  - 1. Install in a vertical stack bond pattern.
  - 2. Install with exposed screw fasteners in flanged finish washers.
  - 3. Use construction adhesive on back during installation.

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**3.5 ADJUSTING AND CLEANING**

- A. Repair damaged or defective finish carpentry where possible to eliminate functional or visual defects. Where not possible to repair, replace finish carpentry. Adjust joinery for uniform appearance.
- B. Clean finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

**3.6 PROTECTION**

- A. Provide final protection and maintain conditions that ensure finish carpentry is without damage or deterioration at time of Substantial Completion.

**END OF SECTION**

**SECTION 064000 – INTERIOR ARCHITECTURAL WOODWORK**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes:
  - 1. Plastic-laminate cabinets.
  - 2. Plastic-laminate-faced countertops.
  - 3. Plastic laminate shelving.
  - 4. Melamine shelving.
  - 5. Solid-surface-material countertops.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 06 Section "Rough Carpentry" for furring, blocking, shims, and hanging strips for installing interior woodwork.
  - 2. Division 06 Section "Finish Carpentry" for interior carpentry exposed to view that is not specified in this Section.
  - 3. Division 09 Section "Gypsum Board Assemblies" for metal backing inside finished walls or above finished ceilings
- C. Laminate, decorative and solid surface colors, patterns, and finishes are specified in the "Finish Schedule" located in the drawings.

**1.2 REFERENCES**

- A. Minimum standards for work in this section shall be in conformity with the North American Architectural Woodwork Standards (NAAWS), current edition.

**1.3 DEFINITIONS**

- A. Exposed Portions of Casework: Those surfaces visible when doors and drawers are closed, including edges of doors and drawers, edges of cabinet boxes visible between doors and drawers, backs of hinged doors, interiors behind glass doors, and interiors in open cabinets.
- B. Semi-Exposed Portions of Casework: Those areas not defined as exposed, but visible when solid (not glazed) doors and drawers are opened.
- C. Concealed Portions of Casework: All remaining areas not defined as exposed or semi-exposed.

**1.4 SUBMITTALS**

- A. Make all submittals in accordance with Section 013300.
- B. Product Literature:
  - 1. Submit literature for a sample of each hardware component proposed.
  - 2. Particle Board and MDF Materials: Literature verifying materials are free of added formaldehyde.
  - 3. Field Applied Finish and Adhesive Systems: Submit product literature and Material Safety Data sheets stating VOC limits and chemical component limits for each product.
- C. Shop Drawings.
  - 1. Submit shop drawings in conforming to the requirements of the North American Architectural Woodwork Standards.
  - 2. On the shop drawing elevations, show the locations of backing required to be installed within walls for attachment of casework and countertops.
  - 3. Indicate materials, components, profiles and configurations, dimensions, fastening and adhering methods, jointing details, colors and finishes, and accessories.
  - 4. Included hardware, cut-out locations for appliances, plumbing fixtures, mechanical and electrical devices, and other items occurring in woodwork.
  - 5. Details shall be at a minimum scale of 1-1/2 inch per foot.
- D. Samples:
  - 1. Prefinished Board: Submit a minimum 8-inch by 11-inch sample of each color and pattern specified.

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2. Plastic Laminate: Submit a minimum of three (3) 8-inch by 11-inch samples of each color and pattern specified.
3. Solid Surfacing:
  - a. Submit a minimum of three (3), 6 by 6 inch in size illustrating color, pattern, and edge treatment for solid surface material.
  - b. Solid surfacing sealant samples for Architect's color selection.

**1.5 QUALITY ASSURANCE**

- A. Fabricator: A minimum of 5 years experience in the fabrication of custom architectural woodwork of the type specified, utilizing all materials specified.
- B. Single Source Responsibility: All Architectural Woodwork shall be under the responsibility of a single fabricator.
- C. Qualifications of Installers:
  1. Use only journeyman finish carpenters who are thoroughly trained and skilled in the work, and who are completely familiar with the all materials and quality standards specified.
  2. No allowance will be made for lack of skill on the part of workmen.
- D. Interface with Other Products: Review manufacturers cuts sheets and the mechanical and electrical documents to ensure that the architectural woodwork will adequately accommodate all appliances, piping, conduit or fixtures shown being located in or fixed to the millwork.
- E. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

**1.6 DELIVERY, STORAGE AND HANDLING**

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

**1.7 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not install woodwork until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to be fitted to other construction, verify dimensions in field before installation. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork.

**PART 2 - PRODUCTS**

**2.1 REQUIREMENTS**

- A. Composite wood products used on the interior of the building must not contain any added urea-formaldehyde.
- B. Adhesives used for wood substrate within the vapor barrier shall have maximum VOC content of 30 grams per liter and not contain urea formaldehyde.
- C. Refer to VOC limit tables in Section 018119 for VOC limits for adhesive and sealant products in this section.

**2.2 GRADE**

- A. Conform to NAAWS Premium Grade standards unless specified or indicated otherwise.

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**2.3 PERFORMANCE CRITERIA**

- A. Provide wall-mounted cabinets able to withstand minimum cabinet-to-wall connection load of not less than 60 pounds per linear foot.

**2.4 MATERIALS**

- A. Lumber: In accordance with the NAAWS Grade specified for the product being fabricated
  - 1. Concealed Framing Lumber: Pine, fir, hemlock, poplar, or other species as approved.
  - 2. Moisture Content: Optimum per NAAWS recommendations.
- B. Plywood:
  - 1. Typical Plywood (Concealed Locations): APA rated in accordance with PS 1; 3/4 inch thick AC exterior grade unless indicated or specified otherwise; touch sanded where plastic laminate veneers are to be applied.
- C. Core:
  - 1. Medium Density Fiberboard (MDF): ANSI A208.2 Class MD (medium density) meeting the requirements of NAAWS.
    - a. Made with no added urea formaldehyde.
    - b. Water-Resistant Core: MDF, ANSI 208.2 Grade MR-50. Provide at woodwork subject to moisture in the following, but not limited to, areas:
      - 1) Countertops where sinks are installed.
      - 2) Countertops installed in breakrooms, restrooms, mothers' rooms, and shower rooms.
- D. High-Pressure Decorative Plastic Laminate: NEMA LD 3.
  - 1. Brands and colors as scheduled on Drawings.
  - 2. Meeting the requirements of NAAWS for its use.
- E. Cabinet Liner: NEMA LD-3 Grade CLS. Colors as indicated on the Drawings.
- F. Pre-Finished Board: Low pressure melamine over MDF; formaldehyde free; color: as indicated.
- G. Edgeband:
  - 1. Veneer of the same species and cut as the exposed surfaces
  - 2. High-pressure decorative laminate to match plastic laminate faces. Provide solid color through high pressure laminate to match faces where scheduled.
- H. Adhesives: EMA.
  - 1. Type I: Typical.
  - 2. Type II: Provide at sink tops and sink cabinets.
- I. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.
  - 1. Type: Standard.
  - 2. Integral Sink Bowls: Comply with ISSFA-2 and ANSI Z124.3, Type 5 or Type 6, without a pre-coated finish.

**2.5 CABINET HARDWARE AND ACCESSORY MATERIALS**

- A. Hardware Standard: Comply with BHMA A156.9.
- B. Hardware Schedule:
  - 1. Concealed Hinges: Fully concealed hinges, standard finish, ANSI/BHMA A156.9.
  - 2. Wire Pulls: 4" brushed stainless steel pulls, 1/4" diameter.
  - 3. Cabinet Shelf Standards and Brackets: Zinc plated; Knappe and Vogt No. 255 and 256.
  - 4. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, complying with BHMA A156.9, Grade 1 and rated for the following loads: box drawers: 75 lbf; file drawers: 50 lbf.
  - 5. Grommets for cable passage through countertops: 2 1/2" OD, molded-plastic grommets with 1" hole and plastic cap with slot for wire passage. Color to be selected from standard. "TG Series" by Doug Mockett and Company, Inc., Manhattan Beach CA.
  - 6. Support Brackets at office counters: 15"x21", white; A&M Hardware (888-647-0200).
  - 7. Cabinet Locks: Olympus DCN-1 Cam Lock. Finish to match balance of hardware.

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- C. Wall Shelf Hardware; One of the Following:
  - 1. Manufacturer: Knape & Vogt.
    - a. Brackets: No. 185, Anochrome finish; length as appropriate for shelving indicated.
    - b. Standards: No. #85, Anochrome finish.
  - 2. Manufacturer: Reeve Store Equipment Co.
    - a. Brackets: No. 844-12, Brillatone (Satin Zinc) finish; length as appropriate for shelving indicated.
    - b. Standards: No. #800-6, Brillatone (Satin Zinc) finish.

**2.6 INSTALLATION MATERIALS**

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15% moisture content.
- B. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements. For metal framing supports, provide screws as recommended by metal-framing manufacturer.
- C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
- D. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.
- E. Adhesives: Do not use adhesives that contain urea formaldehyde.

**2.7 CASEWORK FABRICATION**

- A. General Fabrication Requirements:
  - 1. Provide openings in casework for the incorporation of all electrical and mechanical components. Openings for all plumbing equipment shall be cut from templates obtained from the plumbing equipment installer.
  - 2. Provide concealed access to casework electrical fixtures and wiring.
  - 3. Unless indicated or approved otherwise, provide adjustable base to provide level installation which accommodates variations in floor levelness.
  - 4. Shop assemble casework to the greatest practical extent
  - 5. Adjustable Shelves: All casework shelves shall be adjustable, unless otherwise noted. Provisions for shelf adjustment shall be by holes drilled at 2 inches on center in the cabinet body for the placement of shelf support brackets. Provide 4 supports for each shelf. Holes for supports shall be in straight even lines.
  - 6. Provide all hardware, fasteners, and exposed trim.
  - 7. Provide openings with wiring grommets at locations indicated.
- B. Plastic-Laminate-Faced Cabinet Fabrication:
  - 1. Fabricate casework to NAAWS requirements for "Custom" grade fabrication, "Premium" grade for doors and drawers, except as otherwise indicated.
  - 2. Design: Construction Type A, frameless. Joint between exposed doors, drawer faces, and countertop edges shall be 1/8 inch plus or minus 1/32 inch.
  - 3. Core Material: Medium-density fiberboard.
  - 4. Exposed Surfaces: Plastic laminate clad with matching plastic laminate edging, unless otherwise indicated.
  - 5. "Inside" Exposed Surfaces of Shelving Units and Cabinets Without Doors: Plastic laminate finished board, with exposed edges banded with plastic laminate self-edging to match face color.
  - 6. Semi-Exposed Surfaces: Low-pressure melamine overlay, unless indicated otherwise.
  - 7. Provide vertical grade plastic laminate, except use general purpose grade at countertops.
  - 8. Backs of Doors and Drawers: Plastic laminate to match face color.
  - 9. MDF shall be minimum 3/4" thick unless indicated otherwise. Shelves shall be 1 inch thick, minimum.

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**2.8 PLASTIC-LAMINATE-FACED COUNTERTOP FABRICATION**

- A. Countertops: Fabricate to NAAWS requirements for "Custom" grade fabrication
- B. Material for Exposed Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade HGS, 0.048" (1.2 mm) thick.
  - 1. Edge Treatment: Same as laminate cladding on horizontal surfaces.
  - 2. Core Material: Medium-density fiberboard. Water-resistant MDF core at lavatories. 3/4" thick unless otherwise
  - 3. Grommets: Molded-plastic grommets and matching plastic caps with slot for wire passage. Size as indicated on Drawings.
- C. Fabrication: Provide front and end overhang of 1 inch (25 mm) over base cabinets.

**2.9 WALL SHELVING FABRICATION**

- A. Shelving: Fabricate to NAAWS requirements for "Custom" grade fabrication
- B. Plastic-Laminate Shelving:
  - 1. Material for Exposed Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade HGS, 0.048" (1.2 mm) thick.
    - a. Edge Treatment: Same as laminate cladding on horizontal surfaces.
    - b. Core Material: Medium-density fiberboard.
- C. Melamine Shelving: Prefinished board, with exposed edges banded with melamine self-edging to match face color.
- D. Depth and Length: As indicated on the Drawings.

**2.10 SOLID-SURFACE-MATERIAL COUNTERTOP FABRICATION**

- A. Configuration: Provide countertops with the following front and backsplash style:
  - 1. Front: Straight, slightly eased at top.
  - 2. Backsplash and Endsplash: Straight, slightly eased at corner.
- B. Countertops: 1/2-inch- (12.7-mm-) thick, solid surface material with front edge built up with same material.
- C. Backsplashes and Endsplashes: 1/2-inch- (12.7-mm-) thick, solid surface material.
- D. Fabrication: Fabricate tops in one piece with shop-applied edges. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
  - 1. Fabricate with loose backsplashes for field assembly.
  - 2. Install integral sink bowls in countertops in the shop.

**2.11 FABRICATION, GENERAL**

- A. Fabricate cabinets and countertops to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

**3.2 INSTALLATION**

- A. Install all work in conformance with the North American Architectural Woodwork Standards (NAAWS), latest edition.

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1. Installation shall conform to the NAAWS grade of the items being installed.
- B. Assemble woodwork and complete fabrication at Project site to the extent that it was not completed in the shop.
  1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.
- C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
- E. Cabinets: Scribe and cut to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts. Install without distortion so that doors and drawers fit openings properly and are 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. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
- F. Countertops: Anchor securely to base units and other support systems as indicated. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface. Caulk space between backsplash/endsplash and wall/countertop with specified sealant.
  1. Install countertops with no more than 1/8" in 96" sag, bow, or other variation from a straight line.
  2. Secure backsplashes and endsplashes to countertops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
  3. Comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- G. Wall Shelving Installation: Install wall shelves with standards firmly anchored to studs or other supports. Coordinate installation of studs or other supports to create symmetrical location of wall standards.

**3.3 ADJUSTING AND CLEANING**

- A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets and countertops on exposed and semi-exposed surfaces.

**3.4 PROTECTION**

- A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

**END OF SECTION**



**SECTION 070162 – ROOFING PENETRATIONS AND REPAIR**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Roof flashing at new penetrations through existing roof
  - 2. Patching and repair of roofing and tie-in at new penetrations, including insulation and sheet metal flashing, and base flashings and accessories as required for complete weathertight roof.
- B. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- C. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 REFERENCES**

- A. National Roofing Contractors Association: The NRCA Roofing and Waterproofing Manual, Fourth or Fifth Edition.
- B. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)):
  - 1. C208 - Standard Specification for Cellulosic Fiber Insulating Board
  - 2. B32 - Solder Metal

**1.3 SYSTEM DESCRIPTION**

- A. Existing Roof Analysis: Where specific roof information is not available from building owner, provide services of roofing consultant to analyze existing roofing system and to provide recommendations for appropriate materials for patching, matching and extending.

**1.4 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Roofing Analysis Report: Indicate observations and recommendations; note where testing may be necessary for verification of existing materials
- C. Product Data:
  - 1. Roofing and insulation materials proposed for the work.
  - 2. Proprietary flashing systems.
  - 3. Sheet metal
- D. Shop Drawings:
  - 1. Submit shop drawings for patching and repair work which alters existing drainage patterns.
  - 2. Indicate areas of demolition and new work, drainage layout, roof insulation pattern, and base flashing details.

**1.5 QUALITY ASSURANCE**

- A. Installer Qualifications:
  - 1. As required to maintain the warranty of the existing roof system.
  - 2. Minimum of 3 years experience in installation or maintenance of roofs of the type to be repaired.
  - 3. Certified or approved by the original manufacturer of the existing roof, or by the manufacturer of the replacement roofing materials.
- B. Pre-Installation Conference: In accordance with Section 013119.
  - 1. Administer prior to starting the work of this Section.
  - 2. Require in attendance:
    - a. Architect.
    - b. General Contractor.
    - c. Membrane installer.
    - d. Other parties affected by the work of this Section.

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**SECTION 070162 – ROOFING PENETRATIONS AND REPAIR**

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3. Agenda:
  - a. Review installation details.
  - b. Review requirements for other work including anchorage and coordination requirements for roofing penetrations.
  - c. Review environmental conditions and storage of materials.

**1.6 PROJECT CONDITIONS**

- A. Do not apply roofing membrane during inclement weather or when air temperature may fall below 40 degrees F prior to completion of roofing repair work, taking into consideration added wind chill factor.
  1. Do not allow materials to be exposed to moisture during transportation, storage, handling or installation.
  2. Mark damp or wet materials, including felts which froth or foam during installation, and remove from site within 24 hours.
- B. Do not apply roofing membrane or insulation to damp, frozen, and or unsuitable deck surface. Allow sufficient time for moisture from previous precipitation, fog or dew to evaporate before proceeding with roofing work.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

**1.7 WARRANTY**

- A. Special Warranty: Provide for correction of failure of patched and repaired roofing system to resist penetration of water and damage from wind, for a period of not less than 2 years after Project Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Primary Roofing Materials:
  1. Manufacturer of original (existing) primary roof membrane materials
  2. Johns Manville Corp.
  3. GAF Building Materials Corp.
  4. CertainTeed Corporation.
- B. Accessories: Contractor's option, unless otherwise specified.

**2.2 MATERIALS**

- A. Roofing: Furnish new materials matching existing material types and conforming to requirements of NRCA applicable to existing system.
- B. Insulation: Match existing insulation systems to extent available; do not apply built-up roofing over plastic type insulation, where plastics used originally, cover with perlite fiber or glass fiber insulation.
- C. Cant and Edge Strips: Conform to ASTM C208.
- D. Mechanical Fasteners: As recommended by insulation manufacturer and meeting recommendations of NRCA and specified Quality Assurance requirements for fire rating and wind blow off resistance.
- E. Flexible Boot Pipe Flashing: Portals Plus (708-766-5240; 800-774-5240) "Alumi-Flash" with EPDM boots, or approved; sized to match pipe diameter; multiple penetration type where appropriate; split type with sealing hardware where necessary for installation at penetrating items which cannot be disconnected for top access. Furnish stainless steel draw bands, adapters, connection hardware, and sealants as necessary for a complete and weather tight installation.
- F. Lead Pipe Flashings: Mayco Industries Inc. (Birmingham, AL; 800-749-6061; 205-942-42420) "4 Pound (Base & Riser) Lead Flashing"; riser height and diameter to suit conditions; minimum 4 inch skirt.

**SECTION 070162 – ROOFING PENETRATIONS AND REPAIR**

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G. Solder: ASTM B32.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Cut existing roofing as required for Project; remove only as much as can be repaired in same day; provide protective closure where openings in roof are not covered in same day and maintain watertight until roof repairs can be completed watertight.
  - 1. Take care not to remove materials beyond those required for new construction.
  - 2. Inform Architect and Owner where existing materials beyond those required to be removed are damaged or may be unsuitable due to moisture or deterioration.
- B. Inspect substrates and roof deck to ensure substrates and deck are clean and smooth, free of depressions, waves or projections, and are properly sloped to drains.
- C. Ensure roof openings and curbs, and pipes, sleeves, ducts or vents through roof are solidly set, cant strips in place and nailing strips located.
- D. Inspect roofing materials to ensure they are dry at time of installation.
- E. Apply roofing over clean, dry and warm surfaces during fair weather.

**3.2 PREPARATION**

- A. Protect surrounding surfaces against damage from roofing work.
- B. Where hoisting is necessary, hang tarpaulins to protect walls.

**3.3 INSTALLATION**

- A. Insulation Application: Attach insulation in accordance with insulation manufacturer's instructions and NRCA recommendations for installation of insulation on deck involved.
  - 1. Lay insulation boards to moderate contact without forcing joints.
  - 2. Cut insulation to fit neatly to perimeter blocking and around projections through roof.
  - 3. Install tapered crickets, cants and edge strips in accordance with manufacturer's instructions and NRCA recommendations.
  - 4. Leave no insulation exposed at end of day's work; apply glaze coat of hot bitumen and two plies of felt over insulation and install cut-off weathertight.
- B. Roof Membrane Application: Apply roofing membrane in accordance with manufacturer's instructions and NRCA recommendations for roof type.
  - 1. Apply layers smooth, free from air pockets, wrinkles, fishmouths, prominent lap joints or tears.
  - 2. Carry roofing system up cant strips to vertical surfaces and secure to nailing strips.
  - 3. Comply with manufacturer's recommendations for installation of composition type base, wall and field flashings.
  - 4. Coordinate metal flashings and counterflashing.
  - 5. Seal flashings and flanges of items projecting through membrane.
- C. Mechanical Curbs:
  - 1. Coordinate with mechanical work for installation of curbs.
  - 2. Remove ballast material (gravel, or loose granules) and prepare surface for installation of cants.
  - 3. Install new base flashing and secure to curb. Sequence with curb flashing installation.
- D. Pipe Penetration Flashing: In accordance with manufacturer's recommendations and as follows.
  - 1. Scrape back gravel and prepare surface to 15 inches in all directions from the penetration.
  - 2. Clean and prime flange.
  - 3. Install flange
    - a. For flashings with rubber cap, cut to size and install over pipes or penetrating members; Secure with pipe clamps.
    - b. For lead vent flashings, trim and fold inside vent a minimum of 1 inch..
  - 4. Apply mastic and strip in with roofing material.

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5. Replace ballast material as appropriate to roofing type.

**3.4 CLEANING**

- A. Remove markings caused by roofing repairs from finished surfaces, including run-throughs into building.
- B. In areas where finished surfaces are soiled by roofing repair, clean using procedures appropriate to the surfaces being cleaned.
- C. Leave completed roof uniform in appearance and free from debris.

**3.5 PROTECTION**

- A. Where work must continue over finished roofing membrane, protect surface with plywood sheets.

**END OF SECTION**

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**SECTION 072100 – BUILDING INSULATION**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Concealed building insulation.
- B. Related Sections:
  - 1. 092116 - Gypsum Board Assemblies: Sound attenuation insulation at interior walls.

**1.2 SUBMITTALS**

- A. Product Data: Submit manufacturer's product data and installation instructions for each type of insulation.

**1.3 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
  - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
  - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

**PART 2 - PRODUCTS**

**2.1 INSULATION MATERIALS**

- A. Unfaced Fiberglass Batt Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from glass, slag wool, or rock wool with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
  - 1. Location: Concealed building insulation.
- B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.60 lb/cu. ft., with maximum flame-spread and smoke-developed indices of 75 and 450, respectively:
  - 1. Location: Where rigid insulation is indicated.

**2.2 VAPOR RETARDERS**

- A. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either a nonwoven grid of nylon cord or polyester scrim and weighing not less than 22 lb/1000 sq. ft., with maximum permeance rating of 0.1317 perm, and flame-spread and smoke-developed indices of not more than 5 and 60, respectively. One of the following, or approved:
  - 1. Raven Industries, Inc.; DURA-SKRIM 2FR.
  - 2. Reef Industries, Inc.; Griffolyn T-55 FR.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

**SECTION 072100 – BUILDING INSULATION**

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**2.3 ACCESSORIES**

- A. Insulation Fasteners: Adhesively attached, spindle-type "stick-pin" anchors; plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
  - 1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - 2. Spindle: Copper-coated, low carbon steel, fully annealed, 0.105 inch in diameter, length to suit depth of insulation indicated.
  - 3. Product: Gemco; Spindle Type.
- B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
  - 1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.
- C. Related Accessories: Provide other accessories, not specifically described, as required for a complete installation.
- D. Protection Membrane: White metallized polypropylene; "WMP-VRP" by Lamtec Corporation (800/852-6832); flame spread of 25 or less when tested in accordance with ASTM E84; perforations at 1/8 inch centers.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Verify adjacent materials are secure, properly spaced, dry, and ready to receive installation.
- B. Verify mechanical and electrical services within spaces to insulated have been installed and tested.

**3.2 INSTALLATION - GENERAL**

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.
- F. Install batt insulation in accordance with manufacturer's instructions.

**3.3 INSTALLATION OF GENERAL BUILDING INSULATION**

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

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**SECTION 072100 – BUILDING INSULATION**

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- C. Install batt insulation in cavities formed by framing members according to the following requirements:
  - 1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
  - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.
- D. Install insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
  - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
  - 2. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
  - 3. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- E. Install insulation without gaps or voids.
- F. Trim insulation neatly to fit spaces. Use batts free of damage.

**3.4 INSTALLATION OF VAPOR RETARDERS**

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor-retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
- C. Provide continuous vapor retarder at transition of vertical to horizontal by lapping a minimum of 12 inches and taping lap.
- D. Seal to adjacent construction with tape or sealant recommended by manufacturer.
- E. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor-retarder manufacturer.
- F. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- G. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

**3.5 INSTALLATION - SEMI-RIGID BOARD INSULATION**

- A. Install rigid wall insulation where rigid insulation is indicated at walls and under suspended slabs in accordance with manufacturer's current installation instructions.
- B. Install semi-rigid board wall insulation progressively with "Z"-furring.
  - 1. Trim insulation to tightly fit between the "Z"-furring and framing members. Trim for a close fit around penetrations. Fit ends of board with tight butt joints.
- C. Install semi-rigid board insulation at suspended slabs with stick pin fasteners and retaining washers.
  - 1. Install protection membrane over exposed surfaces of rigid board prior to installing retaining washers. Lap seams a minimum of 12 inches.

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**3.6 PROTECTION**

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

**END OF SECTION**



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**SECTION 072400 - EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: EIFS Drainable System with air/water resistive barrier backup.
  - 1. 079200 - Joint Sealants.

**1.2 DEFINITIONS**

- A. Definitions included here are in addition to terms defined in ASTM C1397 and ASTM E2110.
- B. Openings Through System: Hole which passes completely through Exterior Insulation and Finish System. Includes, but is not limited to doors, windows, fixtures set in wall, pipe or duct penetrations, conduit or cable penetrations, mounting brackets, or vents.
- C. Running Bond: Placement of insulation boards such that vertical joints between boards in successive courses are horizontally offset at least 1/4 of board's horizontal unit length.

**1.3 PRE-INSTALLATION CONFERENCE**

- A. Conduct pre-installation conference in accordance with Section 013119.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 013300.
- B. Samples:
  - 1. Submit four 12 by 12 inches in size for each finish, color, and texture indicated.
  - 2. Prepare samples using same tools, techniques, and system components intended for actual work.

**1.5 QUALITY ASSURANCE**

- A. Single Source Responsibility: Furnish water barrier and EIFS products from one manufacturer for entire Project, unless otherwise acceptable to Architect and proposed manufacturer.
- B. Applicator Qualifications: Approved by manufacturer with experience on at least five projects of similar nature in past five years, and accepted by system manufacturer for this Project.

**PART 2 - PRODUCTS**

**2.1 EIFS MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. Dryvit Systems, Inc., West Warwick, RI 02893
  - 2. Sto Corp., Atlanta, GA 30331
  - 3. Senergy Div. of BASF, Jacksonville, FL 32224.
  - 4. Any Suggested Substitution will be reviewed in accordance with Section 016000.

**2.2 SYSTEM DESCRIPTION**

- A. General: In addition to requirements shown or specified, comply with wind load design requirements indicated in Structural Drawings.
- B. Exterior Insulation and Finish System (EIFS): EIMA Class PB. Conform to ICC ES Report AC24.

**2.3 EIFS MATERIALS**

- A. Weather Resistive Membrane: Breathable, waterproof coating compatible with sheathing.
- B. Base and Finish Coat Aggregate: Manufacturer's aggregate, free of iron-containing compounds.
- C. Base Coat Material: Compatible with insulation board and reinforcing mesh.

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1. Cementitious: System manufacturer's formulation of acrylic co-polymer binder, aggregate, and Portland cement complying with ASTM C150, Type 1.
- D. Sloped surfaces: Use manufacturers product specifically formulated for use at horizontal surfaces to withstand affects of water.
- E. Primer: Manufacturer's standard acrylic primer for preparing base-coat surface for application of finish coat.
- F. Finish Coat Material:
  1. System manufacturer's factory-mixed formulation of acrylic polymer, aggregate, and color-fast pigments.
  2. Use quality materials to achieve color control for individual colors to avoid color changes from differently mixed batches.
- G. Water: Clean and potable.
- H. Drainage Field: Manufacturer's standard method for drainable systems, including weep mechanisms, based on systems specified. Provide drainage medium located behind insulation or insulation with drainage channels as required by manufacturer. Provide positive flow to weep system.
- I. Adhesive and Fasteners: System manufacturer's formulation and system compatible with substrate over which insulation is installed.
- J. Board Insulation: Expanded polystyrene (EPS), ASTM C578, Type I.
  1. Minimum Density: 1.0 PCF.
  2. Minimum Compressive Strength: 10 PSI.
  3. Comply with bead fusion, aging, dimensional, and mechanical criteria of system manufacturer.
  4. Thermal Resistance: ASTM C518, R value of 4 per inch of thickness, at 75 degrees F mean temperature; value determined at not less than 6 months after manufacture.
  5. Panel Size: 24 by 48 inches maximum.
  6. Integral drainage channels or grooves at back surface of each board.
  7. System manufacturer's stamp of compliance on each board.
  8. Thickness: As indicated, but not less than 1 inch nor more than 4 inches.
- K. Reinforcing Mesh: System manufacturer's coated open weave alkaline resistant fiberglass mesh fabric compatible with other system components.
  1. System manufacturer's mesh intended for placement at corners, reveals, or molded and formed profiles.
  2. Standard Weight Mesh: Manufacturer's mesh intended for standard impact resistance described in EIMA-101.86., minimum 4 [6] ounce/sq. yd.

## **2.4 EIFS ACCESSORIES**

- A. Weather Resistive Barriers:
  1. Trowel Applied Air and Water Barrier Coat: Vapor permeable, waterproof coating compatible with sheathing specified in Section 09255.
    - a. Sto Guard Air Barrier, STO, Atlanta, GA 30331.
    - b. Senershield®, Senergy Div. of BASF, Jacksonville, FL 32224.
    - c. Backstop NT Smooth, Dryvit Systems, Inc., West Warwick, RI 02893.
  2. Flashing Materials: Manufacturer's standard recommended tape or liquid products for flashing around penetrations through the exterior sheathing, including around doors, windows, and pipe penetrations, and transitions between dissimilar materials.
- B. Joint Sealant: Refer to Section 079200.

## **2.5 MIXES**

- A. Comply with system manufacturer's requirements.
- B. Do not introduce admixtures, water, or other materials, except as approved by system manufacturer.

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- C. Use materials within time period requirements of system manufacturer.
- D. Use adhesive, coating, and primer mixtures within pot-life time period requirements of system manufacturer.

**2.6 EIFS FINISHES**

- A. Finish: Color, texture, and finish as selected by Architect to match existing.

**PART 3 - - EXECUTION**

**3.1 EXAMINATION**

- A. Examine conditions and proceed with work in accordance with Section 017300.
  - 1. Verify that substrate is flat and even, within tolerances required by system manufacturer. If manufacturer has no substrate tolerance limit, substrate shall be flat and even within tolerance of 1/8 inch in 48 inches.
  - 2. Verify that substrate and adjacent materials are dry and frost free.
  - 3. Verify efflorescence and laitance on concrete and masonry substrates have been removed.
  - 4. Verify that substrate's moisture content, cleanliness, and physical condition are within system manufacturer's tolerances and requirements.
  - 5. Verify that sheathing joints are properly sealed in accordance with Section 061690.

**3.2 PREPARATION**

- A. General:
  - 1. Prepare and clean substrate materials in accordance with system manufacturer's requirements.
  - 2. Mask and cover adjacent work areas to protect from damage during installation of system.
- B. Joint and Crack Treatment:
  - 1. Fill joints between panels of exterior grade gypsum up to 1/4 inch wide with trowel application of air barrier material and reinforce with a strip of 2 inch wide glass fiber tape prior to application of liquid membrane. Joints between panels of exterior grade gypsum wider than 1/4 inch should be sealed with transition □membrane adhered to the substrate.
  - 2. Surfaces should be tied in with beams, columns, window and doorframes, etc.; using strips of transition □membrane lapped a minimum of 3 inches on both substrates. Mechanical attachment should be made to all window and doorframes, or a properly designed sealant joint provided.
  - 3. Seal cracks in masonry and concrete with a strip of transition □membrane lapped a minimum of 3 inches on both sides of the crack.

**3.3 INSTALLATION**

- A. General: ASTM C1397. Comply with manufacturer's printed recommendations.
- B. Trowel Applied Weather Resistive Barrier:
  - 1. Do not apply to wet surfaces.
  - 2. Apply within manufacturer's recommended temperature limits.
  - 3. Trowel apply materials in single coat in thickness as recommended by manufacturer.
  - 4. Fill in crevices and grooves making coating continuous and free from breaks and pin holes.
  - 5. Apply around joints, anchors and into chases, corners and reveals.
- C. Board Insulation: Apply in courses with long edges oriented horizontally; begin first course from level base line and work upwards.
  - 1. Apply adhesive using notched trowel, ribbon and dab method, or in accordance with system producer's current published instructions.
  - 2. Stagger vertical board joints butted tightly in successive courses to produce running bond pattern.
  - 3. Precut boards to fit openings, corners, and projections prior to applying adhesive.
  - 4. At corners, alternate boards in successive courses to create interlocking pattern.
  - 5. Offset board joints minimum of 4 inches from parallel running aesthetic grooves.

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**SECTION 072400 - EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)**

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6. Board Layout at Openings through System:
  - a. Minimum Board Horizontal Dimension Accent to head and sill: 6 inches.
  - b. Minimum Distance from Corners to Insulation Board Joints Along Head, Sill, and Jambs: 6 inches.
  - c. Cut insulation boards at corners to form single L-shaped boards. Insulation board joints emanating from opening corners are not permitted.
7. Provide minimum 12 inches offset between board joints from sheathing joints.
8. Abut boards tightly to produce flush and even surfaces without gaps or raised edges. If gaps wider than 1/16 inch occur, fill with insulation cut to fit gaps exactly without use of adhesive; do not place adhesive in gaps.
9. Rasp or sand flush irregularities of insulation surfaces which project more than 1/16 inch or less if required by system manufacturer. Do not fill depressions with adhesive and coating materials to form flat surface to receive base coat application.
10. Preparation for Coating Application:
  - a. Prepare insulation by abrading surface to rough surface texture.
  - b. During abrading remove site dirt, ultraviolet light degraded insulation, and other harmful conditions which may impair adhesion of base coat to insulation.
11. **[Curved Substrate: Cut kerfs in insulation board surface adjoining curved substrate to depth no closer than 3/4 inch to surface receiving coating.]**
12. Sealant Joints: Interrupt insulation where joints are indicated.
  - a. Form joints to receive joint sealant by leaving gaps of sufficient width to include joint sealant, base coat, and reinforcing fabric.
  - b. Position joints so system's thermal expansion and contraction does not exceed 1/4 of joint width.
  - c. Provide at Following Locations:
    - 1) Where movement joints occur in substrate system.
    - 2) Where system abuts dissimilar material.
    - 3) Where substrate changes.
    - 4) Where significant structural movement occurs, such as long continuous elevations, space vertical joints at maximum 60 **[45]** feet.
    - 5) At changes in roof line.
    - 6) At changes in building shape.
    - 7) At changes in structural system.
    - 8) At floor lines.
    - 9) Where prefabricated panels abut.
  - d. Provide full expansion joints at building expansion joints; do not offset or decrease size.
13. Insulation Attachment:
  - a. Install insulation for Class PB systems with adhesive.
  - b. Apply adhesive as required by system manufacturer and applicable code.
  - c. When insulation board is in final position, remove adhesive which extends beyond board edges. Scrape board edges clean of adhesive. Protect board at tops of walls and continuous runs from weather or other damage.
  - d. Allow adhered insulation to remain undisturbed for time period required by system manufacturer, considering temperature and humidity conditions, but not less than 24 hours prior to:
    - 1) Beginning rasping and sanding insulation.
    - 2) Application of base coat and mesh.
14. Reveals: Includes aesthetic joints, grooves, rabbets, and formed features.
  - a. Cut in outside face of insulation with power tool router and bit configured to produce required features that conform accurately to profiles indicated.
  - b. Do not reduce insulation thickness to less than 3/4 inch.
  - c. Coat recesses in insulation board to create patterns with base and finish coats.
  - d. Reinforce with base coat and reinforcing mesh prior to application of the full base coat and reinforcing mesh.

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**D. Reinforcing Mesh Application:**

1. Install mesh to produce wrinkle-free installation with mesh continuous at corners and reveals, wrapped at terminating edges, and lapped or otherwise treated at joints to comply with system manufacturer's requirements.
  - a. Standard Weight Reinforcing Mesh: Install typically, including over other reinforcing mesh required, to provide continuous appearance of base and finish coats.
    - 1) Lap adjoining sheets of mesh over each other minimum of 2-1/2 inches, or greater if required by system manufacturer.
    - 2) Fully embed standard weight reinforcing mesh separately from supplemental [and impact-resistant] mesh.
2. Backwrapping: Provide backwrapping and double layer of mesh minimum of 4 inches wide at head, sill, jambs, and openings. Backwrap insulation with reinforcing mesh at top and bottom of walls and sections of walls and at other locations identified by manufacturer. Expose not less than 2-1/2 inches of backwrapping mesh and cover with full application of standard mesh.
3. Corners of Openings: Provide 9-1/2 by 12 inches reinforcing mesh panels at corners of openings not aligned with control or sealant joints.
  - a. Position with mesh panel edges at angle of 45 degrees from edges of opening.
  - b. Position panel with long edge touching opening's corner.
  - c. Position overlaps of reinforcing mesh minimum of 8 inches from corners and from edges of insulation panels.
  - d. Strip in at least three mesh panels at each corner to ensure full, continuous reinforcement.

**E. Base and Finish Coating Application:**

1. General: Mesh and mesh pattern shall not be visible after base coat cures. If mesh, or mesh patterns, are visible after base coat cures, recoat with additional base coat material.
  - a. Do not cut reinforcing mesh embedded in base coat. Measure and precut mesh prior to application.
  - b. Apply primer over base coat in accordance with system manufacturer's application instructions.
  - c. Prior to application of finish coat, verify that surface of cured base coat is dry and hardened for not less than 24 hours, and free of projections and strands to produce flat surface.
  - d. Finish Coat: Apply over cured base coat in minimum thickness required by system manufacturer to produce uniform finish texture and color matching approved submitted sample [field sample].
    - 1) Apply finish coat in continuous operation, working to wet edge, having cold joints occur at reveals, [control and] sealant joints, and corners.
    - 2) Apply finish coat free of scaffold lines.
    - 3) Apply each finish coat texture free of texture variations.
2. Class PB Coating Application: ASTM C1397. Apply base coat to exposed surfaces of insulation in not less than minimum thickness required by system manufacturer.
  - a. Fully embed reinforcing mesh in wet base coat.
  - b. Treat internal edge of insulation board at sealant joints by encapsulating and backwrapping with base coat and reinforcing mesh as required by system manufacturer. Do not extend finish coat into joint.
  - c. Treat terminating insulation board edges, including those at openings, by encapsulating and backwrapping with base coat, reinforcing mesh, and finish coat, as required by system manufacturer.
  - d. Apply manufacturer's standard coating for treating inside edges of sealant joints prior to applying sealant. Do not apply finish coat over sealant joints.
  - e. [At drainable systems, keep weep holes open to allow free drainage of water from within system.]

**3.4 FIELD QUALITY CONTROL**

- A. General: Comply with Section 014000.

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**SECTION 072400 - EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)**

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- B. Inspection Services: Comply with Code requirements for inspection of installed system and components.
- C. Owner has the right to obtain and pay for independent third party field quality inspection of EIFS system including the weather resistive barrier and flashing installation conditions.
- D. Manufacturer's Field Services: Comply with Section 014000.
  - 1. Notify manufacturer in timely manner to arrange for manufacturer's technical representative's site visits to ensure proper installation, verify work is in accordance with manufacturer's requirements, and warranty requirements have been met.
  - 2. Manufacturer's Qualified Technical Representative: Monitor activities and advise applicator of proper installation procedures and precautions.
  - 3. Inspect during installation of insulation, application of base coat, and application of finish coat.
  - 4. Inspect after completion of finish coat application.
  - 5. Prepare report indicating:
    - a. Non-complying conditions and locations.
    - b. Repair methods for non-complying conditions.
    - c. Successful and unsuccessful repair of non-complying conditions noted in previous inspection reports.

**3.5 PROTECTION**

- A. Protect finished work in accordance with Section 017300.
  - 1. Cover top row of exposed insulation board until application of base coat.
  - 2. If protection measures are unsuccessful, restore to condition indistinguishable in appearance from, and equivalent in performance to, undamaged areas by removing and replacing in compliance with system manufacturer's instructions.

**END OF SECTION**

**SECTION 072713 – SHEET-APPLIED AIR/WATER BARRIERS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Self-adhesive SBS modified bitumen air/water barrier membrane system.
- B. Related Sections:
  - 1. 072100 - Thermal Insulation.
  - 2. 092843 - Gypsum Sheathing.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product Data: Submit product data illustrating membranes and accessory materials and indicating compliance with specified requirements.
- C. Technical Documents:
  - 1. Submit statement from manufacturer(s), indicating products supplied under this Section are compatible with one another and with products previously installed under the work of related Sections.
  - 2. Submit two copies of the most current technical data sheets describing the physical properties of the material, and explanations about product installation, including installation techniques, restrictions, limitations and other manufacturer recommendations.

**1.3 QUALITY ASSURANCE**

- A. Contractor Qualifications: Perform air/water barrier work only by skilled applicators, employed by an installation contractor operating all adequate and necessary equipment to execute such work in accordance with the manufacturer's recommendations and recognized standards.
- B. Manufacturer's Representative:
  - 1. The air/water barrier materials manufacturer may delegate a representative to visit the work site at commencement of work.
  - 2. At all times, permit and facilitate access to the site by the manufacturer's representative cited above.

**1.4 MATERIALS STORAGE**

- A. Rolls of materials should be handled with care and proper equipment.
- B. Rolls of materials shall be carefully stored and adequately protected in accordance with the manufacturer's recommendations.

**1.5 COORDINATION**

- A. Select products to be compatible with adjoining membranes previously installed under related Sections.
- B. Select products from a single manufacturer, or products which are compatible, from different manufacturers.

**1.6 SEQUENCING AND SCHEDULING**

- A. If climatic conditions may result in condensation between membranes and substrates, schedule installation of insulation to immediately follow installation of membranes.

**SECTION 072713 – SHEET-APPLIED AIR/WATER BARRIERS**

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- B. Install membranes over joints and gaps before installing membranes over adjacent substrates.
- C. Unless membrane will be adhered directly to window frames or other components fitted into openings, install membrane before installation of such components.

**1.7 MANUFACTURERS WARRANTIES**

- A. The product manufacturer shall issue a written and signed document in the name of the Owner, certifying the product will meet all the physical characteristic published by the manufacturer, for a period of 5 years, starting from the date of completion of installation of membranes. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.

**1.8 SUBCONTRACTOR GUARANTY**

- A. Furnish Subcontractor Guaranties in accordance with Section 017700.

**PART 2 - PRODUCTS**

**2.1 SHEET APPLIED AIR/WATER BARRIER MEMBRANE**

- A. Membrane:
  - 1. Basis of Design:
    - a. Manufacturer: Henry Company.
    - b. Product: "Blueskin VP 160;" vapour-permeable SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film.
    - c. Applications: For temperatures down to 10 degrees F (-12C) use "Blueskin VP LT."
    - d. Thickness: 40 mils (1mm).
    - e. Water Vapor Transmission: ASTM E96 method A (desiccant) greater than 10 perms.
- B. Acceptable options from the following manufacturers (subject to compliance with Contract Document requirements and Architect's approval of conformance to design intent) will also be considered:
  - 1. Carlisle Coating & Waterproofing Incorporated.
  - 2. Grace Construction Products.
  - 3. Soprema, Inc.

**2.2 DESCRIPTION**

- A. Coordinate interface of membrane specified in this Section with adjacent systems to provide a continuous barrier to bridge and seal air leakage pathways and gaps through the building envelope.
  - 1. Connections of the walls to the roof air barrier.
  - 2. Connections of the walls to the foundations.
  - 3. Seismic and expansion joints.
  - 4. Openings and penetrations of window and door frames, and store front.
  - 5. Piping, conduit, duct and similar penetrations
  - 6. Masonry ties, screws, bolts and similar penetrations.
  - 7. All other air leakage pathways in the building envelope.
- B. Materials and installation methods of the primary air/water & rain barrier membrane system.

**2.3 ACCESSORIES**

- A. Transition Membrane (Flexible Flashing): Provide self-adhering, reinforced, transition membrane as recommended by the manufacturer of the air/water barrier system.
- B. Adhesive (Basis of Design) for self-adhering membranes at temperatures above 10 degrees F (-12C):
  - 1. Manufacturer: Henry Company.
  - 2. Product: Blueskin Adhesive; synthetic rubber-based adhesive.
  - 3. Color: Blue.



**SECTION 072713 – SHEET-APPLIED AIR/WATER BARRIERS**

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- C. Primer (Basis of Design) for self-adhering membranes at temperatures above 25 degrees F (-4C):
  - 1. Manufacturer: Henry Company.
  - 2. Product: Aquatac Primer; polymer emulsion-based adhesive.
  - 3. Color: Aqua,

**2.4 TERMINATION SEALANT**

- A. Sealant (Basis of Design): Henry Company "POLYBITUME 570-05 Polymer-Modified Sealing Compound".

**PART 3 - EXECUTION**

**3.1 EXAMINATION AND PREPARATION OF SURFACES**

- A. Surface examination and preparation must be completed in conformance with recommendations in the manufacturer's installation manual.
- B. Before waterproofing work begins, the Owner's representative and the membrane contractor's foreman will inspect and approve substrate condition and ensure that related work has been properly executed. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be made. The start of the membrane application means that substrate conditions are acceptable for work completion.
- C. Before commencing work, all surfaces must be smooth, dry, clean and free of ice and debris as per manufacturer's recommendations.
- D. No materials will be installed during rain or snowfall.
- E. Concrete must be cured a minimum of fourteen days and an adhesion test is recommended before membrane application.
- F. Provide minimum 25 gage (18 mil) sheet metal backing at gaps 1/2 inch (13 mm) wide and wider.
- G. At deflection joints, a self-adhesive membrane should be installed as continuous as possible.

**3.2 EQUIPMENT**

- A. Maintain equipment and tools in good working order.

**3.3 APPLICATION, PRIMER APPLICATION**

- A. Apply primer for self-adhering membranes at rate recommended by manufacturer for the substrates encountered.

**3.4 INSTALLATION, PENETRATIONS**

- A. Pre-strip small penetrations through the membrane with a membrane and sealed with mastic.
- B. Cut membrane to ensure it is installed tight to penetrations.
- C. Provide flanged membrane collar around mechanical and electrical penetrations. Install flange at plane of surrounding membrane.
- D. Apply mastic where membrane has been cut to fit around penetrations.

**3.5 INSTALLATION, TRANSITION MEMBRANE**

- A. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2-inch (50 mm) overlap at all end and side laps.
- B. Tie-in to window frames, metal doorframes, storefront, and at the interface of dissimilar materials as indicated in drawings.
- C. Ensure all preparatory work is complete prior to applying air/water barrier membrane.

**SECTION 072713 – SHEET-APPLIED AIR/WATER BARRIERS**

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**3.6 INSTALLATION, AIR/WATER BARRIER MEMBRANE**

- A. Apply self-adhering membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.
- B. Align and position self-adhering membrane, remove protective film and press firmly into place. Ensure minimum 2-inch (50 mm) overlap at all end and side laps. Promptly roll all laps and membrane with a counter top roller to affect the seal.
- C. At the end of each day's work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel-apply a feathered edge to seal termination and shed water.
- D. Tie-in to window frames, metal doorframes and at the interface of dissimilar materials as indicated in drawings. Refer to manufacturers' standard details.
- E. Ensure projections are properly sealed with a caulk application of liquid air seal mastic.
- F. Where proper adhesion and bonding cannot be maintained, mechanically fasten membrane through continuous securement bars to windows and doors as recommended by membrane manufacturer.
- G. Pay special attention to membrane applied to the underside of substrate surfaces to ensure maximum surface area adhesion is obtained.

**3.7 FIELD QUALITY CONTROL**

- A. Work shall be performed on a continuous basis as surface and weather conditions allow.
- B. Adjoining surfaces shall be protected against any damage that could result from the waterproofing installation.
- C. The following are unacceptable:
  - 1. Fishmouths and folds.
  - 2. Blisters and bulges.
  - 3. Insufficient overlaps.
  - 4. Inadequate adhesion.
  - 5. Punctures, tears, cuts.
  - 6. Other similar defects.

**3.8 PROTECTION**

- A. Membranes are not designed for permanent exposure. Cover as soon as possible.
- B. Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.
- C. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane. Drying time varies depending on temperature and relative humidity.

**END OF SECTION**

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**SECTION 074213 – METAL WALL PANELS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Metal wall panels. <M-1>
- B. Related Sections:
  - 1. 054000 - Cold-Formed Metal Framing: Metal studs, bracing, anchorage, and framing accessories.
  - 2. 072713 - Sheet-Applied Air/Water Barriers
  - 3. 076200 - Sheet Metal Flashing and Trim: Metal flashing and trim not part of this Work.
  - 4. 079000 - Joint Sealants: Field-applied sealants.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide manufactured wall panel assemblies capable of withstanding design wind loads indicated under in-service conditions with deflection no greater than the following, in accordance with ASTM E 330.
  - 1. Maximum Deflection: 1/180 of the span.

**1.3 SUBMITTALS**

- A. Product Data: Include manufacturer's product specifications, standard details, certified product test results, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.
- B. Shop Drawings: Show layouts of panels, details of corner conditions, joints, panel profiles, supports, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work.
- C. Samples for Verification: Provide sample panels 12 inches long by actual panel width, in the profile, style, color, and texture indicated. Include clips, caps, battens, fasteners, closures, and other exposed panel accessories.

**1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced installer who has completed metal wall panel projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Handling: Exercise care in unloading, storing, and erecting wall panels to prevent bending, warping, twisting, and surface damage.
- B. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight and ventilated covering. Store panels to ensure dryness. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

**1.6 PROJECT CONDITIONS**

- A. Field Measurements: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Basis of Design: The design is based on Mini V Beam manufactured by AEP Span. No substitutions allowed.

**SECTION 074213 – METAL WALL PANELS**

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**2.2 METALS AND FINISHES**

- A. Metallic-Coated Steel Sheet Pre-painted with Coil Coating: Steel sheet metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A 755 and the following requirements:
  - 1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792, Class AZ-55 coating, Grade 40; structural quality.
  - 2. Thickness: As required to meet performance criteria, but not less than 24 gage.
  - 3. Color: As scheduled on Drawings.
  - 4. Surface: Smooth, flat, mill finish.
  - 5. Exposed Finish: Manufacturer's standard 2-coat, fluoropolymer system composed of not less than 70 percent polyvinylidene fluoride resin by weight with a total minimum dry film thickness of 0.9 mil and 30 percent reflective gloss when tested according to ASTM D 523.
  - 6. Prime Coat for Concealed Surfaces: Apply pretreatment and white or light-colored, baked-on polyester primer coat; with a minimum dry film thickness of 0.2 mil.

**2.3 MISCELLANEOUS MATERIALS**

- A. Fasteners: Self-tapping stainless-steel screws, bolts, nuts, self-locking rivets and bolts, EPDM or neoprene sealing washer, end-welded studs, designed to withstand design loads.
  - 1. Provide exposed fasteners with heads matching color of metal wall panels by means of plastic caps or factory-applied coating.
- B. Accessories: Unless otherwise specified, provide components required for a complete wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, seam covers, flashings, louvers, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of panels.
  - 1. Closure Strips: Closed-cell, self-extinguishing, expanded, cellular, rubber or cross-linked, polyolefin-foam flexible closure strips. Cut or pre-mold to match configuration of panels. Provide closure strips where indicated or necessary to ensure weathertight construction.
  - 2. Joint Sealant: One-part elastomeric polyurethane, polysulfide, or silicone-rubber sealant as recommended by panel manufacturer.
- C. Touch-up Paint: Manufacturer's special color-matched material, formulated for retouching fluoropolymer finishes, as appropriate.
- D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat, unless otherwise indicated. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

**2.4 FABRICATION**

- A. Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Apply bituminous coating or other permanent separation materials on concealed panel surfaces where panels would otherwise be in direct contact with substrate materials that are noncompatible or could result in corrosion or deterioration of either materials or finishes.
- C. Fabricate panel joints with captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will minimize noise from movements within panel assembly.

**SECTION 074213 – METAL WALL PANELS**

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**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements indicated for conditions affecting performance of metal panel walls.
  - 1. Panel Supports and Anchorage: Examine wall framing to verify that girts, angles, and other secondary structural panel support members and anchorage have been installed to meet requirements of panel manufacturer.
  - 2. Do not proceed with wall panel installation until unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Coordinate metal wall panels with rain drainage work; flashing; trim; and construction of roofing, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.
- B. Promptly remove protective film, if any, from exposed surfaces of metal panels. Strip with care to avoid damage to finish.
- C. Secondary Structural Supports: Install girts, angles, and other secondary structural panel support members and anchorage according to the Light Gage Structural Institute's "Guide Specifications," Section 07410, "Manufactured Roof and Wall Panels."

**3.3 PANEL INSTALLATION**

- A. General: Comply with panel manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Field cutting exterior panels by torch is not permitted.
  - 2. Locate and space exposed fasteners in true vertical and horizontal alignment. Use proper tools to obtain controlled, uniform compression for positive seal without rupture of neoprene washer.
- B. Accessories: Install components required for a complete wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, seam covers, flashings, louvers, sealants, gaskets, fillers, closure strips, and similar items.
- C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not otherwise indicated, types recommended by panel manufacturer.
  - 1. Install weatherseal to prevent air and moisture penetration. Flash and seal panels at ends and intersections with other materials with rubber, neoprene, or other closures to exclude weather.
  - 2. Seal panel end laps with a bead of tape or sealant, full width of panel. Seal side joints where recommended by panel manufacturer.
- D. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating or by other permanent separation as recommended by manufacturers of dissimilar metals.
- E. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4 inch in 20 feet on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

**3.4 CLEANING AND PROTECTING**

- A. Damaged Units: Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- B. Cleaning: Remove temporary protective coverings and strippable films, if any, as soon as each panel is installed. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

**END OF SECTION**

**SECTION 074293 - SOFFIT PANELS**

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**SECTION 074293 - SOFFIT PANELS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Metal soffit panels. <M-5>

**1.2 RELATED SECTIONS**

- A. 074213 Metal Wall Panels
- B. 083100 Access Doors and Panels

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Warranties: Samples of special warranties.

**1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

**1.6 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Finish Warranty Period: 10 years from date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Other Design Loads: As indicated on Drawings.
  - 3. Deflection Limits: For wind loads, no greater than 1/240 of the span.

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**SECTION 074293 - SOFFIT PANELS**

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**2.2 METAL SOFFIT PANELS**

- A. Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. Metal Soffit Panels: Match profile and material of metal panels.
  - 1. Finish: As indicated on Drawings.
- C. Flush-Profile Metal Soffit Panels <M-5>: Solid panels formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.
- D. Basis of Design: The design is based on Flush Panel Metal Siding manufactured by AEP Span. No substitutions allowed.
  - 1. Material: Steel conforming to ASTM A792.
    - a. 24 Gauge: Yield strength 50,000 psi; with aluminum-zinc alloy coating conforming to ASTM A792, Class AZ50.
    - b. Thickness and yield strength as required for performance indicated; with aluminum-zinc alloy coating conforming to ASTM A792, Class AZ50 or with zinc coating conforming to ASTM A653, Class G 90.
  - 2. Exterior Finish: Two-coat fluoropolymer .
    - a. Color: As selected by Architect from manufacturer's full range.

**2.3 MISCELLANEOUS MATERIALS**

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
  - 1. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

**2.4 FABRICATION**

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

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**SECTION 074293 - SOFFIT PANELS**

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- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

**2.5 FINISHES**

- A. Panels and Accessories:
  - 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.
  - 1. Soffit Framing: Wire tie or clip furring channels to supports.

**3.2 INSTALLATION**

- A. Metal Soffit Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
  - 1. Apply panels and associated items true to line for neat and weathertight enclosure.
  - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
  - 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
  - 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
- B. Watertight Installation:
  - 1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels and elsewhere as needed to make panels watertight.
  - 2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
  - 3. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.



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**SECTION 074293 - SOFFIT PANELS**

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- C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

**3.3 CLEANING**

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

**END OF SECTION**

**REI – GLENWOOD SPRINGS  
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SECTION 074623 - WOOD SIDING**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Building paper.
  - 2. Exterior siding and soffits.
  - 3. Exterior trim.
  - 4. Related flashings, accessories, and fastenings.
- B. Related Sections:
  - 1. 061000 - Rough Carpentry: Substrate.
  - 2. 076200 - Flashing and Sheet Metal Trim: Metal flashing.
  - 3. 079200 - Joint Sealants: Joint fillers.
  - 4. 099000 - Painting: Finishing of wood siding and trim.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 REFERENCES**

- A. ASTM International (ASTM): ([www.astm.com](http://www.astm.com)): D226 - Asphalt-Saturated Organic Roofing Felt.
- B. West Coast Lumber Inspection Bureau (WCLIB): Standard Grading Rules for West Coast Lumber.
- C. Product Standard: PS-20 American Softwood Lumber Standard.

**1.3 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product Data: Submit for plywood siding.
- C. Submit Samples:
  - 1. Each type of proposed fastener.
  - 2. Each type of siding furnished under this section. Samples shall be accurate representations of materials which will be installed in the Work and shall be large enough to show characteristics of the materials which will be visible in the finished work. Siding purchase shall not occur until samples are approved by the Architect.

**1.4 QUALITY ASSURANCE**

- A. Mock Up:
  - 1. Provide mock ups in accordance with Section 014500.
  - 2. Install a minimum of 1000 board feet of materials in locations on the Work as directed by the Architect.

**1.5 DELIVERY AND STORAGE**

- A. Deliver products to site under provisions of Section 016000.
- B. Wood materials shall be allowed to acclimate to the site prior to work under this section. Wood materials shall be stored, stickered, and under cover at the site for a minimum of seven days prior to priming, finishing and installation.

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**SECTION 074623 - WOOD SIDING**

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Wood Siding and Soffit
  - 1. Delta Millworks
    - a. [deltamillworks.com](http://deltamillworks.com)
    - b. 4701 East 5th ST, Austin, TX 78702
    - c. (512) 385-1812
  - 2. 1x6, 6' -16' random lengths, edge profiles as indicated in the Drawings
  - 3. Color(s)/finish(es) as indicated in the Drawings.

**2.2 ACCESSORIES**

- A. Fasteners:
  - 1. "Splittless" ring-shank nails or screws.
  - 2. Use stainless steel 304 or 316, hot-dipped galvanized per ASTM A-153 or aluminum fasteners.
  - 3. Pre-drill holes to 0.04" less than nail diameter.
  - 4. Preserve the quality of the wood and finish by using caution when installing siding.
  - 5. Use the appropriate length of nail (fastener must drive at least 1.25" into a solid substrate or wall stud).
  - 6. Assess environmental conditions prior to choosing a fastener (coastal and other extreme climates may affect fastener choice).
- B. Building Paper: Du Pont Company "Tyvek," Simplex Products Division "R-Wrap," or approved.
- C. Flexible Flashing: GCP Applied Technologies "Perm-A-Barrier" Wall Flashing, or "Ice and Snow Shield," or approved.
- D. Soffit Screen: Aluminum bug screen; natural aluminum.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully examine the installed work of other trades and verify that such work is complete to the point where work of this section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

**3.2 PREPARATION**

- A. Back Kerfing: Back kerf trim and siding where necessary to prevent warpage and where indicated on Drawings.

**3.3 INSTALLATION**

- A. Building Paper: Install in accordance with the manufacturer's recommendations and as follows. Install one layer of building paper horizontally on sheathed walls. Weather lap edges and ends minimum 6 inches. Stagger vertical joints. Staple or nail in place. Lap over metal flashing.
- B. Install metal flashings at sills, and head of wall openings to ensure water flow to the exterior. Provide "Z" and drip flashing at non-lapping horizontal joints to prevent water penetration.
- C. Flexible Flashing:
  - 1. Provide 6 inch wide flexible flashing strips at window, door, and other wall penetrations.
  - 2. Lap to the frame of the penetrating element as necessary seal perimeter joint, but not so that the membrane will be exposed in the finished work.

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3. Install strips in sequence; first at the sill, next at the jamb, and last at the head condition. Lap all strips to weather.
  4. Integrate flexible flashing with building paper and related metal flashing as necessary to shed water and lap to weather.
- D. General Installation Requirements for Siding and Trim:
1. Arrange components to encourage watershed. Securely fasten in place, aligned, level, and plumb. Cut board ends over bearing surfaces.
  2. Exercise care when site cutting. Cut edges shall be smooth and clean.
  3. Allow 1/8 inch space for sealant at adjacent construction, and between siding and trim.
  4. Align coursing wherever possible.
  5. Fabricate exposed surfaces of special shapes to a uniform profile free of saw marks and other surface irregularities.
  6. Components shall be plumb and level unless indicated otherwise.
- E. General Fastening Requirements:
1. Surfaces to Receive Stain: Nail flush with siding surface.
  2. Surfaces to Receive Paint: Countersink nails and putty over flush with adjacent surfaces.
  3. Arrange for orderly nailing pattern.
  4. Adhesive joints shall have no squeeze out.
- F. Trim:
1. Nail securely at each support.
  2. At solid backing, fasten securely with nails 1 inch from the edge at 12 inches on center.
  3. Allow space for sealant and flashing.

**END OF SECTION**

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**SECTION 076200 – SHEET METAL FLASHING AND TRIM**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Sheet metal and flashing associated with roof repair, roofing installation, re-flashing of existing work, and new openings.
  - 2. Sheet metal flashing and trim for the following:
    - a. Exposed trim, and fasciae.
    - b. Cap flashings.
    - c. Metal flashing.
    - d. Gutters and downspouts.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 07 Section "Joint Sealants" for elastomeric sealants.

**1.2 PERFORMANCE REQUIREMENTS**

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.
- B. Fabricate and install flashings at roof edges to comply with recommendations of Owner's Insurance Company.

**1.3 SUBMITTALS**

- A. Submit the following according to the Conditions of the Contract and Division 01 Sections:
  - 1. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

**1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

**PART 2 - PRODUCTS**

**2.1 METALS**

- A. Pre-painted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
  - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.
  - 2. Exposed Finishes: Apply the following coil coating:
    - a. High-Performance Organic Finish: Two-coat thermo-cured system containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2604, except as modified for below:
      - 1) Color: As scheduled on Drawings.
- B. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.

**2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES**

- A. Solder: ASTM B 32, Grade Sn50, used with rosin flux.
- B. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
- C. Flexible Flashing:
  - 1. Concealed Wall Flashing: "Blueskin SA" by Henry or approved.
  - 2. Under Metal Coping: Butyl based "Vycor Ultra" by W.R. Grace.

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- D. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat. Verify mastic is compatible with sheet membrane roof material
- E. Mastic Sealant: Polyisobutylene; nonhardening, non-skinning, nondrying, nonmigrating sealant.
- F. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 07 Section "Joint Sealants."
- G. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal. Verify adhesives are compatible with sheet membrane roof material
- H. Paper Slip Sheet: 5-lb/square red rosin, sized building paper, FS UU-B-790, Type I, Style 1b.
- I. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.
- J. Roofing Cement: ASTM D 4586, Type I, asbestos free. Verify compatible with sheet roof material.

**2.3 FABRICATION, GENERAL**

- A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
- B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.
- D. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- E. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24" of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1" deep, filled with mastic sealant (concealed within joints).
- F. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- G. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.
- H. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
- I. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer. Size as recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

**2.4 SHEET METAL FABRICATIONS**

- A. Fabricate all flashing to detail and as specified below. Use minimum 24 gage prefinished galvanized steel sheet unless indicated or specified otherwise.
  - 1. Roof-drain Flashing: Lead Sheet: 0.1094 inch thick
  - 2. Exposed Trim and Fascia: 0.0276 inch thick.
  - 3. Copings: 0.0396 inch thick.

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4. Base Flashing: 0.0276 inch thick.
5. Counterflashing: 0.0217 inch thick.
6. Equipment support flashing: 0.0276 inch thick.
7. Roof Penetration Flashing: 0.0276 inch thick.
8. Drip Edges: 0.0276 inch thick.
9. Mechanical Vent Flashing: Lead Sheet: 0.1094 inch thick.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

- A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.
- B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- C. Roof-Edge Flashings: Secure metal flashings at roof edges according to meet Owner's Insurance Company Requirements for specified wind zone.
- D. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- E. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2", except where pre-tinned surface would show in finished Work.
- F. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant. Use joint adhesive for nonmoving joints specified not to be soldered.
- G. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- H. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.
- I. Counterflashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches and bed with sealant.

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**3.3 CLEANING AND PROTECTION**

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

**END OF SECTION**



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SECTION 077233 - ROOF HATCHES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Roof access hatches.
  - 2. Retractable safety post.
  - 3. Safety railing system.
- B. Related Section:
  - 1. 055133 - Prefabricated Ladders: Vertical roof access ladders.
  - 2. 075400 - Thermoplastic Membrane Roofing: Coordination.
- C. Drawings, the provisions of Division 01 specification sections apply to all work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product data.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Acceptable Manufacturers:
  - 1. Babcock-Davis Hatchways, Inc. ([www.babcockdavis.com](http://www.babcockdavis.com))
  - 2. Bilco Co. ([www.bilco.com](http://www.bilco.com))
  - 3. Milcor/Commercial Products Group. ([www.commercialproductsgroup.com](http://www.commercialproductsgroup.com))
  - 4. Nystrom, Inc. ([www.nystrom.com](http://www.nystrom.com))
  - 5. Precision Ladders, LLC. ([www.precisionladders.com](http://www.precisionladders.com))

**2.2 MANUFACTURED UNITS**

- A. Size, Configuration: 30 by 36-inch nominal size, single leaf type.
- B. Curb: 11 gage aluminum with 1-inch rigid insulation; integral cap flashing to receive roof flashing system; extended flange for mounting; mill finish.
- C. Cover: 11 gage aluminum with minimum one-inch glass fiber insulation retained by inner aluminum liner. Continuous gasket to provide weatherproof seal; mill finish.
- D. Hardware:
  - 1. Manufacturer's standard manually operated type with compression spring or torsion bar counterbalance, positive snap latch with turn handles inside and out; automatic hold-open arm with grip handle for easy release.
  - 2. Padlock Hasp: Provide at hatch interior.
- E. Hinges: Manufacturer's standard heavy duty zinc-plated pintle type.
- F. Provide for removal of condensation.

**2.3 ACCESSORIES**

- A. Retractable Safety Post: Bilco "LadderUp" Safety post or approved; black enamel steel finish.
- B. Safety Railing System:
  - 1. Manufacturer:
    - a. The Bilco Company (New Haven, CT; 203-934-6363) "Bil-Guard" Hatch Railing System.

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**SECTION 077233 - ROOF HATCHES**

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- b. Kee Safety, Inc. (Buffalo, NY; 800-851-5181) "KeeHatch" Safety Railing System.
- 2. Configuration: Side or end-exit orientation as applicable at retrofit, mid-rails, and end-chain or swing gate.

**PART 3 - EXECUTION**

**3.1 INSPECTION**

- A. Verify that deck openings, supports, and other items affecting the work of this Section are complete and positioned correctly.
- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

**3.2 INSTALLATION**

- A. Install components in accordance with manufacturer's instructions, and as indicated. Coordinate with installation of metal deck and concrete fill, roofing, flashing, and other trades as necessary to ensure secure and watertight installation.
- B. Mount safety post to access ladder beneath roof hatch in accordance with manufacturer's recommendations.
- C. Mount safety railing system to roof hatch in accordance with manufacturer's recommendations.

**END OF SECTION**

**SECTION 079000 – JOINT SEALANTS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Exterior joints in horizontal traffic surfaces as indicated below:
    - a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
    - b. Other joints as indicated.
  - 2. Exterior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below
    - a. Perimeter joints of openings where indicated.
    - b. Other joints as indicated.
  - 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:
    - a. Perimeter joints of openings where indicated.
    - b. Acoustic sealing of concealed perimeter joints of GWB partitions to reduce sound transmission.
    - c. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
    - d. Perimeter joints of toilet fixtures.
    - e. Perimeter of mirrors and benches in fitting rooms.
    - f. Other joints as indicated.
  - 4. Interior joints in horizontal traffic surfaces as indicated below:
    - a. Control and expansion joints in cast-in-place concrete slabs.
    - b. Other joints as indicated.
- B. Related Sections: The following Section contain requirements that relate to this Section:
  - 1. Division 08 Section "Glazing" for sealants used in glazing.

**1.2 SYSTEM PERFORMANCE REQUIREMENTS**

- A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates. Maintain fire resistance rating of exterior and interior walls.

**1.3 SUBMITTALS**

- A. Submit the following in accordance with Conditions of Contract and Division 01 Sections:
  - 1. Product data from manufacturers for each joint sealant product required, including VOC content.
  - 2. Samples of each type and color of sealant required. Install sealant samples in 1/2" wide joints formed between two 6" long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
  - 3. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.

**1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.
- B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

**1.5 PROJECT CONDITIONS**

- A. Environmental Conditions: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside the limits permitted by manufacturer.
- B. Joint Width and Substrate Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by manufacturer for application indicated, or until contaminants capable of interfering with their adhesion are removed from joint substrates.

SECTION 079000 – JOINT SEALANTS

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**1.6 SEQUENCING AND SCHEDULING**

- A. Sequence installation of joint sealants to occur not less than 21 or more than 30 days after completion of waterproofing, unless otherwise indicated.

**PART 2 - PRODUCTS**

**2.1 REQUIREMENTS**

- A. Refer to VOC limit tables in Section 018119 for VOC limits for adhesive and sealant products in this section.

**2.2 SEALANTS**

- A. Silicone; Neutral Cure: Exterior vertical and horizontal non-traffic bearing sealant. Maximum VOC content of 250 grams per liter.
1. Typical Locations: Provide at all perimeter joints of openings and other joints as indicated.
  2. Provide one of the following:
    - a. 790/795; Dow Corning.
    - b. Silpruf SCS-2200/2700; General Electric Co.
    - c. Silicone; Pecora Corporation.
    - d. Spectrem 1; Tremco Incorporated
- B. Silicone; Mildew-Resistant: Formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes. Maximum VOC content of 250 grams per liter.
1. Typical Locations: Joints around countertops in kitchen or coffee areas; joints around sinks, etc.
  2. Provide one of the following:
    - a. 786 Mildew Resistant; Dow Corning.
    - b. Sanitary 1700; GE Silicones.
    - c. 898 Silicone Sanitary Sealant; Pecora Corporation.
- C. Urethane; Multicomponent Pourable: Type M, Grade P, Class 25; with maximum VOC content of 250 grams per liter for interior applications; standard colors as selected.
1. Typical Locations: Provide at all exterior and interior horizontal joints subject to traffic and abrasion with slope less than 6%, unless specified otherwise.
  2. Uses Related to Exposure: T (traffic).
  3. Provide one of the following:
    - a. THC-900; Tremco.
    - b. MasterSeal SL 2; BASF.
    - c. NR-200 Urexpand; Pecora Corporation.
    - d. 2C SL; SikaFlex.
- D. Urethane; Multicomponent Nonsag: Type M, grade NS, Class 25; with maximum VOC content of 250 grams per liter, custom colors to match the Architect's samples.
1. Typical Locations: Horizontal expansion joints in tile.
  2. Uses Related to Exposure: T (traffic).
  3. Provide one of the following:
    - a. Dynatred; Pecora.
    - b. 2C NS TG; Sikaflex; Sika Corporation
    - c. THC-901; Tremco.
- E. Latex Joint Sealants: Provide manufacturer's standard one-part, nonsag, mildew-resistant, paintable latex sealant of formulation indicated that is recommended for exposed applications on interior and protected exterior locations and that accommodates indicated percentage change in joint width existing at time of installation without failing either adhesively or cohesively.
1. Acrylic-Emulsion Sealant: Per ASTM C 834 with maximum VOC content of 250 grams per liter that accommodates joint movement of not more than 5 percent in both extension and compression for a total of 10 percent.
  2. Provide one of the following:

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- a. AC-20; Pecora Corp.
  - b. MasterSeal NP 520; BASF.
  - c. Tremco Acrylic Latex 834; Tremco, Inc.
- F. Epoxy: Two-part, self-leveling, 100% solids joint filler with maximum VOC content of 250 grams per liter.
  - 1. Typical Locations: Exposed sawcuts and construction joints in interior concrete slabs.
  - 2. Color: Gray.
  - 3. Provide one of the following:
    - a. MasterSeal CR 190 Control Joint Filler / Crack Filler; BASF
    - b. Sikadur 51 SL; Sika Corp.
    - c. Euco 700; The Euclid Chemical Company.
- G. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, per ASTM C 834, with maximum VOC content of 250 grams per liter, effective in reducing airborne sound transmission through perimeter joints and openings in building construction per ASTM E 90, flame spread and smoke developed ratings of less than 25 per ASTM E 84.
  - 1. Provide one of the following:
    - a. SHEETROCK Acoustical Sealant; United States Gypsum Co.
    - b. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
- H. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, nonhardening, nonskinny, nonstaining, gunnable, synthetic rubber sealant with maximum VOC content of 250 grams per liter recommended for sealing interior concealed joints to reduce transmission of airborne sound.
  - 1. Provide one of the following:
    - a. BA-98; Pecora Corp.
    - b. Tremco Acoustical Sealant; Tremco, Inc.

### **2.3 JOINT SEALANT BACKING**

- A. General: Provide backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
- C. Elastomeric Tubing Joint Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to -26 deg F (-32 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

### **2.4 MISCELLANEOUS MATERIALS**

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

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- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean concrete, masonry, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
  - 3. Remove laitance and form release agents from concrete.
  - 4. Clean metal, glass, porcelain enamel, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

**3.3 INSTALLATION OF JOINT SEALANTS**

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply. Sealant installation standard ASTM C 1193. Acoustical sealant application standard ASTM C 919.
- B. Installation of Sealant Backings: Install joint fillers of type indicated 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.
  - 1. Do not leave gaps between ends of joint fillers.
  - 2. Do not stretch, twist, puncture, or tear joint fillers.
  - 3. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
  - 4. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
- C. Installation of Sealants: 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 widths that

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**SECTION 079000 – JOINT SEALANTS**

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allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

- D. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

**3.4 CLEANING**

- A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

**3.5 PROTECTION**

- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

**3.6 SEALANT SCHEDULE**

- A. Exterior Joints in Vertical and Non-Traffic Horizontal Surfaces: Single-part neutral curing silicone or as required to maintain the fire-resistance rating of the exterior wall.
- B. Exterior Joints in Horizontal Traffic Surfaces: Multi-part pourable urethane.
- C. Interior Joints in Vertical and Overhead Surfaces:
  - 1. Control and Expansion Joints on Interior Surfaces: Single-part neutral curing silicone.
  - 2. Exposed and Concealed Acoustic Joints: Acoustic joint sealant.
  - 3. Perimeter Joints of Interior Surfaces and Frames at Door and Windows: Latex acrylic emulsion.
  - 4. Perimeter-Joints of Toilet Fixtures: Single-part neutral curing silicone.
  - 5. Other Joints: Latex acrylic emulsion.
- D. Interior Joints in Horizontal Traffic Surfaces: Epoxy.

**END OF SECTION**

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**SECTION 081000 – WOOD DOORS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Solid core flush wood doors with hardboard faces.
  - 2. Solid core flush wood doors with veneer faces.
  - 3. Stile and rail wood doors with glazed panels.
  - 4. Shop priming of flush wood doors.
  - 5. Factory finishing of flush wood doors.
  - 6. Factory machining for hardware.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. 081214 - Knock-Down Hollow Metal Frames: Steel frames.
  - 2. 087100 - Finish Hardware: For door hardware.
  - 3. 088000 - Glazing: For glass in wood doors.
  - 4. 099000 - Painting: For field painting of shop primed doors.

**1.2 SUBMITTALS**

- A. Submit the following according to the Conditions of the Contract and Division 01 Sections:
  - 1. Product data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.
    - a. Include data for door cores and certification from manufacturer that materials do not contain added urea formaldehyde.
  - 2. Shop drawings indicating location and size of each door, elevations, details, location and extent of hardware blocking, fire ratings, requirements for factory finishing and other pertinent data. Indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light and louver openings.
  - 3. Samples, 12" square, showing door faces with typical range of color and grain for each veneer and lumber species required for transparent finish.

**1.3 QUALITY ASSURANCE**

- A. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grade of door, core, construction, finish, and other requirements.
- B. Fire-Rated Wood Doors: Per NFPA 80; and are identical in materials and construction to units tested per ASTM E 152; and are labeled and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.

**1.4 PROJECT CONDITIONS**

- A. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with AWI quality standard Section 100-S-11 "Relative Humidity and Moisture Content," applicable to Project's geographical location:

**1.5 WARRANTY**

- A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4" in a 42" x 84" section or that show telegraphing of core construction in face veneers exceeding 0.01" in a 3" span, or do not conform to tolerance limitations of referenced quality standards.



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**SECTION 081000 – WOOD DOORS**

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1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.
2. Solid Core Interior Doors: Warranty shall be in effect during the life of the installation.

**PART 2 - PRODUCTS**

**2.1 REQUIREMENTS**

- A. Composite wood products used on the interior of the building must not contain any added urea-formaldehyde.

**2.2 INTERIOR FLUSH WOOD DOORS**

- A. Solid Core Doors for Opaque Finish: Comply with the following requirements:
  1. Faces: Medium-density overlay over standard thickness hardwood face veneers.
  2. Grade: Premium.
  3. Construction: Hardboard faces glued directly to core.
  4. Core: Particleboard core.
  5. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.
- B. Solid Core Doors for Transparent Finish: Comply with the following requirements:
  1. Faces: Vertical grain fir veneer; book matched. Provide doors with faces produced from the same flitches.
  2. Grade: Premium.
  3. Construction: Veneer faces glued directly to core. 1/8 inch minimum solid hardwood cladding to match veneer.
  4. Core: Particleboard core.
  5. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

**2.3 STILE AND RAIL DOORS**

- A. Interior Wood Doors for Transparent Finish: Comply with the following requirements:
  1. Grade of Doors for Transparent Finish: Premium.
  2. Wood Species: Plain Sliced Ponderosa Pine Veneer.
  3. Stile and Rail Dimensions: 1-3/4" inch thickness x widths indicated.
  4. Glazed Panel Characteristics: Laminated safety glass per Division 8 Section "Glazing".

**2.4 FABRICATION**

- A. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings, DHI A115-W series standards, and hardware templates.
- B. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
  1. Light Openings: Trim openings with moldings of material and profile indicated.
  2. Glazed Panel Characteristics: Laminated safety glass per Division 8 Section "Glazing".
  3. Louvers: Factory install louvers in prepared openings.

**2.5 FINISHING**

- A. Doors for Opaque Finish: Shop prime exposed portions of doors for paint finish with one coat of wood primer specified in Division 9 Section "Painting."
- B. Doors for Transparent Finish: Matte, water-based polyurethane to match finish of adjacent plywood paneling, shop-finished as a part of the work of Section 099000.
- C. Doors for Transparent Finish: Finish doors at factory that are indicated to receive transparent finish.
  1. Finish: AWI System TR-6 catalyzed polyurethane.
  2. Grade: Premium.

**SECTION 081000 – WOOD DOORS**

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**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine installed door frames prior to hanging door: Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads. Reject doors with defects.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

- A. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced quality standard and as indicated. Install fire-rated doors in corresponding fire-rated frames according to requirements of NFPA 80.
- B. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
  - 1. Fitting Clearances for Non-Fire-Rated Doors: Provide 1/8 inch at jambs and heads, 1/16 inch per leaf at meeting stiles for pairs of doors, and 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4-inch clearance from bottom of door to top of threshold.
  - 2. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
  - 3. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
  - 4. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.
- C. Field-Finished Doors: Refer to Division 09 Section "Painting."

**3.3 ADJUSTING AND PROTECTION**

- A. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
- C. Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at the time of Substantial Completion.

**END OF SECTION**

**SECTION 081214 – KNOCKED DOWN HOLLOW METAL FRAMES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Knocked down, site assembled, factory primed metal, non-fire rated frames for wood doors in interior applications.
- B. Related Sections:
  - 1. 079200 - Joint Sealants.
  - 2. 081000 - Wood Doors: Doors for metal frames; installation of doors.
  - 3. 087100 - Finish Hardware: For door hardware.
  - 4. 088000 - Glazing: Glazing in frames.
  - 5. 092116 - Gypsum Board Assemblies: Bracing for frame installation.
  - 6. 099000 - Painting: Field painting of frames.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 012500.

**1.2 REFERENCES**

- A. ASTM International (ASTM): ([www.astm.org](http://www.astm.org))
  - 1. A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

**1.3 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product Literature: Manufacturer's published literature indicating products to be incorporated in the work.
- C. Shop Drawings: Indicate configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.

**1.4 DELIVERY, STORAGE AND HANDLING**

- A. In accordance with Section 016000.
- B. Factory package door frames individually with surface protected against shipping and handling.
- C. Store in a dry protected area off the ground. Do not store outdoors under a tarp.

**PART 2 - PRODUCTS**

**2.1 FRAMES**

- A. Manufacturer:
  - 1. Curries / Assa Abloy (Mason City, IA; 641-423-1334).
  - 2. Acceptable Option (subject to compliance with Contract Document requirements and Architect's approval of conformance to design intent): Karpen Steel (Weaverville, NC; 828- 645-4821)
- B. Frame and Trim Material: Cold rolled steel to ASTM A1008 with proprietary chemically passivated treatment.
- C. Window and Door Frame Profile: "KD Drywall Frames" double return back bend; 14 gage thick; equal rabbet.
- D. Cased Opening: "KD Drywall Frames" double return back bend; 14 gage thick; no stops.

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**SECTION 081214 – KNOCKED DOWN HOLLOW METAL FRAMES**

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- E. Face Dimension: 2 Inches.
- F. Accessories:
  - 1. Frame Reinforcements for Site Installation: Manufacturer's standard reinforcements for hardware as indicated in Section 087100.
  - 2. Glass Stops: Removable rolled steel, shape, butted ends. Pre-punch and countersink for flathead TEK screws.
  - 3. Furnish fasteners, shims, and other accessories as necessary for a complete installation.
- G. Fabrication:
  - 1. Cut, notch and fabricate frames at manufacturer's facility.
  - 2. Flush hairline miter at corner of head and jamb.
  - 3. Hinge Reinforcing: Provide minimum 7 gage hinge reinforcing, tapped for machine screws supplied with hinges.
  - 4. Lock/Strike Reinforcing: 14 gage x Template.
  - 5. Provide compression bar anchor system at top of each jamb to secure frame in opening.
  - 6. Provide optional bottom base anchor for concealed attachment.
  - 7. Provide manufacturer's standard steel glass stop, factory cut to exact length.
  - 8. Prepare frames for strikes, where required. Provide minimum 1/4 inch depth of threads in factory tapped screw holes.
  - 9. Furnish 16 gage concealed corner reinforcement and alignment clips.
  - 10. Finish: Frames shall be bonderized and receive one coat of factory baked-on prime coat.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

**3.2 INSTALLATION OF FRAMES**

- A. Install frames in accordance with manufacturers written instructions.
- B. Installation Tolerances; Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.
- C. Coordinate with wall construction for anchor placement; secure anchorages and connections to adjacent construction.
- D. Brace frames solidly to maintain in position while being built-in.
- E. Install loose accessories.
- F. Door installation is specified in Section 081000.
- G. Hardware is specified in Section 087100.

**END OF SECTION**

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**SECTION 083100 - ACCESS DOORS AND PANELS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Non-rated access doors and frames and accessories.
- B. Related Sections:
  - 1. 074923 – Soffit Panels
  - 2. 092116 – Gypsum Board Assemblies: Framing of openings for access doors; finishes for concealed access doors.
  - 3. 099000 - Painting: Field paint finish.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product Data. Include sizes, types, finishes, scheduled locations, and details of adjoining work.

**PART 2 - PRODUCTS**

**2.1 WALL AND CEILING ACCESS DOORS**

- A. Acceptable Manufacturers:
  - 1. Milcor LP. (Lima, OH; 800-441-6899).
  - 2. The Williams Brothers Corporation of America (Front Royal, VA; 800-255-5515).
  - 3. Nystrom Products Co. (Minneapolis, MN; 612-781-7850).
  - 4. Karp Associates, Inc. (Maspeth, NY; 718-784-2105).
  - 5. JL Industries (Bloomington, MN; 612-835-6850)
- B. Door Types:
  - 1. Non Rated Metal Wall and Ceiling Access Door:
    - a. Flush type design with exposed trim flange.
    - b. 16 gage steel frame; 14 gage door panel.
    - c. Fully concealed pin type hinges or continuous piano hinge, 175 degree opening.
    - d. Latches: Screwdriver operated cam latch.
  - 2. Non Rated Concealed Drywall Access Door:
    - a. Flush type design, with integral attachment flange and drywall bead for flush installation.
    - b. Minimum 16 gage frame; minimum 14 gage door panel.
    - c. Fully concealed pin type hinges or continuous piano hinge, 175 degree opening.
    - d. Latches: Screw driver operated cam type.
  - 3. Metal Soffit Panel Access Door
    - a. Flush type design with exposed trim flange.
    - b. 16 gage steel frame; 14 gage door panel.
    - c. Size to correspond to soffit panel width(s).
    - d. Fully concealed pin type hinges or continuous piano hinge, 175 degree opening.
    - e. Latches: Screwdriver operated cam latch.
    - f. Finish to match soffit panels
- C. Sizes: Approximately 12" x 12" size for hand access, 22" x 22" size for man entry, unless indicated otherwise; furnish custom sizes as necessary.
- D. Finish: Galvanized steel with wiped coat finish; prime units with manufacturer's standard primer to receive paint coatings as specified in Section 099000. Provide stainless steel access doors at restrooms, and other moist locations.

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**SECTION 083100 - ACCESS DOORS AND PANELS**

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**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.
- C. Verify rough openings for door and frame are correctly sized and located.

**3.2 INSTALLATION**

- A. Install access doors of sizes and in locations as indicated. Provide access doors for access to balancing and fire dampers, trap primers, valves, fans, terminal units, and other equipment requiring periodic inspection through finished walls and ceilings, whether indicated or not. Coordinate access requirements with other trades.
- B. Provide concealed drywall access doors at public locations unless otherwise indicated.
- C. Install frames plumb and level in wall and ceiling openings, with plane of door surface in accurate alignment with plane of wall or ceiling surface.
- D. Secure rigidly in place in accordance with manufacturer's instructions.

**END OF SECTION**

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**SECTION 083819 – DOUBLE ACTING DOORS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Double-acting doors.

**1.2 SUBMITTALS**

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Initial Selection: Manufacturer's color charts showing full range of colors available for units with factory-applied finishes.
- D. Double Acting Door Schedule: Use same designations indicated on Drawings.
- E. Product certificates.
- F. Operation and maintenance data for the following:
  - 1. Finishes, coverings, or facings for doors including finishes for exposed trim and accessories.
  - 2. Hardware, track, carriers, seals, and other operating components.

**1.3 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: Provide folding doors with the following surface-burning characteristics, as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Basis-of-Design Product: The design for double-acting doors is based on products as manufactured by Chase Doors. No substitutions allowed. See Section 011100 for contact information.

**2.2 DOUBLE-ACTING DOORS**

- A. General: Provide abuse-resistant, pivot-hinged, double acting doors.
  - 1. Type: Model SPC-8 Solid Core Style, Biparting Retail Service Doors.
  - 2. Color: Black.
  - 3. Thickness: 3/4 inch.
  - 4. Base Plates: 38 inch high (both sides), 18 gauge stainless steel.
  - 5. Windows: Standard 9 inch x 14 inch clear acrylic set in black rubber molding.
  - 6. Provide small, stainless steel jamb guards.
  - 7. Provide manufacturers standard hold open door hardware.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. General: Install doors to comply with manufacturer's written installation instructions.
- B. Standard Floor Clearances: 1/4 to 3/4 inch maximum (above floor finish).

**3.2 ADJUSTING**

- A. Adjust units as necessary to ensure smooth, quiet operation.

**END OF SECTION**

**SECTION 084113 – GLAZED ALUMINUM FRAMING SYSTEMS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Glazed aluminum exterior framing systems.
  - 2. Glazed aluminum interior vestibule framing systems.
  - 3. Glazed aluminum interior framing systems.
  - 4. Aluminum and glass exterior doors and entrances.
  - 5. Aluminum and glass interior vestibule entrance doors.
  - 6. Sealants within systems.
  - 7. Related flashing and trim.
  - 8. Related anchor brackets and supports.
  - 9. Structural design of systems including framing system, glazing, and attachment to structure.
- B. Related Sections:
  - 1. 079000 - Joint Sealants: Installation of joint sealants installed with glazed aluminum framing systems and for sealants to the extent not specified in this Section.
  - 2. 088000 - Glazing: Glass and glazing requirements.

**1.2 SYSTEMS DESCRIPTION**

- A. Glazing: Physically and thermally isolated from framing members.
- B. Reglazable from the interior.
- C. Appearance: System shall conform to the general appearance as indicated on the drawings, including without limitation, position, spacing, and location of framing members, plane of glazing, exterior frame general profile and shape, and dimension points.

**1.3 PERFORMANCE REQUIREMENTS**

- A. General: Provide glazed aluminum framing systems that have the following capabilities based on preconstruction testing:
- B. Thermal Performance:
  - 1. Systems shall provide for noiseless expansion and contraction caused by a cycling temperature range of -20 degrees F. to 180 degrees F. without causing detrimental effects to components, sealing systems, or surrounding construction.
  - 2. Thermal Transmittance - Exterior and Vestibule System: Provide systems with certification labels stating that they have been tested in accordance with NFRC-100 SB (site-built) to meet the specified requirements using glass which matches the glass to be used in the Project. At the Contractor's option, computer simulated performance calculations may be used when accepted by the jurisdictional code authorities. Provide glazed aluminum framing systems with a U-values required by the local jurisdiction but in no case higher than 0.55.
- C. Structural Design:
  - 1. Wind Loads:
    - a. Design to resist flexural, shear, and torsional stresses caused by positive and negative wind loads indicated on the Structural Drawings, but in no case less than 20 PSF for exterior and vestibule systems and 5 PSF for interior systems.
    - b. Deflection of framing members in a direction normal to wall plane is limited to 1/175 of clear span or 3/4 inches, whichever is smaller
    - c. Wind loads need not be considered as additive to seismic loads.
    - d. Sidesway (Story Drift): Accommodate building story drift when wind loads effect maximum overturning moment. Calculate story drift according to requirements of authorities having jurisdiction.
  - 2. Anchorages and inserts shall be designed to resist all design and live loads, in combinations as specified, and including a contribution of 1.5 x the design wind load.



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**SECTION 084113 – GLAZED ALUMINUM FRAMING SYSTEMS**

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3. Seismic Design: The installed system shall be capable of accommodating seismic loads in compliance with the requirements of Seismic Design Category indicated on the Drawings.
  4. In the plane of the wall, deflection of framing members, when carrying their full design dead loads, shall not reduce the glass bite below 75 percent of the design dimension, reduce the glass edge clearance below 25 percent of the design dimension, or exceed 1/8 inch, whichever is greater.
  5. Uniform Structural Load Test: At 150 percent of design pressure, permanent deflections of framing members shall not exceed 1/1000 of the span length, and components shall not experience failure or significant distortion.
  6. At connection points of framing members to anchors, anchor deflections in any direction shall not exceed 1/8 inch, and permanent set shall not exceed 1/16 inch under 100% design pressure.
  7. Anchor clips with slotted holes shall be calculated in the most extended position.
  8. Each system shall have been tested in accordance with ASTM E330 to resist the maximum design wind loads. Tested assemblies shall have spans equal to or greater than the assemblies proposed for this contract.
- D. Air leakage - Exterior and Vestibule Systems: ASTM E283; maximum per square foot of surface area at differential static pressure of 6.24 psf as follows:
1. Framing System: 0.06 cfm.
- E. Water Control - Exterior and Vestibule Systems:
1. Systems shall drain water entering joints, condensation occurring in glazing channels, or migrating moisture to exterior.
  2. Systems shall remain watertight when tested in accordance with ASTM E331 at a minimum differential static pressure of 8 psf.
- F. Dynamic Movement: Systems shall accommodate the following without damage to system components or performance.
1. Movement within the system.
  2. Movement between the system and perimeter framing components.
  3. Application and release of design live loads
  4. Deflection of structural support framing.
- G. System shall not exhibit vibration harmonics, wind whistles, noises caused by thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of the system.
1. Framing members shall have thermally broken or thermally improved design.
  2. Systems shall not use snap engaged components as structural members.
- H. Dimensional Tolerances: Provide glazed aluminum framing systems, including anchorage, which accommodates dimensional tolerances of building frame and other adjacent construction.

#### **1.4 SUBMITTALS**

- A. Shop Drawings:
1. Elevations, system dimensions, and expansion and contraction joint location.
  2. Special and typical details.
  3. Framing profiles.
  4. Operator and electrical coordination requirements.
  5. Threshold configurations.
  6. Materials, alloys, and finishes.
  7. Adjacent construction.
  8. Anchorage system details.
  9. Fastening methods.
  10. Shop drawings shall be stamped by the designing structural engineer.
- B. Samples:
1. One sample of each typical glazed aluminum framing system corner section with minimum 12-inch long legs. Finish to match Architect's sample. Include typical glass unit and glazing system.
  2. One 12 x 12 inch sample of each type of glass proposed.

**SECTION 084113 – GLAZED ALUMINUM FRAMING SYSTEMS**

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- C. Preconstruction Sealant Test Reports: Compatibility and adhesion test reports from sealant manufacturer indicating that materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with sealants; include sealant manufacturer's interpretation of test results for sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.
- D. Test Reports: Copies of test reports which verify that the glazed aluminum framing systems meet the thermal, structural, air and water infiltration performance requirements specified.
- E. Submit manufacturer's certificate that window units meet or exceed specified performance requirements.

**1.5 QUALITY ASSURANCE**

- A. Installers: Under the direct supervision of the manufacturer of the glazed aluminum framing systems.
- B. Testing Agency Qualifications for NFRC Labeling: An independent agency certified by the NFRC to provide NFRC labels for testing indicated.
- C. Design: Structural design of the glazed aluminum framing systems shall be by a Structural Engineer Licensed to practice in the State where project is located.
- D. Structural welding shall be performed by AWS Certified welders.
- E. Unless specified otherwise, all materials shall conform to the Metal Curtain wall Guide Specifications as published by the Architectural Aluminum Manufacturer's Association.
- F. Pre-installation Conference:
  - 1. Attendance:
    - a. Architect.
    - b. Owner's representative.
    - c. Glazed aluminum framing systems subcontractors.
    - d. Glazing subcontractor.
    - e. Sealant subcontractor.
    - f. Other parties affected by the Work of this Section.
  - 2. Agenda: Include review of scheduling, phasing, coordination with other trades, approvals, glazing, scaffolding, protection, manufacturer's field observation requirements, field quality control, cleaning, and remedies.
- G. Single Source Responsibility: Obtain each type of glazed aluminum framing system, including operable windows and doors, metal panels, exterior flashing and sheet metal, trim, air barriers, related anchors and supports, and exterior sealant systems related to the aluminum framing system, insulation, from one source and by a single manufacturer.
- H. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sight lines and relationships to one another and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, or in-service performance.
- I. Preconstruction Sealant Testing: Perform sealant manufacturer's standard tests for compatibility and adhesion of sealants with each material that will come in contact with sealants and each condition required by curtain-wall systems.
  - 1. Test a minimum of five samples of each metal, glazing, and other material.
  - 2. Prepare samples using techniques and primers required for installed systems.
  - 3. Perform tests under environmental conditions that duplicate those under which systems will be installed.
  - 4. For materials that fail tests, determine corrective measures required to prepare each material to ensure compatibility with and adhesion of sealants, including, but not limited to, specially formulated primers. After performing these corrective measures on the minimum number of samples required for each material, retest materials.

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**1.6 PROJECT CONDITIONS**

- A. Field Measurements: Verify dimensions by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

**1.7 COORDINATION**

- A. Coordinate installation of assemblies and components adjacent to and penetrating glazed aluminum framing systems to ensure that completed installation meets performance criteria established herein.

**1.8 WARRANTY**

- A. Submit a written 5 year warranty executed by the manufacturer agreeing to repair or replace components of glazed aluminum framing systems that fail in materials or workmanship. Failures include, but are not limited to, the following:
  - 1. Structural failures including, but not limited to, excessive deflection.
  - 2. Noise or vibration caused by thermal movements.
  - 3. Failure of system to meet performance requirements.
  - 4. Deterioration of metals, metal finishes, and other materials.
  - 5. Failure of operating components to function normally.
  - 6. Water leakage at exterior storefront locations.
  - 7. Glazing breakage.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Basis-of-Design Products: The design for glazed aluminum framing systems is based on products manufactured by Kawneer as follows (No substitutions allowed):
  - 1. Exterior and Vestibule Storefront (M-3): Trifab 451T.
  - 2. Interior Storefront (M-5): Trifab 450.
  - 3. Doors: Heavy duty extruded aluminum frame; wide stile, dimensions as indicated. Provide with special 10 inch high bottom rail.

**2.2 MATERIALS**

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.
  - 1. Sheet and Plate: ASTM B 209.
  - 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.
  - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
- B. Steel Reinforcement: ASTM A 36 for structural shapes, plates, and bars; ASTM A 611 for cold-rolled sheet and strip; or ASTM A 570 for hot-rolled sheet and strip.
- C. Glazing as specified in Section 088000 - Glazing.
- D. Glazing Gaskets: Manufacturer's standard pre-molded corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers; in hardness recommended by manufacturer.

**2.3 DOOR HARDWARE**

- A. Door Hardware: As scheduled on the Drawings.

**2.4 COMPONENTS**

- A. Brackets and Reinforcements: Provide manufacturer's standard high-strength aluminum brackets and reinforcements. Provide nonstaining, nonferrous shims for aligning system components.
- B. Fasteners and Accessories: Aluminum, stainless steel, or ASTM B633 zinc plated steel and accessories compatible with adjacent materials. Finish exposed portions to match glazed aluminum framing systems.

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1. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.
- C. Anchors: 3-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.
- D. Thermal Breaks - Exterior and Vestibule Systems: Continuous polyamide nylon or continuous polyurethane.
  1. Polyamide nylon shall be reinforced with glass fibers and shall be mechanically locked to extrusions with closely spaced crimps.
  2. Polyurethane shall be poured into a cavity of a single extrusion. The extrusion shall be debridged after the polyurethane hardens. The cavity shall have closely spaced indentations to mechanically lock the polyurethane against slippage in the cavity.
- E. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

## **2.5 FABRICATION**

- A. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
- B. Frame Units: Factory assemble frame units according to Shop Drawings to greatest extent possible. Rigidly secure non-movement joints. Seal joints watertight, unless otherwise indicated. Assemble components to drain water-passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.
  1. Install glazing according to Shop Drawings. Comply with requirements of Division 08
  2. Section 088000 - Glazing unless otherwise indicated.
- C. Fabricate system components to the shapes indicated, with allowance for shim spacing around perimeter of assembly.
- D. Provide internal reinforcement in mullions with members to maintain rigidity. Provide reinforcing at all door strike jambs.
- E. Fabricate storefront system to accommodate hardware using templates furnished from Section 087100.
- F. Sub-Sills - Exterior and Vestibule Systems: Furnish extruded aluminum sub-sills in accordance with manufacturer's installation instructions and as specified below.
- G. Compensation Heads: Where required, furnish compensation channels for head conditions as detailed and as recommended by the storefront system manufacturer.
- H. Make joints flush, hairline, and weatherproof. Seal joints with sealant.
- I. Prefabricate custom brake-formed sections from minimum .050 inch thick aluminum to the configurations indicated. Fabricate to have concealed fasteners in the final installation. Prefinished to match framing sections.
- J. Aluminum Fabrication Tolerances: Conform to AA requirements.
- K. Isolate aluminum from dissimilar materials

## **2.6 FINISHES**

- A. Finish for Exposed Exterior Aluminum Surfaces:
  1. Color Anodized Finish:
    - a. Conform to AA-M12C22A44; Architectural Class I, etched, medium matte, colored anodic coating, 0.7 mil thickness.
    - b. Color: Dark Bronze

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- c. Apply at all aluminum framing member surfaces exposed to view in installed position.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Coordinate dimensions, tolerances, and method of attachment with the other work.

**3.2 INSTALLATION**

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing glazed aluminum framing systems. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints. Seal joints watertight, unless otherwise indicated. Provide means to drain water to the exterior to produce a permanently weatherproof system.

- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

- C. Storefront Framing:

1. Sill Flashing - Exterior and Vestibule Systems:

- a. Provide color matching aluminum back angle and drip flashings in the configuration indicated.
- b. Provide continuous flexible flashing seal of the rough opening sill. Adhere the flexible flashing up the back of the angle and up the jamb at the end dams. Seal all joints. Do not expose the flexible flashing.
- c. Prepare for installation of the sub-sill assembly over.

2. Sub-Sills - Exterior and Vestibule Systems:

- a. Provide extruded aluminum sub-sills in accordance with manufacturer's installation instructions and as follows.
- b. Provide manufacturer's standard end dams and splice plates sealed into position. End dams and splice plates shall match the height of the sub-sill back.
- c. Seal joint between end dam and jamb.
- d. Fasten the sub-sill securely to the sill construction. Cap seal tops of fasteners.
- e. Fasten the storefront framing into the sub-sill. Use manufacturer's standard interlocking anchors which engage the sub-sill and allow fastening of the storefront without penetrating the horizontal pan of the sub-sill.

3. Install water diverters - Exterior and Vestibule Systems.

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4. Compensation Heads:

- a. Provide compensation channels at head conditions in accordance with manufacturer's installation instructions.
- b. Provide manufacturer's standard end caps sealed into position. End caps shall match the height of the compensation channel and shall be pre-finished to match the framing at exposed locations.
- c. Provide interlocking mullion anchors at vertical tubes.

- D. Where compensating head channels are used, screw channels to structure with center of channel fixed and other fasteners through slotted holes.

- E. Screw attach end dams to sub-sill ends; seal joints between dam and sub-sill. Fasten the sub-sill securely into the openings. Cap seal tops of fasteners.

- F. Install sealant to vertical leg of sub-sill and to end dams and set framing into sealant. Fasten the storefront framing into the sub-sill. Use manufacturer's standard interlocking anchors which engage the sub-sill and allow fastening of the storefront without penetrating the horizontal pan of the sub-sill.

- G. Install preformed gasket at top of sub-sill against back of storefront sill.

- H. Securely attach frames to structure. Maintain drainage channels free from construction debris.

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- I. Install factory-assembled frame units plumb and true in alignment with established lines and grades.
- J. Install components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.
- K. Align frames plumb and level, free of warp or twist, in accordance with the installation tolerances. Maintain dimensional tolerances, aligning with adjacent work.
- L. Perimeter sealant is provided under Section 079200.
- M. Doors: Install closers and doors for uniform clearances and smooth operation.

**3.3 INSTALLATION TOLERANCES**

- A. Install glazed aluminum framing 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: Where surfaces abut in line, limit offset from true alignment to 1/16 inch; where a reveal or protruding element separates aligned surfaces by less than 2 inches, limit offset to 1/2 inch.
  - 4. Location: Limit variation from plane or location shown on Shop Drawings to 1/8 inch in 12 feet; 1/2 inch over total length.

**3.4 ADJUSTING**

- A. Set clearances and adjust operating hardware for smooth operation.
- B. Closers:
  - 1. Set manual closers at exterior entrances to pounds spring tension at the pull handles.
  - 2. Set initial opening force to 5 pounds and time delay at barrier free entrances to 15 seconds, unless otherwise directed.

**3.5 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent testing agency to perform the following tests:
  - 1. Air Infiltration: Test areas of installed system identified by Architect for compliance with system performance requirements according to ASTM E 783.
  - 2. Water Spray Test for exterior system: After completing the installation of 75-feet- by-1-story minimum area of each glazed aluminum framing system, test systems for water penetration according to AAMA 501.2 in a minimum of 3 areas each system as directed by Architect and Construction Manager.
- B. Repair or remove Work that does not meet requirements or that is damaged by testing; replace to conform to specified requirements.

**3.6 CLEANING**

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Remove dirt from corners. Wipe surfaces clean.

**END OF SECTION**

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**SECTION 086200 - UNIT SKYLIGHTS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Plastic unit skylights with integral curbs.
  - 2. Fall protection system.
- B. Related Sections
  - 1. 061000 - Rough Carpentry.
  - 2. 075400 - Thermoplastic Membrane Roofing: Coordination.
  - 3. 079200 - Joint Sealants.
  - 4. 092116 - Gypsum Board Assemblies: Interior curb finishes.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to all work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 REFERENCES**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.
  - 2. 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 3. 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
  - 4. 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Architectural Extrusions and Panels.
  - 5. 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Architectural Extrusions and Panels.
- B. American Architectural Manufacturers Association/Window and Doors Manufacturers Association/Canadian Standards Association (AAMA/WDMA/CSA) 101/I.S.2/A440 - Standard/Specification for Windows, Doors and Unit Skylights.
- C. American Society of Civil Engineers (ASCE) 7 - Minimum Design Loads for Buildings and Other Structures.
- D. ASTM International (ASTM):
  - 1. B209 - Standard Specification for Aluminum-Alloy Sheet and Plate.
  - 2. B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 3. D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
  - 4. D1929 - Standard Test Method for Determining Ignition Temperature of Plastics.
  - 5. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 6. E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - 7. E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights.
- E. Energy Star- Qualified Products.
- F. National Fenestration Rating Council (NFRC) 100 - Procedures for Determining Fenestration Products U-Factors.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 013300.

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- B. Product Data: Submit for skylights.
  - 1. Submit typical section details, configuration, dimensions, fastening methods, and performance criteria for system components.
  - 2. Include information for factory finishes, glazing, sealants, accessories, and other required components.
  - 3. Include sample of warranty customized for this Project.
  - 4. Include color charts for finish indicating manufacturer's standard colors available for selection.
- C. Informational Submittals (packaged separately from other submittals): Manufacturer's instructions.
- D. Closeout Submittals: Submit specified warranty in accordance with Section 017700.

**1.4 QUALITY ASSURANCE**

- A. Engineer Qualifications: Registered professional engineer licensed to practice structural engineering, with minimum of five years' experience in design of skylights.
- B. Certifications: Submit manufacturer's certification that products furnished for Project meet or exceed specified requirements.
- C. Skylights: Energy Star qualified for project location; bear Energy Star label.

**1.5 WARRANTY**

- A. Special Warranty: Prepare and submit following in accordance with Section 017700.
  - 1. Warrant installed units to be free from leaks and defects in material and workmanship for ten years.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Manufacturer, Basis of Design:
  - 1. VELUX America LLC, Greenwood, SC 29648; [www.VELUXusa.com](http://www.VELUXusa.com); (800) 878-3589
  - 2. Point of contact: Scott Brodie, Commercial Development Manager, (864) 943-2610, [scott.brodie@velux.com](mailto:scott.brodie@velux.com)
  - 3. Model CD2 \_\_\_\_ 3PI2S Dynamic Dome Skylight.
- B. Acceptable Manufacturers:
  - 1. Bristolite Skylights, Santa Ana, CA 92707.
  - 2. Naturalite Skylight Systems, Terrell, TX 75160.
  - 3. O'Keeffe's Skylights, San Francisco, CA 94124.
  - 4. Wasco Products, Inc., Sanford, ME 04073.
  - 5. Any Suggested Substitution will be reviewed in accordance with Section 012500.

**2.2 SYSTEM DESCRIPTION**

- A. Design Requirements: Manufacturer responsible for designing units, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
  - 1. Drawings: Diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage, or moisture disposal.
  - 2. Requirements Shown by Details: Establish basic dimension of units, sight lines and profiles of members.
  - 3. Provide concealed fastening wherever possible.
  - 4. Attachments: Account for site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening and fracturing connection between units and building structure or between units themselves.
  - 5. Design and size components and anchors to withstand imposed live and dead loads.



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- B. Structural Requirements:
  - 1. Dead Loads: Support actual weight of materials and construction, but not less than unit dead loads prescribed by applicable building codes and ANSI A58.1.
  - 2. Live and Snow Loads: Support design snow load as determined by local jurisdiction requirements, but not less than minimum uniformly distributed live load of 20 PSF.
- C. Thermal Requirements: System to provide for expansion and contraction within system components caused by cycling surface temperature range of 180° F without detrimental effects to system or components.
- D. Sealant Performance and Requirements: Section 079200.
- E. Interface with Adjacent Systems: Coordinate installation with adjacent roofing and support systems, base flashings and counterflashings creating watertight conditions.
  - 1. Accommodate allowable tolerances and deflections for structural members in installation.

## **2.3 MATERIALS AND COMPONENTS**

- A. Aluminum:
  - 1. Extrusions: ASTM B221, alloy 6063-T6 or T5.
  - 2. Sheet or Plate: ASTM B209, alloy and temper as recommended by manufacturer for conditions encountered.
  - 3. Maximize use of recycled aluminum.
- B. Fixed Unit Skylights:
  - 1. Shape: Rectangular.
  - 2. Nominal size: per Drawings.
  - 3. Glazing: Acrylic plastic; dome shape.
    - a. Double Glazing: Clear outer lite; clear prismatic inner lite; air sealed.
  - 4. Configuration: Single units.
  - 5. Frame: Extruded aluminum, ASTM B221 alloy 6063-T5, thermally broken, thickness as appropriate for design loads, reinforced and welded corner joints, with integral condensation drainage gutter, weeps, and counterflashing.
  - 6. Curb: Integral, sheet aluminum, sandwich construction, fibrous glass insulated with integral flange for anchorage to roof deck; insulated, 9 inch nominal height.
    - a. Acceptable product and manufacturer: Model CCA3 manufactured by VELUX America LLC.
- C. Fall Protection: Provide exterior safety screen accessory, only if required by the authority having jurisdiction. Interior safety screens are not acceptable.
- D. Anchorage Devices:
  - 1. Stainless steel, or type recommended by manufacturer. Color coated to match aluminum members where exposed to view.
  - 2. At locations where securing dissimilar metals, provide dual alloy fasteners.
- E. Bituminous Coating: SSPC-Paint 12, alkyd-type, bituminous mastic capable of preventing galvanic action between dissimilar metals, free of lead, chromates, or sulfur and containing no asbestos fibers, compounded for 30 mil dry film thickness per coat.
- F. Shims: Molded or extruded plastic, establishing sufficient space between dissimilar metals to prevent galvanic action or arcing of current.

## **2.4 FABRICATION**

- A. Unit Skylights: Fabrication free of visual distortion and defects.
  - 1. Fabricate to drain water entering joints, or migrating moisture occurring within unit, to exterior.
  - 2. Provide for removal of condensation and water infiltration with integral gutter.

## **2.5 FINISH**

- A. Aluminum: AAMA 611, Architectural Class I anodized to 0.0007 inch minimum thickness, clear.

**SECTION 086200 - UNIT SKYLIGHTS**

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**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of conditions as satisfactory.

**3.2 INSTALLATION**

- A. Unit Skylights: Install in accordance with the manufacturer's installation instructions, and in accordance with the approved shop drawings..
  - 1. Install units plumb, level, square, and free from warp or twist while maintaining dimensional tolerances and alignment with adjacent surfaces.
  - 2. Apply bituminous coating on metal surfaces in contact with concrete and dissimilar metals.
  - 3. Coordinate with installation of roofing system and related flashings.
  - 4. Wood Curb: Install skylight as indicated on Drawings and in accordance with NRCA MB-16.
  - 5. Secure flanges curb as recommended by manufacturer.
  - 6. Install fall protection complying with manufacturer's instructions.

**3.3 CLEANING**

- A. General: clean as recommended by manufacturer. Do not use materials or methods which may damage skylight materials or surrounding construction.

**END OF SECTION**

**SECTION 087100 – FINISH HARDWARE**

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**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section Includes: Items commonly known commercially as finish or door hardware which are required for swinging, sliding, and folding doors, except for items which are otherwise specified or specifically omitted herein.
- B. Related Sections:
  - 1. Section 062000 - Finish Carpentry: Installation of finish hardware.
  - 2. Section 081214 - Knock-Down Hollow Metal Frames.
  - 3. Section 081000 - Wood Doors.
  - 4. Section 087116 - Low Energy Automatic Door Operators.
- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.
  - 1. Windows.
  - 2. Cabinets of all kinds, including open wall shelving and locks.
  - 3. Signs, except as noted.
  - 4. Toilet accessories of all kinds including grab bars.
  - 5. Installation.
  - 6. Rough hardware.
  - 7. Angle sill threshold.
  - 8. Corner guards.

**1.3 SUBSTITUTIONS & SUBMITTALS**

- A. Substitutions: In general, observe the following guidelines for any proposed substitutions:
  - 1. Requests for substitutions must be made in writing 10 days prior to bid date to allow architect to issue an addendum. If proposing a substitute, submit that product data attached to one showing specified item and indicate savings to be made. No other substitutions will be allowed.
  - 2. Items listed with no substitute manufacturers have been requested by Owner or requested by Owner to match existing.
- B. Submittals: Submit digital schedule at earliest possible date prior to delivery of hardware. Organize schedule into "Hardware Sets" with an index of doors and heading, indicating complete designations of every item required for each door or opening. List each door individually. Coded or horizontal format submittal are unacceptable. Include the following information:
  - 1. Type, style, function, size, quantity and finish of each hardware item.
  - 2. Name, part number and manufacturer of each item.
  - 3. Fastenings and other pertinent information.
  - 4. Location of hardware set cross referenced to indications on drawings both on floor plans and in door schedule.
  - 5. Explanation of all abbreviations, symbols, and codes contained in schedule.
  - 6. Mounting locations for hardware.
  - 7. Door and frame sizes and materials.
  - 8. Submit manufacturer's technical data and installation instructions for the electronic hardware.
  - 9. Catalog cuts.
- C. Templates: Where required, furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware.

**SECTION 087100 – FINISH HARDWARE**

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**1.4 QUALITY ASSURANCE**

- A. Qualifications:
  - 1. Obtain each kind of hardware (latch and locksets, exit devices, hinges, and closers) from only one manufacturer, although several may be indicated as offering products complying with requirements.
  - 2. Hardware supplier shall be a direct factory contract supplier who has in his employment a certified hardware consultant (AHC) who is available at all reasonable times during the course of the Work, and for project hardware consultation to the Owner, Architect, and Contractor.
- B. Schedule Designations: Except as otherwise indicated, the use of one manufacturer's numeric designation system in schedules does not imply that another manufacturer's products will not be acceptable, unless they are not equal in design, size, weight, finish function, or other quality of significance. See 1.02 A for substitutions.
- C. Exit Doors: Openable at all times from the inside without the use of a key or any special knowledge or effort.
- D. Fire-rated openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80. This requirement takes precedence over other requirements for such hardware. Provide only such hardware which has been tested and listed by UL for the type and size of door required, and complies with the requirements of the door and the door frame labels. Latching hardware, door closers, ball bearing hinges, and seals are required whether or not listed in the Hardware schedule. In addition, where panic exit devices are required on fire-rated doors, provide supplementary marking on door UL label on exit device indicating "Fire Exit Hardware".
- E. Electronic Security Hardware: Coordinate installation of the electronic security components with the Owner and other related sub-contractor(s). Upon completion of the electronic security hardware installation, verify that all components are working properly and state in the required guarantee that this inspection has been performed.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Acceptance at the Site: Individually package each unit of finish hardware complete with proper fastening and appurtenances, clearly marked on the outside to indicate contents and specific locations in the Work.
- B. Deliver packaged hardware items at the times and to the locations (shop or field) for installation, as directed by the Contractor.

**1.6 PROJECT CONDITIONS**

- A. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- B. Upon request, check the Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

**1.7 WARRANTY**

- A. Provide guarantee from hardware supplier as follows:
  - 1. Closers: Ten years; except electronic closers which shall be two years.
  - 2. Exit devices: Three years.
  - 3. Locksets: Three years.
  - 4. All other hardware: One year.

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**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Approval of manufacturers other than those listed shall be in accordance with paragraph 1.02 A.

Item:	Manufacturer:	Acceptable Substitute:
Hinges:	McKinney	Hager, Stanley
Locks:	Best;Schlage	None
Locks (Fitting Room):	Hager	None
Cylinders:	Best	None
Exit Devices:	Yale	Dorma
Electric Strike	HES	None
Flush Bolts:	Trimco	Ives, Rockwood
Stops:	Trimco	Ives, Rockwood
Viewer	Trimco	Ives, Rockwood
O.H. Holders:	Rixson	Glynn Johnson, ABH
Thresholds:	Pemko	National Guard, Reese
Seals & Bottoms:	Pemko	National Guard, Reese
Closers:	Norton	LCN
Automatic Operators	Record	None

- B. Furnish all items of hardware required to complete the work in accordance with specifications and plans.
- C. Carefully inspect Project for the extent of the finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware furnish finish hardware to specification.

**2.2 MATERIALS**

- A. Locksets: All locksets and latchsets shall be as specified. Strikes shall be 16 gauge curved brass, bronze or stainless steel with a 1" deep box construction, and have of sufficient length to clear trim and protect clothing.
1. Locks shall have minimum 3/4" throw. All deadbolt functions shall have one inch minimum throw.
  2. Comply with requirements of local security ordinances.
  3. Lock Series and Design: Best 40H-15H mortise, 93K-15D cylindrical.
  4. Cylinders and Cores: Best 7-Pin.
- B. Hinges: Outswinging exterior doors shall have non-removable (NRP) pin. All hinge open widths shall be minimum, but of sufficient size to permit door to swing 180. Furnish hinges with five knuckles and flush bearing.
1. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
  2. Provide hinges as listed in schedule.
- C. Exit Devices: Furnish all sets at wood doors with sex bolts unless otherwise specified. Lever handle trim shall match locksets. Provide Glass Bead Kits where interference with Vision Frames occurs. All Touch Bar type devices shall have deadlocking latchbolt, stainless steel touchpads pads and be non-handed. Device push bar must release with 32 lbs maximum pressure when 250 lbs of pull is applied against the pull side of door.
- D. Surface Door Closers: Full rack and pinion type with removable non-ferrous cover. Provide sex bolts at all wood doors. Place closers inside building, stairs, and rooms. Closers shall be non-sized and adjustable.
1. Provide multi-size 1 through 6 at all doors rated or not.
  2. Flush transom offset brackets shall be used where parallel arm closers are listed for doors with fixed panels over.
  3. Drop brackets are required at narrow head rails.

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- 4. Set exterior Doors Closers to have 8.5 lbs. maximum pressure to open, interior non-rated at 5 lbs. , rated openings at 12lbs.
- E. Automatic Door Operators: Refer to Section 087116.
- F. Kick Plates: Provide .050" stainless steel with four beveled edges, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish Type "A" screws to match finish. Armor plates 30 inches high.
- G. Seals: All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.
- H. Screws: All exposed screws shall be Phillips head.
- I. Silencers: Furnish silencers equal to Trimco 1229A on all interior frames, 3 for single doors, 6 for pairs. Omit where any type of seals occur.
- J. Thumbturns shall be ADA compliant lever type actuators.

**2.3 FINISH**

- A. Generally to be BHMA 626 Satin Chrome except:
  - 1. Exterior Butts: US32D
  - 2. Locksets, Latchsets: US32D
  - 3. Push Plates, Pull Plates: US32D
  - 4. Kick Plates, Mop plates: 16 GA. Stainless Steel w/Satin or Matt finish
  - 5. Spray Door Closers to match other hardware, unless otherwise noted.
- B. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

**2.4 KEYING REQUIREMENTS**

- A. Provide construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished on the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys, prepared according to the accepted keying schedule, will be furnished to the Owner by the local Best factory representative prior to occupancy.
- B. All cylinders shall be Best 7-pin housings utilizing Best interchangeable cores.
- C. Permanent keys and cores shall be stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- D. Grand Masterkeys, Masterkeys and other Security keys shall be transmitted to the Owner by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:
  - 1. (2) each Grand Master keys.
  - 2. (4) each Master keys.
  - 3. (2) each Change keys each keyed core.
  - 4. (6) each Construction Master and Construction Control keys.
  - 5. (1) each Control keys.
- F. Contractor provided agent/locksmith will install permanent cores upon completion of all punch list items prior to space turnover Construction cores will be returned to the Best Lock Factory Representative.
- G. Keying schedule: Submit three copies of separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

**SECTION 087100 – FINISH HARDWARE**

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**PART 3 - EXECUTION**

**3.1 HARDWARE LOCATIONS**

- A. Hinges:
  - 1. Bottom Hinge: 10 inches from door bottom to bottom of hinge.
  - 2. Top Hinge: 5 inches from door top to top of hinge.
  - 3. Center Hinge: Center between top and bottom hinge.
  - 4. Extra Hinge: 6 inches from bottom of top hinge to top of extra hinge.
- B. Unless otherwise noted, mount hardware as follows:
  - 1. Lock: 38 inches from finished floor to center of lever or knob.
  - 2. Push Bar: 44 inches from bottom of door to center of bar.
  - 3. Push Plate: 44 inches from bottom of door to center of plate.
  - 4. Pull Plate: 42 inches from bottom of door to center of pull.
  - 5. Exit Device: 39 and 13/16 inches from finished floor to center of pad.
  - 6. Deadlock Strike: 36 inches from floor, centered.

**3.2 INSTALLATION**

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Installation shall conform to local governing agency security ordinance.

**3.3 ADJUSTING**

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.
- B. Inspection: Hardware supplier shall inspect all hardware furnished within 10 days of contractor's request and include with his guarantee a statement that this has been accomplished. Inspector or Contractor shall sign off the hardware as being complete and correctly installed and adjusted. Further corrections of defective material shall be the responsibility of his representative.

**3.4 SCHEDULE OF FINISH HARDWARE**

- A. Refer to drawings.

**END OF SECTION**

**SECTION 087116 – LOW ENERGY AUTOMATIC DOOR OPERATORS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Low energy, heavy-duty, automatic swing door operators and control systems.
  - 2. Metal bollards.
- B. Related Sections:
  - 1. 084113 – Glazed Aluminum Framing Systems: Storefront doors and frames to receive swing operator.
  - 2. 087100 - Door Hardware: Related hardware.
  - 3. Division 26: - Electrical Connections.
- C. Drawings, the provisions of the Agreement, and Division 1 specification sections apply to all work of this Section.
- D. Substitutions: Substitutions will be considered only under the terms and conditions of Section 012500.

**1.2 SUBMITTALS**

- A. Make submittals in accordance with Section 013300, unless specified otherwise.
- B. Product Data: Complete product literature, including standard details, for automatic operator systems and metal bollards.
- C. Shop Drawings: Indicate location of bollards, push button controls and door operators. Provide wiring diagrams including underground, bollard, and door frame conduits.
- D. Contract Closeout Submittals: In accordance with Section 017700. Include operation and maintenance data with operation and maintenance manuals.

**1.3 QUALITY ASSURANCE**

- A. Qualifications of Installers: Use only mechanics who are thoroughly trained and experienced in the skills required and who are completely familiar with the manufacturer's recommended methods of installation plus the requirements of this work.
- B. Automatic door and installation shall conform to the requirements of ANSI A156.19.
- C. All components shall be UL listed.

**1.4 WARRANTY**

- A. Automatic door components and bollards shall be warranted free of defects in materials or workmanship under normal use for a period of two years from the date of substantial completion.

**PART 2 - PRODUCTS**

**2.1 LOW ENERGY DOOR OPERATOR SYSTEMS**

- A. Automatic Swing Door Operators and Manual Closer:
  - 1. Manufacturer (No substitutions): Record - USA (Monroe, NC; 704-289-9212; contact Don Hunter, [don.hunter@record-usa.com](mailto:don.hunter@record-usa.com); 800-438-1937, X217).
  - 2. Type: Series 8100 low energy electro-mechanical swing operator; overhead surface applied; active leaf and manual leaf door configurations as indicated on the Drawings; aluminum housing finish to match storefront; 4-1/2 inches high by 5 inches deep. Include LCN 4040 closer with specialized adaptor plate.
- B. Receiver, Transmitter and Push Plate Switches
  - 1. Manufacturer: BEA, Inc (Pittsburg, PA; 800-523-2462).



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2. Transmitter and Receiver: RF 900 Series, long range, 900 MHz wireless transmitters and receiver.
  3. Vestibule Push Plate and Box (location as indicated): PBDGP Series, dual vestibule pushplate; hardwired or wireless as required by field conditions; 4-3/4 inch surface - mount box, include weather boot and back plate for all-weather conditions; etched graphic, stainless steel, face plates.
  4. Exterior and Interior Push Plate and Box (locations as indicated): PBS Series, single pushplate; hardwired or wireless as required by field conditions; 4-3/4 inch surface - mount box, include weather boot and back plate for exterior conditions; etched graphic stainless steel face plate.
  5. Mounting/Bollard Post: As indicated on the Drawings.
    - a. Coordinate with card reader installation on bollard.
  6. Provide required conduits, including underground conduits to bollard, and raceways for door operators, and card reader as specified in Division 26.
- C. Aluminum Finish: Class II, Dark Bronze, anodized aluminum finish to match storefront framing.
1. All conduit shall be concealed wherever possible. When not possible, finish to header color.
- D. Provide additional parts and accessories as necessary for a complete door operating system.

**2.2 MOUNTING BOLLARDS**

- A. Manufacturer: Wikk Industries (Greendale, WI; [www.wikk.com](http://www.wikk.com))
- B. Model: SQ-40
1. Order number: B-6SQ-RT-DB-SM-NP
  2. Height: 42".
  3. Shape: 6" square.
  4. Material: Aluminum Type 6063 T-5, .135" wall.
  5. Top: Removable ABS Cap (RT)
  6. Finish: Dark Bronze Anodized (DB) (710).
  7. Mount: Surface mount, concealed mounting base (SM).
  8. Preparation: None (NP)
- C. Accessories:
1. Mounting Fasteners: Provided expansion anchors for installation into concrete slab substrates in accordance with manufacturers recommendations.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of conditions as satisfactory.

**3.2 INSTALLATION**

- A. Install automatic door operators and bollards as indicated and in accordance with the manufacturer's instructions. Securely mount bollards to concrete substrates.
- B. Install doors, operators, and other associated hardware for uniform clearances and smooth operation.
- C. Adjust open, hold-open and close times to those required by the Owner and in accordance with the current ANSI/BHMA 156.19.
- D. Verify exact location of bollards and controls with the Architect.

**SECTION 087116 – LOW ENERGY AUTOMATIC DOOR OPERATORS**

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**3.3 ADJUSTING AND CLEANING**

- A. Adjust doors for positive seal and smooth operation.
- B. Adjust sensor beam to provide optimum door operation for conditions of the installation.

**END OF SECTION**

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**SECTION 088000 - GLAZING**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:
1. Glazed aluminum framing systems.
  2. Hollow metal window frames.
  3. Vision lites.
  4. Entrances and other doors.

**1.2 SYSTEM PERFORMANCE REQUIREMENTS**

- A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (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; and other defects in construction.
- B. Glass Design: Glass thicknesses indicated on Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
1. Minimum glass thickness, nominally, of lites in exterior walls is 6.0 mm (0.23").
  2. Tinted and heat-absorbing glass thicknesses for each tint indicated are the same throughout Project.
  3. Minimum glass thicknesses of lites, whether composed of annealed or heat-treated glass, are selected so the worst-case probability of failure does not exceed 8 lites per 1000 for lites set vertically or not over 15 degrees off vertical and under wind action. Determine minimum thickness of monolithic annealed glass according to ASTM E 1300. For other than monolithic annealed glass, determine thickness per glass manufacturer's standard method of analysis including applying adjustment factors to ASTM E 1300 based on type of glass.
- C. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass-framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

**1.3 SUBMITTALS**

- A. Submit the following according to Conditions of the Contract and Division 1 Sections:
1. Product data for each glass product and glazing material indicated.
  2. Samples, 12" square, of each type of glass indicated except for clear monolithic.
  3. Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.
  4. Test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.
  5. Test reports from manufacturer of insulating glass edge sealant indicating that sealants were tested for compatibility with other glazing materials.
  6. Product test reports for each type of glazing sealant and gasket indicated, evidencing compliance with requirements specified.
  7. Maintenance data for glass and other glazing materials to include in Operating and Maintenance Manual specified in Division 1.
- B. Coordinate submittal with storefront, window, and door submittals.

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**1.4 QUALITY ASSURANCE**

- A. Glazing Publications: "FGMA Glazing Manual" and SIGMA, TM-3000 "Vertical Glazing Guidelines."
- B. Safety Glass: ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials. Permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.
- C. Insulating Glass Certification Program: Provide units permanently marked with appropriate certification label of inspecting and testing agency indicated below:
  - 1. Insulating Glass Certification Council (IGCC).
  - 2. Associated Laboratories, Inc. (ALI).
  - 3. National Certified Testing Laboratories (NCTL).
- D. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.

**1.5 PROJECT CONDITIONS**

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes. Install liquid sealants at ambient and substrate temperatures above 40 deg F.

**1.6 WARRANTY**

- A. Warranty on Coated Glass: Submit warranty signed by manufacturer agreeing to furnish replacements for those coated units that deteriorate, f.o.b. point of manufacture, freight allowed Project site. Warranty covers only deterioration and defects due to normal conditions of use and not to handling, installing, and cleaning practices contrary to manufacturer's published instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating. Warranty Period: Manufacturer's standard but not less than 5 years after date of Substantial Completion.
- B. Warranty on Laminated Glass: Submit warranty signed by manufacturer agreeing to furnish replacements for those laminated units that deteriorate, f.o.b. point of manufacture, freight allowed Project site. Warranty covers only deterioration and defects due to normal conditions of use and not to handling, installing, and cleaning practices contrary to manufacturer's published instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced standard. Warranty Period: Manufacturer's standard but not less than 5 years after date of Substantial Completion.
- C. Warranty on Insulating Glass: Submit warranty signed by manufacturer agreeing to furnish replacements for insulating units that deteriorate, f.o.b. point of manufacture, freight allowed Project site. Warranty covers only deterioration and defects due to normal conditions of use and not to handling, installing, protecting, and maintaining practices contrary to glass manufacturer's published instructions. Defects include failure of the hermetic seal under normal use due to causes other than glass breakage and improper practices for maintaining, and cleaning insulating glass. Evidence of failure is the obstruction of vision by dust, moisture, or film on the interior surfaces of glass. Warranty Period: Manufacturer's standard but not less than 10 years after date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 PRIMARY FLOAT GLASS PRODUCTS**

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class 1 (clear) or Class 2 (tinted), heat-absorbing, and light-reducing where indicated, and Quality q3 (glazing select).

**2.2 INSULATING GLASS**

- A. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified.

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- B. 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.

- C. Interspace Content: Air.

**2.3 HEAT-TREATED FLOAT GLASS**

- A. Uncoated, Clear, Heat-Treated Float Glass: ASTM C 1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select). Kind FT (fully tempered) where required or indicated.
- B. Coated, Clear, Heat-Treated Float Glass: ASTM C 1048, Condition C (other coated glass), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), with coating type and performance characteristics complying with requirements specified under coated glass products. Kind FT (fully tempered) where required or indicated.
- C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering heat-treated glass products that may be incorporated in the Work include the following.
  - 1. Guardian Industries Corp.
  - 2. LOF
  - 3. Viracon, Inc.
  - 4. Vitro Architectural Glass.

**2.4 LAMINATED GLASS PRODUCTS**

- A. Laminated Glass Products: Per ASTM C 1172. Refer to primary and heat-treated glass requirements relating to properties of glass products comprising laminated glass products.
- B. Interlayer: Interlayer material of polyvinyl butyral sheets or urethane acrylate resin, in clear or colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
- C. Available Products: Subject to compliance with requirements, the plastic interlayer products that may be incorporated in the Work include the following:
  - 1. Saflex, Eastman Chemical Company.
  - 2. SentryGlas, Kuraray America Inc.

**2.5 ELASTOMERIC GLAZING SEALANTS**

- A. General: Provide products of type indicated, complying with the following requirements:
  - 1. Compatibility: Select glazing sealants and tapes of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturer's recommendations for selecting glazing sealants and tapes that are suitable for applications indicated and conditions existing at time of installation.
  - 3. Colors: Provide selections made by Architect from manufacturer's standards.
- B. Elastomeric Glazing Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with ASTM C 920.

**2.6 GLAZING GASKETS**

- A. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.
- B. Dense Compression Gaskets: Neoprene, ASTM C864, molded or extruded gaskets, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal.
- C. Soft Compression Gaskets: Neoprene extruded or molded closed-cell, integral-skinned gaskets of material indicated below, complying with ASTM C 509, Type II, black, and of profile and hardness required to maintain watertight seal.

## **2.7 MISCELLANEOUS GLAZING MATERIALS**

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material, Shore A durometer hardness of 85 plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement.

## **2.8 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS**

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, 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. Insulating Glass Units:
  - 1. Dual lite units fabricated from glass as scheduled; 1/2 inch nominal airspace; dual seal system.
  - 2. Twin primary seals of polyisobutylene and secondary seal of silicone or polysulfide sealant. Outer seal shall be compatible with glazing system.
  - 3. Spacer Bar: Mill finish aluminum; fill with desiccant; corners shall be partially miter cut and bent (not cut through), or formed with corner keys ultrasonically soldered in place.
  - 4. Each piece shall bear certification number, date, and manufacturer's identification mark.
  - 5. Assembly of insulating units shall be by a fabricator approved by the glass materials manufacturer.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION AND PREPARATION**

- A. Examine glass framing, with glazier present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
  - 2. Presence and functioning of weep system.
  - 3. Minimum required face or edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.
- C. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

### **3.2 GLAZING, GENERAL**

- A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation. Provide structural edge glazing at locations indicated.

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- C. Protect glass from edge damage during handling and installation as follows:
  - 1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
  - 2. Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass sizes larger than 50 united inches (length plus height) as follows:
  - 1. Locate spacers inside, outside, and directly opposite each other. Install correct size and spacing to preserve required face clearances, except where gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and comply with system performance requirements.
  - 2. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

**3.3 GASKET GLAZING (DRY)**

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Secure compression gaskets in place with joints located at corners to compress gaskets producing a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- C. Install gaskets so they protrude past face of glazing stops.

**3.4 PROTECTION AND CLEANING**

- A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- B. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.
- C. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.
- D. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

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**3.5 GLASS TYPE SCHEDULE**

- A. Provide the following glass types as indicated on the Drawings:
1. GL-1: Clear insulating glass unit with 1/2 inch space between two panes of glass. Surface as follows:
    - a. Exterior Pane: Minimum 1/4 inch clear glass, low-e coating on #2 surface, PPG Solarban 60 or Viracon VE 1-2M Solarscreen.
    - b. Interior Pane: Minimum 1/4 inch clear glass.
  2. GL-2: Clear tempered and laminated insulating glass unit with 1/2 inch space between two panes of glass. Surface as follows:
    - a. Exterior Pane: Minimum 1/4 inch clear glass, Laminated glass, low-e coating on #2 surface, Vitro Architectural Glass Solarban 60 or Viracon VE 1-2M Solarscreen.
    - b. Interior Pane: Minimum 1/4 inch clear glass. fully tempered.
  3. GL-3: Minimum 3/8 inch thick laminated glass.

**END OF SECTION**



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**SECTION 088700 – GLAZING SURFACE FILMS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Field applied glazing film.
- B. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to all work of this Section.
- C. Substitutions: Substitutions will be considered only under the terms and conditions of Section 016000.

**1.2 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product Data: Submit complete product data for glazing surface film.
- C. Sample: Submit 8 x 10 sample of film.

**1.3 QUALITY ASSURANCE**

- A. Qualifications of Glazers: Glazing surface film shall be installed by personnel experienced in the field installation of glazing films.
- B. Mock-Up:
  - 1. Provide mock-up in accordance with Section 014500.
  - 2. Provide mock-up of each film in location as approved by the Architect.
  - 3. Approved mock-up may be used in the work.

**PART 2 - PRODUCTS**

**2.1 GLAZING FILMS**

- A. Window Film: Manufacturer and product as scheduled on the Drawings.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Clean glass to receive glazing surface film.

**3.2 INSTALLATION**

- A. General:
  - 1. Install films in accordance with the film manufacturer's recommendations.
  - 2. Field apply to surfaces of glazing as indicated. Use dilute detergent pretreatment as recommended by the manufacturer for release enhancement properties. (Assume removal after maximum of three years.)
  - 3. Install film to each distinct pane as a single sheet, free of scratches, dirt, and imperfections.
  - 4. Accurately trim film even with glazing stops for complete coverage of visible exterior surface.
  - 5. Provide straight and clean edge line where film is terminated within the field of a glass panel.
- B. Field apply to interior face of vision panel as indicated.

**END OF SECTION**

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**SECTION 092116 – GYPSUM BOARD ASSEMBLIES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Nonload-bearing steel framing members for gypsum board assemblies.
  - 2. Gypsum board assemblies attached to steel framing.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. 079000 - Joint Sealants: For acoustical sealant.

**1.2 REGULATORY REQUIREMENTS**

- A. Assemblies shall be approved by the local jurisdictional authorities.
- B. Fire rating requirements take precedence over the construction requirements indicated. In the event of conflict, notify the Architect, and do not begin construction in the area of conflict until the conflict has been resolved.

**1.3 SUBMITTALS**

- A. Submit the following according to the Conditions of the Contract and Division 01 Sections:
  - 1. Product Data for each type of product specified.

**1.4 PROJECT CONDITIONS**

- A. General: Establish and maintain environmental conditions for applying and finishing gypsum board per ASTM C 840 or manufacturer's recommendations, whichever are more stringent.
- B. Room Temperatures: For attachment of gypsum board to framing, maintain not less than 40 deg F. Do not exceed 95 deg F when using temporary heat sources.
- C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

**PART 2 - PRODUCTS**

**2.1 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS**

- A. General: Provide components complying with ASTM C 754 for conditions indicated.
- B. Wire Ties: ASTM A 641, Class 1 zinc coating, soft temper, 0.062" thick.
- C. Wire Hangers: ASTM A 641, Class 1 zinc coating, soft temper, 0.162" diameter.
- D. Hanger Rods: Mild steel and zinc coated or protected with rust-inhibitive paint.
- E. Flat Hangers: Mild steel and zinc coated or protected with rust-inhibitive paint.
- F. Channels: Cold-rolled steel, 0.0598" minimum thickness of base (uncoated) metal and 7/16" wide flanges, 2" deep, 590 lb/1000 feet, rust-inhibitive paint.
- G. Steel Rigid Furring Channels: ASTM C 645, hat shaped, depth of 7/8", thickness: 0.0329", manufacturer's standard corrosion-resistant coating.

**SECTION 092116 – GYPSUM BOARD ASSEMBLIES**

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**2.2 STEEL FRAMING FOR WALLS AND PARTITIONS**

- A. General: Provide steel framing members with manufacturer's standard corrosion-resistant coating per ASTM A 653, G40 hot-dip galvanized coating.
- B. Steel Studs and Runners:
  - 1. ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16" wide minimum lip (return), thickness and depth as indicated.
  - 2. Furnish minimum 20 gage metal framing studs at locations where security mesh is to be installed.
- C. Deflection Track: Manufacturer's standard top runner designed to prevent cracking of gypsum board applied to interior partitions resulting from deflection of the structure above. Thickness as indicated for studs, and width to accommodate depth of studs, 2-1/2" deep flanges with V-shaped offsets or slotted holes for fasteners.
- D. Steel Rigid Furring Channels: ASTM C 645, hat shaped, thickness: 0.0329", depth: 1-1/2".
- E. Furring Brackets: Serrated-arm type, adjustable, fabricated from corrosion-resistant steel sheet complying with ASTM C 645, minimum thickness of base (uncoated) metal of 0.0329", designed for screw attachment to steel studs and steel rigid furring channels used for furring.
- F. Z-Furring Members: Steel sheet with a minimum base metal (uncoated) thickness of 0.0179", face flange of 1-1/4", wall-attachment flange of 7/8", and of depth required to fit insulation thickness indicated.
- G. Steel Flat Strap and Backing Plate: Length and width as indicated, and with a minimum base metal (uncoated) thickness of 0.0598" where indicated.
- H. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.

**2.3 GYPSUM BOARD PRODUCTS**

- A. General: Provide gypsum board in widths of 48", 5/8" thick, with tapered edges, in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application. Provide type X where required for fire-resistance rated assemblies.
- B. Gypsum Wallboard and Water Resistant Gypsum Wallboard: ASTM C 1396.

**2.4 TRIM ACCESSORIES**

- A. Accessories for Interior Installation: Formed from steel sheet zinc coated by hot-dip process or rolled zinc per ASTM C 1047. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047:
  - 1. Cornerbead on outside corners, unless otherwise indicated.
  - 2. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim, unless otherwise indicated.
  - 3. Control Joint Trim: One of the following.
    - a. ClarkDietrich (West Chester, OH; 800-543-7140) #093 Zinc Control Joint.
    - b. AMICO (Birmingham, AL; 800-366-2642) No. 93 Drywall Control Joint, zinc alloy.

**2.5 JOINT TREATMENT MATERIALS**

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
- B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.
- C. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.

**SECTION 092116 – GYPSUM BOARD ASSEMBLIES**

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- D. Drying-Type Joint Compounds for Gypsum Board: Factory-packaged and mixed, vinyl-based products. Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories. Topping compound formulated for fill (second) and finish (third) coats. All-purpose compound formulated for both taping and topping compounds.

**2.6 MISCELLANEOUS MATERIALS**

- A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.
- B. Steel drill screws complying with ASTM C 1002 for the following applications:
  - 1. Fastening gypsum board to steel members less than 0.033 inch thick.
  - 2. Fastening gypsum board to gypsum board.
- C. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch thick.
- D. Sound-Attenuation Blankets: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing). Mineral-Fiber Type: Fibers manufactured from slag wool or rock wool.
- E. Security Mesh and Clips:
  - 1. Security Mesh: Alabama Metal Industries Corporation (AMICO) "ASM.75-9F Maximum Security" security mesh.
  - 2. Attachment Clips: AMICO "Secura Clips" with appropriate treaded fasteners.

**PART 3 - EXECUTION**

**3.1 EXAMINATION AND PREPARATION**

- A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

**3.2 INSTALLING STEEL FRAMING, GENERAL**

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- B. Install 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 and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.
  - 1. Where building structure abuts ceiling perimeter or penetrates ceiling.
  - 2. Where partition framing and wall furring abut structure, except at floor. Install deflection track top runner to attain lateral support and avoid axial loading. Attach jamb studs at openings to tracks using manufacturer's standard stud clip.

**3.3 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS**

- A. Suspend ceiling hangers from building structural members and as follows:

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1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
  3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
  4. Secure flat, angle, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or otherwise fail.
  5. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- B. Sway-brace suspended steel framing with hangers used for support.
- C. Install suspended steel framing components in sizes and at spacings indicated, but not less than that required by the referenced steel framing installation standard.
1. Wire Hangers: 48 inches o.c.
  2. Carrying Channels (Main Runners): 48 inches o.c.
  3. Furring Channels (Furring Members): 24 inches o.c.
- D. Installation Tolerances: Install steel framing components for suspended ceilings so that cross-furring or grid suspension members are level to within 1/8 inch in 12 feet as measured both lengthwise on each member and transversely between parallel members.
- E. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
- F. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

### **3.4 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS**

- A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction. Where studs are installed directly against exterior walls, install asphalt felt strips or foam gaskets between studs and wall.
- B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch from the plane formed by the faces of adjacent framing.
- C. Extend partition framing as indicated on Drawings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board. Cut studs 1/2 inch short of full height to provide perimeter relief.
- D. Install steel studs and furring in sizes indicated. Space studs 16 or 24 inches o.c., as indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.
- F. Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
1. Install 2 studs at each jamb, unless otherwise indicated.
  2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint.

**SECTION 092116 – GYPSUM BOARD ASSEMBLIES**

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3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- G. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.
- H. Installation of Security Mesh.
  1. Install mesh tight to framing from floor to height as indicated on the Drawings.
  2. Install per manufacturers recommendations in manner which provides continuous coverage with no gaps between mesh panels
  3. Attach mesh to framing members using manufacturers clips at 12 inches on center vertically. Penetrate steel studs minimum 3/8" with flat head bugle type self tapping screws; wood studs minimum 1-1/2" with 1-5/8" fine threaded drywall screws.
  4. Stagger mesh panel joints and join panels at framing members.
  5. Install board over mesh in single or multiple layers as indicated on the drawings.
  6. If mesh is installed over metal framing, do not attach to top runner to allow for structural deflection.
  7. Locations indicated on the drawings.

**3.5 APPLYING AND FINISHING GYPSUM BOARD, GENERAL**

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216. Install gypsum board shaft-wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions.
- B. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- E. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.
  1. Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  2. Fit gypsum panels around ducts, pipes, and conduits.
- I. Isolate perimeter of nonload-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- J. Where acoustic insulation or STC-rated gypsum board assemblies are indicated, seal construction at perimeters, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of the partitions. Per ASTM C 919 and manufacturer's recommendations for location of

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edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

- K. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

**3.6 GYPSUM BOARD APPLICATION METHODS**

- A. Single-Layer Application: Install gypsum wallboard panels as follows:
  - 1. On ceilings, apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated, and provide panel lengths that will minimize end joints. At stairwells and other high walls, install panels horizontally.
- B. Multilayer Application on Partitions/Walls/ Ceilings: Apply gypsum board indicated for base layers and gypsum wallboard face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints. Stagger joints on opposite sides of partitions.
- C. Acoustical Sealants: Apply sealant per details and manufacturer's recommendations at panel edges. Seal around all pipes ,duct penetrations, conduit, switches penetrating on both sides of wall.

**3.7 INSTALLING TRIM AND ACCESSORIES**

- A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
- B. Install cornerbead at external corners.
- C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.

**3.8 CONTROL JOINTS**

- A. Discontinue gypsum board and use control joint trim at control joints.
- B. Coordinate with the framing installer to ensure that framing is installed immediately on either side of each control joint.
- C. Space control joints as indicated. When not indicated, locate as follows:
  - 1. At maximum 30 foot intervals along continuous wall planes.
  - 2. At maximum 50 foot intervals at continuous ceilings with perimeter relief.
  - 3. At maximum 30 foot intervals at continuous ceilings without perimeter relief.
  - 4. At locations where expansion or control joints occur in the building structure.
  - 5. Where gypsum board is vertically continuous, such as at stairwells and other vertical wall areas spanning multiple floors, provide horizontal control joints at each floor level.
  - 6. Position control joints to intersect light fixtures, air diffusers, door openings, and other areas of stress concentration.
  - 7. Extend control joints from both corners of door frame to top of wall, where door occurs in wall greater than 30 feet in length.
  - 8. Coordinate with Section 092216 for special requirements at fire rated assemblies.
- D. Verify location with the Architect prior to installation.

**3.9 FINISHING GYPSUM BOARD ASSEMBLIES**

- A. General: Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
- B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.

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- C. Apply joint tape over gypsum board joints and to flanges of trim accessories as recommended by trim accessory manufacturer.
- D. Levels of Gypsum Board Finish: Provide the following levels of finish per GA-214.
  - 1. Level 1 for ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
  - 2. Level 2 where panels are located in storage and stock rooms.
  - 3. Level 4 smooth wall finish for all other gypsum board surfaces, unless otherwise indicated and for surfaces receiving wall covering.
  - 4. Level 5 smooth wall finish for gypsum board surfaces at graphics display wall behind cashier area. Refer to plans for location.
- E. Use the following joint compound combination as applicable to the finish levels specified:
  - 1. Embedding and First Coat: Setting-type joint compound. Fill (Second) Coat: Setting-type joint compound. Finish (Third) Coat: Sandable, setting-type joint compound.
  - 2. Embedding and First Coat: Setting-type joint compound. Fill (Second) Coat: Setting-type joint compound. Finish (Third) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
  - 3. Embedding and First Coat: Ready-mixed, drying-type, all-purpose or taping compound. Fill (Second) Coat: Ready-mixed, drying-type, all-purpose or topping compound. Finish (Third) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
- F. For Level 4 gypsum board finish, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.
- G. For Level 5 gypsum board finish, finish must be equal to Level 4 (embedding coat and three finish coats) plus a skim coat over the entire gypsum board surface. Surfaces must be smooth and free of tool marks and ridges.
- H. Where Level 2 gypsum board finish is indicated, embed tape in joint compound and apply first coat of joint compound.
- I. Where Level 1 gypsum board finish is indicated, embed tape in joint compound.

**3.10 CLEANING AND PROTECTION**

- A. Promptly remove any residual joint compound from adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.

**END OF SECTION**



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**SECTION 092400 - PORTLAND CEMENT PLASTERING**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Portland cement plaster.

**1.2 REFERENCES**

- A. ASTM International (ASTM): ([www.astm.org](http://www.astm.org))
  - 1. C144 - Aggregate for Masonry Mortar
  - 2. C150 - Portland Cement.
  - 3. C206 - Finishing Hydrated Lime.
  - 4. C207 - Hydrated Lime for Masonry Purposes.
  - 5. C260 - Air Entraining Admixtures for Concrete.
  - 6. C897 - Specification for Aggregate for Job Mixed Portland Cement-Based Plasters.
  - 7. C926 - Application of Portland Cement-Based Plaster.

**1.3 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product Data: Submit for each plaster trim accessory, admixture, fiber reinforcing, and bonding agent proposed for the work.
- C. Samples:
  - 1. Submit one 24-inch by 24-inch (600mm by 600mm) cured cement plaster sample of each texture on plywood or cement board substrate for approval of color and finish texture, only.

**1.4 QUALITY ASSURANCE**

- A. Single Source Responsibility: Except where specified otherwise, obtain plaster materials from a single manufacturer or from manufacturers recommended by prime manufacturer of portland cement plaster.
- B. Installer Qualifications: Company specializing in portland cement plaster work having minimum of five years successful experience with work comparable to that indicated and specified.

**1.5 ENVIRONMENTAL CONDITIONS**

- A. Do not apply cement plaster unless minimum ambient temperature of 40 degrees F (4 deg.C) is maintained continuously in the area to be plastered; maintain temperature 48 hours prior to application of plaster, while the plastering is being applied, and during the curing operation.
- B. Do not apply plaster to any frozen surfaces or surfaces containing frost; protect plaster coats against freezing for a period of 24 hours after application.

**PART 2 - PRODUCTS**

**2.1 PLASTER AND ASSOCIATED MATERIALS**

- A. Cement:
  - 1. Portland Cement: ASTM C150, Type I; gray for base coats; white for finish coat.
  - 2. Masonry Cement: ASTM C91.
- B. Sand: Natural type, conforming to requirements of ASTM C144 or C897; gradation and use recommended for portland cement basecoat and finish coat plastering.
- C. Air Entrainment Admixture: ASTM C260, free of calcium chloride and thiocyanates, not more than 0.05 percent chloride ions.
- D. Water: Clean and free from matter deleterious to quality of cement plaster materials.

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- E. Hydrated Lime: Special finishing type, as follows.
  - 1. For scratch and brown coats: ASTM C206 or C207, Type S.
  - 2. For finish coat: ASTM C206, Type S.
- F. Hydrated Lime Replacement Liquid Admixture:
  - 1. For scratch and brown coats: Gibco .
  - 2. For finish coat: ASTM C206, Type S.
- G. Fiber Reinforcing: One of the following.
  - 1. Propex Concrete Systems (425-746-0900; 800-621-1273) "Fibercast 500"; fibrillated polypropylene fiber; 1/4 inch or 3/8 inch length.
  - 2. Hill Brothers Chemical Co. "Hi-Fibe P-1510"; 1/4 inch or 3/8 inch long monofilament polypropylene fibers.
- H. Synthetic Finish:
  - 1. Acceptable Manufacturers:
    - a. Dryvit System Inc. (800-556-7752).
    - b. STO Industries, Inc. (800-221-2397).
    - c. Senergy, Inc./Div. MSC (800-221-WALL).
    - d. TEC Specialty Products Inc. (Palatine IL; 800-323-7407)
    - e. BASF (888-338-7170).
  - 2. Primer: As recommended by the color coat manufacturer; color matched to color coat.
  - 3. Surfacing Mortar: Fiber reinforced polymer modified mortar as recommended by the color coat manufacturer
  - 4. Color Coat: 100 percent acrylic EIFS finish coat; custom integral color as selected by the Architect; medium sand texture.
- I. Bonding Agent: ASTM C932; non-oxidizing; non-crystallizing; non-re-emulsifiable.
- J. Waterproofing Admixture:
  - 1. Anti-Hydro International, Inc. (Flemington, NJ; 800-777-1773) "Stucco Waterproofing."
  - 2. Non-corrosive liquid admixture which reacts with Portland cement to better complete hydration; improves water-resistance and crack-resistance.

## **2.2 ACCESSORIES**

- A. Furnish attachment devices as necessary for secure anchoring of plaster accessories; furnish connection devices and splice plates for reveals and plastic expansion joints, to ensure accurate alignment, allowance for axial movement, where required. Furnish in lengths as necessary for minimum number of joints in each uninterrupted run.
- B. Corner Beads: Stockton Wire Products (213-245-5193) "Plastic Nose Cornerbead" or approved; 2-1/2" woven wire flanges; plastic coated nose wire.
- C. Casing Beads: Unimast (800-969-4110) "No. 66 Casing Bead," Amico "X-66," Delta Star / Superior Metal Trim (800-892-8673; 650-508-2850 Lynchburg VA; 800-368-3017) "Superior Casing Bead SCB078-112Z," or approved; zinc alloy; 7/8".
- D. Weep Screed: One of the following, or approved.
  - 1. J Bead With Weep Holes: Delta Star / Superior Metal Trim (San Carlos CA; 800-892-8673; 650-508-2850 Lynchburg VA; 800-368-3017) "Superior J- Bead SJB078W312Z"; 7/8 inch ground x 3-1/2 inch attachment flange.
  - 2. Slotted Weep Screed: Masonry Technology Inc. (MTI) (Cresco IA; 800-879-3348) "LR 3501 L+R Weep Screed"; 26 gauge galvanized steel bent into 70° L shape; 3.5 inch vertical attachment flange; 7/8 inch ground; 1 inch slots punched at maximum 3 inches o.c.
- E. Control Joints: Western Metal Products (909-360-3500; 800-365-5284) "#XJ15-3," Unimast (800-969-4110) "Double-J Expansion Joint XJ-15"; 1/2 inch reveal x 3/4 inch depth; return lip; galvanized steel; expanded metal flanges; include "clean-up" tape."
- F. Anchorages for Lath and Accessories:
  - 1. Minimum 3/8 inch head diameter; minimum length of 3/4 inch.

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2. Screws: Galvanized or copolymer coated steel self tapping wafer head screws.
3. Nails: Galvanized hardened concrete stub nails.

G. Cavity Drainage Mat:

1. Stuc-O-Flex International, Inc (Redmond, WA; 800-305-1045) ["WaterWay 9714"; nominal 3/16 inch ["WaterWay 9714A"; nominal 5/16 inch ["WaterWay 9010"; nominal 3/8 inch thick mat consisting of a nylon core of fused entangled filaments and a geotextile fabric bonded to one side.

**2.3 CEMENT PLASTER MIXES**

A. Proportions (By Volume):

1. Scratch Coat: 1 part portland cement, 4 to 5 parts sand, 1/2 to 3/4 part lime, and 1 lb of polypropylene strands for each 1000 lbs of mix (dry); [or 1 part plastic cement, 3 to 4 parts sand, and 1 lb of polypropylene strands for each 1000 lbs of mix (dry)].
2. Brown Coat: 1 part portland cement, 4 to 5 parts sand, 1/2 to 3/4 part lime, and 1 lb of polypropylene strands for each 1000 lbs of mix (dry); [or 1 part plastic cement, 3 to 4 parts sand, and 1 lb of polypropylene strands for each 1000 lbs of mix (dry)].
3. Finish Coat: 1 part white portland cement, 3 parts sand, and 3/4 -1 part lime or proprietary integral color synthetic finish coat as specified.

B. Mixing:

1. Unless otherwise specified or approved by the Architect, provide mechanical mixing of plaster in accordance with the requirements of ASTM C926. Keep water to a minimum, using only the amount necessary to maintain consistency.
2. Add air entrainment admixtures to provide 2 to 4 percent entrainment per coat.
3. Incorporate pumping additives as required in the approved mix design.
4. Retempering not permitted; discard plaster which has begun to stiffen.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that work is complete to the point where work of this section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of conditions and responsibility for defective installation caused by prior observable conditions.

**3.2 INSTALLATION OF LATH, UNDERLAYMENT, AND ACCESSORIES**

- A. Install specified products and systems in accordance with referenced standards and specifications, unless indicated or specified otherwise.
- B. Building Paper (Double Layer):
  1. Apply two plies of building paper over substrate in accordance with the manufacturer's recommendations; both layers lapped to weather.
  2. Apply base layer complete to form a continuous air barrier. Tape joints and penetrations with manufacturer's recommended tape.
  3. Coordinate installation of windows and other wall penetrations with the installation of flexible flashing and building paper as shown.
  4. Apply outer layer.
  5. Install building paper layers with corrosion resistant screws with washers. Do not use staples.
  6. [Provide continuous flexible seal at expansion joint locations indicated. Flash to weather and seal joints tight with manufacturer's recommended tape systems. Extend additional material into the joint to allow joint movement without stressing the membrane.]
- C. Installation of Cavity Drainage Mat:

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1. Install continuously over surfaces to receive cement plaster in accordance with the manufacturer's recommendations; install with geotextile fabric towards the exterior.
2. Lap fabric at joints to form a continuous barrier.
3. At wall terminations, place a wood termination strip along the outside edge of each wall to create a wind dam for negative wind load.

**D. Accessories:**

1. Fasten accessories through sheathing to metal studs; unless otherwise indicated, secure accessories through sheathing to framing with screws at maximum 7 inches o.c. Fasten flanges on both sides of accessory except at accessories which are used at plaster field terminations.
2. Install accessories as indicated in combination with cement plaster work. Sequence as necessary to ensure proper lapping of building paper, flashings, cavity drainage mat over accessories to promote drainage.
3. Field cut accessories as necessary for accurate alignment and conformance to details; make cuts neat and straight; remove burrs before installation.
4. Install accessories in accurate end to end alignment, straight, and according to details. Install continuous shims behind flanges of accessories as necessary to achieve proper face location for accurate screeding to finished surface.
5. Field drill accessories as necessary for anchorage.
6. Construct joints and intersections in accessories to preclude rainwater leakage. Provide weeps or washes at bottom of vertical reveals and control joints.
7. Except as otherwise detailed, case finishes terminating at dissimilar materials; install corner bead at outside corners.
  - a. Verify exact locations with the Architect prior to installation.
  - b. Run metal lath continuous under control joints.
  - c. Secure control joints by screwing flanges through lath to sheathing or framing, or by wire tying to lath 16 to 20 inches o.c. Use additional attachments as necessary to hold joints firmly in position.
8. Stops, other than casings, where shown or required around lighting fixtures, air diffusers, etc., are to be furnished under other Sections for installation as part of the cement plaster work. Type of stop, if not shown, shall be submitted to the Architect for review and must be approved by the Architect before installation.

**E. Lath:**

1. Attach metal lath in accordance with ASTM C1063 unless specified otherwise.
2. Fasten accessories through sheathing to metal studs; unless otherwise indicated, secure accessories through sheathing to framing with screws at maximum 7 inches o.c. Fasten flanges on both sides of accessory except at accessories which are used at plaster field terminations.
3. Concrete Masonry Substrate:
  - a. Attach to concrete masonry units with galvanized roofing nails.
  - b. Fasten to the surfaces with approved galvanized fasteners at 24 inches on center horizontally and a maximum of 8 inches on center vertically.
  - c. Use self-furring lath.
4. Concrete Substrate:
  - a. Fasten with galvanized powder driven fasteners at 12 inches on center vertically and horizontally.
  - b. Use self-furring lath.
  - c. The fasteners shall be rated by ICBO reports to resist a downward shear force of 96 lbs (12 lb load with a safety factor of 8).
  - d. Select fasteners which conform to the performance specified under each installation condition, including the compressive strength of the concrete, which may be greater than that indicated or specified.

**3.3 INSTALLATION OF BASE COATS**

- A. Verify that accessories have been installed within tolerance limits specified, prior to application of each coat.
- B. Standards: Apply in accordance with ASTM C926 and as specified herein.

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- C. Thicknesses: Apply base coats to permit installation of finish coat for total system thicknesses as follows:
1. 3 Coat Application Over Metal Lath: 7/8 inch total thickness.
  2. 2 Coat Application Direct Applied Over Concrete Masonry: 1/2 inch total thickness
  3. Hold final (brown) base coat shy of trims to permit subsequent installation of finish coat flush with trim surfaces.

**3.4 PLASTER FINISH**

- A. Dampen base coat prior to application of finish coat.
- B. Apply finish coat, accurately screeded to accessories; 1/8 inch thickness over base coats.
- C. Steel trowel to a smooth and uniform sand finish, to match approved mock-up. Maintain wet edge during application in each distinct field.
- D. Perform plastering and finishing operations to avoid damaging accessories, and to avoid dislodging masking.
- E. Perform final troweling to achieve plaster surface precisely even with screed surface of reveals and other accessories.
- F. Avoid excessive working of the surface. Delay troweling as long as possible to avoid drawing excess fines to the surface.
- G. Apply finish coat to each distinct area in a continuous operation. Utilize techniques to prevent scaffold marks and variations in surface texture.
- H. Protect cement plaster from uneven and excessive evaporation during curing by covering with vapor barrier or moist curing, in accordance with ASTM C926. Cure finish coat for a minimum period of 48 hours. Extend curing times as necessary to achieve complete cure.]

**3.5 SYNTHETIC FINISH**

- A. Synthetic finish coat shall be applied as recommended by the manufacturer.
- B. Trowel apply skim coat of manufacturer's recommended surfacing mortar to obtain smooth and flat surfaces within a tolerance of 1/8 inch in 10 feet, and to fill surface imperfections. Use bonding agent as necessary to obtain adequate bond.
- C. Apply color match primer.
- D. Apply finish coat continuously and in a single operation to each distinct area; maintain a wet edge during application in each distinct field. Employ techniques to ensure a uniform appearance.
- E. At joints to receive sealant, mask the base coat at the contact surfaces to receive the sealant. Align the masking so that when the sealant is applied after the finish coat is applied, the sealant will overlap the finish coat slightly. Apply the finish coat to the mask line.
- F. Finish: Provide texture similar to Dryvit Fine sand finish to match the approved sample.

**3.6 FIELD QUALITY CONTROL**

- A. Patching:
1. Neatly perform cutting, patching, repairing and pointing up operations.
  2. Repair cracks and indented surfaces by moistening plaster and filling with new material, troweled or tamped flush with adjoining surfaces.
  3. Point up and finish surfaces to match adjacent plaster.
  4. Where new plaster adjoins plaster which has been installed more than 48 hours, cut existing plaster at an angle of approximately 0.78 rad [(45 degrees)] with surface before installing new plaster.
- B. Non-Conforming Work:
1. Work containing cracks, blisters, pits, checks, or discolorations will be rejected.
  2. Remove such work and replace with new.

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3. Patching of defective work will be permitted only with approval from the Architect.

**3.7 CLEANING**

- A. Clean beads, screeds, reveals, metal base, metal trim, electrical outlets, and other items in contact with cement plaster, leaving work ready for decoration by others. As work is completed in each area, remove rubbish, utensils, and surplus materials, leaving surrounding areas broom clean.
- B. Remove masking from accessories masked to prevent cement plaster clogging.

**3.8 TOLERANCES**

- A. Flat plaster surfaces shall be straight within 1/8" in 10 feet when tested with a straightedge in any direction.
- B. Accessories shall be installed free of visible wave, straight within 1/16 inch in 1 foot and 1/8 inch in 10 feet of any plane through the axis of the accessory, when tested with a straightedge; horizontal accessories shall be installed level.
- C. Curved Surfaces: True to the radius indicated with no flat spots or waves; radii shall be uniform and not vary from indicated dimensions by more than 1/8" in 10 feet.
- D. Corners and Edges: Sharp with no buildup of surface material; straight within 1/16 inch in 1 foot and 1/8 inch in 10 feet.
- E. Alignment: Joints between accessories shall be aligned to within 1/32 inch.

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Interior wall tile.
  - 2. Metal edge/cove trims.
  - 3. Sealer.
- B. Related Sections:
  - 1. 079200 - Joint Sealants: Expansion joint fillers.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

### **1.2 REFERENCES**

- A. American National Standards Institute (ANSI):
  - 1. A108.5 - Installation of Ceramic Tile With Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
  - 2. A108.10 - Installation of Grout in Tilework.
  - 3. A118.4 - Latex-Portland Cement Mortar.
- B. Tile Council of North America (TCNA): Handbook for Ceramic Tile Installation, current edition.

### **1.3 DEFINITIONS**

- A. Expansion Joints: Unless otherwise detailed, expansion joints in tile fields are sealant-filled joints to accommodate expansion and contraction of tile and possible substrate movement at construction joints.

### **1.4 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product Data: Submit for each type of tile, grout, mortar, additive, metal edge/cove trims. and accessory specified.
- C. Samples:
  - 1. Tile: Submit samples of each type and color of tile. Include representative range of colors and finishes to be expected.
  - 2. Grout: Submit cured samples of each grout color.

### **1.5 QUALITY ASSURANCE**

- A. Conform to ANSI Standard Specifications for the Installation of Ceramic Tile.
- B. Pre-Installation Conference:
  - 1. In accordance with Section 013119, schedule and administer a meeting to review and discuss the tile installation a minimum of one week (7 calendar days) prior to start of setting tile.
  - 2. Require in attendance, the Architect, the tile installer, and other parties affected by work of this Section.
  - 3. Agenda: Address installation scheduling and procedures, coordination, preparation and protection requirements, grout and expansion joint locations, tile quantities required, material and installation tolerances, overage required for waste, overage for maintenance stock, sealant joint locations.

### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. In accordance with Section 016000.

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**1.7 GUARANTY**

- A. In accordance with Section 017700, furnish from the tile installer, a two year written guaranty, executed to the Owner, against defects in workmanship and materials.

**1.8 MAINTENANCE**

- A. Extra Stock: Furnish minimum 1 percent of the quantity of each type of tile used in the work,
- B. Leave extra stock at site where directed, in clearly marked sealed cartons.
- C. Tile which is used to satisfy extra stock requirements shall be free of damaged tiles, seconds, or tile which is not in conformance with these specifications.

**PART 2 - PRODUCTS**

**2.1 TILE**

- A. Tile Types: Types as indicated on the drawings.

**2.2 ACCESSORY MATERIALS**

- A. Setting Materials:
1. Thinset Mortar: Portland cement with 100 percent acrylic latex additive; in accordance with ANSI A118.4; one of the following.
    - a. Mapei Inc. (Garland TX; 800-426-2734) "Grani/Rapid" or "Kerabond" with "Universal Keralastic."
    - b. Laticrete International Inc. (Lebanon OR; 541-258-4122) "211 Crete Filler Powder" with "4237 Latex Thin-set Mortar Additive."
    - c. Bostik (Middleton MA; 978-777-0100) "Hydroment Tile-Mate Premium" with "447 Flex-a-lastic."
    - d. Custom Building Products (Seal Beach, CA; 562-59--8808) "MegaFlex," or approved.
  2. Rapid-Set Thin Bed Mortar: Latex modified; Mapei Corp "Grani/Rapid" with "KER 318" Flexible Admixture," Bostik "Hydroment Single Flex FS," or Laticrete International Inc "211 Crete Filler Powder" with "4237 Latex Thin-set Mortar Additive" and "101 Rapid Set Latex"(proportions as recommended by the manufacturer for the setting time required).
- B. Cementitious Sanded Grout:
1. Fast Setting: Mapei Corp. "Ultracolor," or Laticrete International, Inc. "1500 Series Sanded Grout" with "1776 Grout Admix" and "101 Rapid Latex Admix" (proportions as recommended by the manufacturer for the setting time required); sanded, except unsanded at joints scheduled at 1/16 inch wide, or less.
  2. Standard Grout: Mapei Corp. "Keracolor S" or Laticrete International Inc. "1500 Series Sanded Grout" with "1776 Grout Admix," or Bostik Hydroment "Ceramic Tile Grout /Joint Filler" with "425 Flexible Grout Admixture;" sanded, except unsanded at joints scheduled at 1/16 inch wide, or less.
  3. Colors: As scheduled.
- C. Cementitious Unsanded Grout:
1. Standard Grout: Mapei Corp. "Keracolor U," Laticrete International, Inc. "1600 Series Unsanded Grout" with "1776 Grout Admix Plus," or Bostik Hydroment "Ceramic Tile Grout /Joint Filler" with "425 Flexible Grout Admixture."
  2. Colors: As scheduled.
- D. Tile Backing Board and Accessories:
1. Cementitious Backing Board: 1/2 inch nominal thickness "Durock Brand Cement Board" by USG (800-874-8968, "Wonderboard" by Custom Building Products (800-272-8786), or approved.
  2. Gypsum Backing Board: Georgia Pacific (800-225-6119) "DensShield," or approved; 5/8 inch thickness.
  3. Joint Tape: Open weave glass mesh joint tape, self-adhesive; 2-1/2 inches wide.



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- 4. Fasteners: As recommended by the backing board manufacturer; thread forming self-drilling wafer head screws; polymer coated or zinc plated; USG "Durock Screws," "Rock-On," or approved.
- E. Metal Edge and Cove Trims: As manufactured by Schlüter Systems, Inc. (800 225-8902), types as indicated on the drawings.
- F. Siloxane Type Tile Sealer:
  - 1. Aqua Mix Inc (800-272-8786) "Sealer's Choice Gold."
  - 2. Miracle Sealants and Abrasives Company (800-350-1901) "511-H2O Plus."

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.
- C. Verify that locations of expansion joints , control joints, and construction joints in substrate correspond to tile expansion joint locations.

**3.2 PREPARATION**

- A. Clean substrate surfaces free of grease, dirt, dust, organic impurities, and other materials which would impair bond.

**3.3 TILE BACKING BOARD INSTALLATION**

- A. Install in accordance with the manufacturer's installation instructions.
- B. Install units with edges firmly supported.
- C. Screw attach units with 1 inch long drywall screws spaced 6 inches on center along framing.
- D. Install fiberglass reinforcing tape at joints between panels. Completely embed in a thin set mortar bed. Trowel mortar smooth with adjacent surfaces.
- E. Where cementitious tile backing board is indicated as substrate for wainscot, ensure that backing board has been properly shimmed to align with gypsum board above.

**3.4 INSTALLATION OF TILE**

- A. Wall Application - Tile Backing Board:
  - 1. TCNA System: Similar to W244.
  - 2. Installation Standard: ANSI A108.5.
- B. Joint Pattern:
  - 1. Lay out tile pattern prior to commencing tile installation.
  - 2. Accurately locate grout joints on lines indicated; where not indicated, adjust grout joints within specified tolerances to minimize use of cut tiles at field edges.
  - 3. Where cut tiles are necessary, position tile such that cut tile at each edge of each rectilinear field is not less than half of a full size unit, unless indicated otherwise.
  - 4. Align tile joints across changes in plane.
- C. Tiles shall be blended as required to avoid pattern repeats and "patches" of adjoining tiles of distinctive color or character within each field area.
- D. Install tiles aligned with adjacent finishes, where indicated. Provide mortar fill as necessary for proper alignment.

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- E. Clean joints of mortar to minimum depth of 1/4 inch to allow subsequent grout installation.
- F. Tolerances:
  - 1. Joint Width Variation: Plus or minus 25% of the proposed joint width.
  - 2. Taper: Plus or minus 25 percent from one end to the other.
  - 3. No portion of a tile surface shall vary more than 1/16 inch above or below an adjacent tile surface.
  - 4. Install tile fields level to within tolerance specified for finished substrate.
- G. Special Requirements for Large Format Tiles (8 x 8 inch size or larger):
  - 1. Wash backs of each tile to remove dust and soil that would compromise adhesion.
  - 2. Dampen substrate as necessary to prevent excessive suction.
  - 3. Key the mortar into the substrate with the flat side of the trowel.
  - 4. Comb mortar over the previously keyed substrate in one direction using the notch side of the trowel.
  - 5. Firmly press each tile into the mortar. Press down and move the tile back and forth perpendicularly across the ridges approximately 1/8 to 1/4 inch to flatten the ridges and fill in the valleys of the combed mortar.
  - 6. Set tiles in accurate alignment.
- H. Metal Edge and Cove Trim Installation: Per manufacturer's recommendation, as detailed.

**3.5 EXPANSION JOINTS**

- A. Joint Sizes: Set to match width of typical grouted joint.
- B. Leave expansion joints free of mortar.
- C. Sealant materials and installation are specified in Section 079200.

**3.6 GROUTING**

- A. Comply with provisions of ANSI A108.10.
- B. Mix grouts in accordance with manufacturer's instructions.
- C. Grout joints, except expansion joints, in accordance with the manufacturer's recommendations. Float joints to a slightly concave profile.
- D. Remove excess grout from tile surfaces in accordance with the grout and tile manufacturer's recommendations. Do not use excess amounts of water.
- E. Protect adjacent surfaces from damage caused by cleaning agents. Do not use cleaners which would damage tile or grout surfaces.
- F. Do not grout joints indicated to receive sealants. Grout joints perpendicular to expansion joints shall be finished flush with tile edges.
- G. Cured grout joints shall be made free of efflorescence, prior to sealing.

**3.7 CURING**

- A. Cure installation in accordance with the grout manufacturer's recommendations. Protect tile and grout during curing operations.

**3.8 PROTECTION**

- A. Protect tile installations from damage, in accordance with Section 015000.
- B. Replace damaged tiles.

**3.9 CLEANING**

- A. In accordance with Section 015000 and Section 017700.
- B. Coordinate final cleaning with work of Section 079200. Do not begin cleaning operations until tile expansion joints sealants are fully cured.

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- C. Wash and thoroughly rinse tile. Leave tile surfaces clean.

**3.10 TILE SEALING**

- A. Apply stain repellent sealer to tile grout, in accordance with the manufacturer's recommendations to achieve maximum penetration into tile grouts.
- B. Apply sealer at earliest possible date allowed by grout and sealer manufacturer.
- C. Wipe tile surfaces after application as necessary to remove visible sealer residue.

**END OF SECTION**

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**SECTION 095123 – ACOUSTICAL LAY-IN CEILINGS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Exposed suspension system.
  - 2. Trim and accessories.
  - 3. Acoustical lay-in panels.
  - 4. Seismic grid restraint.
- B. Products Furnished But Not Installed Under This Section:
  - 1. Concrete inserts.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 SUBMITTALS**

- A. Product Data: Submit data for each distinct suspension system and acoustical unit type indicated.
- B. Coordination Drawings: Submit reflected ceiling plans showing correlations as necessary between work of this section and work of other sections.
  - 1. Minimum drawing scale: 1/4 inch equals 1 foot.
  - 2. Show the following:
    - a. Ceiling suspension elements.
    - b. Hanger type and method of attachment to structure.
    - c. Light fixtures.
    - d. HVAC equipment.
    - e. Fire suppression system components.
    - f. Loudspeakers.
    - g. Partitions.
- C. Samples: Submit the following:
  - 1. Verification samples:
    - a. Acoustical units: 12-inch-square samples of each type required.
    - b. Exposed suspension and trim elements: 12-inch-long samples of each type and finish required.

**1.3 QUALITY ASSURANCE**

- A. Fire Performance Characteristics:
  - 1. Surface burning characteristics: Provide products having the following characteristics when tested in accordance with ASTM E 84:
    - a. Maximum flame spread: 25.
    - b. Maximum smoke developed: 50.

**1.4 PROJECT CONDITIONS**

- A. In a timely manner, furnish to affected installers, attachment devices for incorporation into other work.
- B. Coordination Data: Prepare and distribute to affected installers, data necessary for coordination with related work. Include setting diagrams showing placement of attachment devices for acoustical ceiling hangers.
- C. Within each space to receive specified products, do not begin installation until the following conditions are met:
  - 1. Work above ceilings has been finished, tested, and approved.
  - 2. Space to receive ceiling system is properly enclosed and protected from weather.
  - 3. Any wet work within the space is dry.

**SECTION 095123 – ACOUSTICAL LAY-IN CEILINGS**

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- D. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained.

**PART 2 - PRODUCTS**

**2.1 ACOUSTICAL CEILING UNITS - GENERAL**

- A. Standard for Acoustical Ceiling Units: Provide units conforming to applicable requirements of ASTM E 1264 for Class A materials.

**2.2 CEILING SUSPENSION SYSTEMS - GENERAL**

- A. Provide suspension systems conforming to specified requirements and to requirements of ASTM C 635.
- B. Colors: Provide indicated colors. Where color is not indicated, provide colors as selected by the architect from manufacturer's complete set of standard colors.
- C. Finishes: Manufacturer's standard shop-applied finishes.
- D. Attachment Devices for Suspension System:
  - 1. Anchors and intermediate support members: Provide sizes capable of sustaining 5 times the load-carrying capabilities shown in ASTM C 635, Table 1, "Direct Hung" column.
  - 2. Deck inserts and hanger clips: Fabricate from hot-dip galvanized steel.
  - 3. Hanger wire: Zinc-coated (galvanized) carbon steel wire, ASTM A 641, soft temper, with Class 1 coating, minimum 12 gage (0.106 inch diameter).
  - 4. Hanger wire for use with corrosion-resistant grids: Stainless steel, type 302 or 304, soft temper, prestretched, minimum 10 gage (0.135 inch diameter).
- E. Edge Moldings and Trim:
  - 1. Extruded plastic or metal; provide profiles indicated.

**2.3 LAY-IN ACOUSTICAL CEILING SYSTEM TYPE 1 (ACP-1)**

- A. Acoustical Panels: "Cortega"; Armstrong – 747.
  - 1. Substitutions: Equivalent products by other manufacturers will be considered. The architect will be the sole judge of equivalence.
  - 2. Size: 24 by 48 inches.
  - 3. Edge profile: Square.
  - 4. Color: White.
- B. Exposed Grid: Formed steel with painted finish.
  - 1. Profile: Double-web tee, 15/16 inch wide.
  - 2. Structural classification (ASTM C 635): Intermediate-Duty System (Heavy-Duty System for projects in Seismic Design Categories D, E and F).
  - 3. Color and texture: White color to match ceiling panels; standard smooth texture.

**2.4 MISCELLANEOUS MATERIALS**

- A. Acoustical Sealer: Resilient type, nonshrinking, nonstaining, nondrying, nonhardening, nonsag. Provide sealer which is suitable for application indicated.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates and conditions under which products of this section are to be installed and verify that the work properly may commence.
- B. Verify that products furnished as work of this section, but not installed under this section, have been properly installed by the entity performing the installation.

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**SECTION 095123 – ACOUSTICAL LAY-IN CEILINGS**

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**3.2 PREPARATION**

- A. Layout: Position ceiling components to maximize use of full-sized acoustical units and to provide border units which are equal in size and shape at opposing ceiling edges. Use of acoustical units which are smaller than 1/2 full-width is prohibited at ceiling perimeters. Conform to reflected ceiling plans to greatest extent possible.

**3.3 SUSPENSION SYSTEM INSTALLATION**

- A. General:
1. Conform to the requirements of ASTM C 636, manufacturer's installation instructions, and governing regulations.
  2. Install hangers plumb and supported solely by building structure or carrying channels. Do not allow hangers to contact any objects or materials in ceiling plenum which are not actual components of ceiling system.
    - a. Splay hangers only where necessary to avoid obstacles. Provide countersplaying, bracing, or other acceptable devices to compensate for lateral stresses caused by splayed hangers.
    - b. Install splay hangers or other means of seismic restraint as required to meet the requirements of ASTM E 580.
    - c. Do not attach hangers to piping, conduit, or duct. Provide carrying channel trapeze support where obstruction cannot be avoided by splaying hanger 45 degrees from vertical or less.
  3. Space hangers at not more than 48 inches on center and within 6 inches of ends of each direct-hung runner or carrying channel, unless indicated otherwise.
  4. Loop and tie wire hangers securely to building's structural members; to attachment devices indicated; or, where not indicated, to devices suitable for substrate and capable of permanently supporting ceiling weight without failure or deterioration.
  5. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet, with cumulative tolerance not to exceed 1/4 inch. Bending or kinking of hangers is not allowed.
  6. Caulk around perimeter of all suspended ceilings with tile caulk to seal all edges. Use clear or white caulk. Clean excess with damp cloth. Touch up paint on walls as needed.
- B. Exposed (Lay-in) Grid Installation: Install grid members square, with ends of members securely interlocked. Remove and replace dented, bent, or kinked members.

**3.4 TRIM INSTALLATION**

- A. Install edge moldings and trim units at acoustical ceiling borders, at locations indicated, and where required to cover acoustical unit edges.
1. Molding and trim attachment: Space screws not more than 16 inches on center and within 3 inches of ends of each trim-piece being installed. Install moldings and trim level with suspension system and within tolerance specified for suspension system.
  2. Edge moldings: Before installing molding, apply acoustical sealer in uniform bead to vertical molding edge which will be concealed after installation.
  3. Miter corners and align butt joints carefully to form tight hairline joints.
  4. Face-riveting of trim and moldings is not allowed.

**3.5 LAY-IN PANEL INSTALLATION**

- A. Panel Installation: Install acoustical panels for accurate fit with suspension system and trim members. Scribe and cut panels at ceiling perimeter and at obstructions to provide neat, precise fit.
1. Square-edge panel installation: Provide installation with panel edges which are hidden from view, by suspension members or trim.

**3.6 ADJUST AND CLEAN**

- A. Use ceiling manufacturer's recommended methods and materials to clean and touch-up exposed components of ceiling system.
- B. Replace ceiling system components which are discolored or damaged in any way, in a manner which results in the ceiling system showing no evidence of replacement work.

**END OF SECTION**

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**SECTION 096500 – RESILIENT FLOORING**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Resilient sheet flooring.
  - 2. Moisture testing of concrete slabs.
- B. Related Sections:
  - 1. 030013 - Concrete: Substrate.
  - 2. 096813 - Tile Carpeting.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 1. F710 - Preparing Concrete Floors to Receive Resilient Flooring.
  - 2. F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes

**1.3 SUBMITTALS**

- A. Make submittals in accordance Section 013300.
- B. Product data, including certification by floor covering manufacturer that products supplied for installation comply with VOC requirements specified. Include CRI Green Label certificate for adhesives.
- C. Samples for verification purposes in manufacturer's standard sizes.
- D. Test Reports: Results of concrete subfloor moisture and alkalinity testing indicating the subfloor surfaces are ready for flooring installation.

**1.4 QUALITY ASSURANCE**

- A. Qualifications of Installers:
  - 1. Use only skilled and experienced resilient flooring installers for preparation of substrate and installation of resilient flooring.
  - 2. Helpers and apprentices used for such work shall be under full and constant supervision at all times by thoroughly skilled resilient flooring installers.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. In accordance with Section 016000.

**1.6 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain minimum 70 degrees F air temperature at flooring installation area for three days prior to, during, and for 24 hours after installation.
- B. Store flooring materials in area of application. Allow three days for material to reach equal temperature as area.

**PART 2 - PRODUCTS**

**2.1 REQUIREMENTS**

- A. Refer to VOC limit tables in Section 018119 for VOC limits for adhesive and sealant products in this section.

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**SECTION 096500 – RESILIENT FLOORING**

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**2.2 RESILIENT FLOORING**

- A. Resilient Flooring: As scheduled on the drawings.

**2.3 ACCESSORIES**

- A. Subfloor Filler: Portland cement based latex filler, mixed with water to produce a self leveling underlayment, or cementitious paste, as appropriate to project requirements.
- B. Adhesives: Types recommended by resilient flooring and base manufacturers for specific application and to maintain warranty.
- C. Transition Strips: Vinyl; color as selected by the Architect from manufacturer's standard.
- D. All other materials not specifically described, but required for a complete and proper installation of resilient flooring, shall be only as recommended by the manufacturer of the material to which it is applied and shall be subject to the approval of the Architect.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine site conditions and verify that the work of this Section may properly commence. Notify the Architect in writing of unsatisfactory conditions.
- B. Perform moisture tests in accordance with ASTM F2170 to determine the vapor emission rate from concrete floors. Notify the Architect of readings in excess manufacturer's recommendations for flooring installation and to maintain warranty.
- C. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

**3.2 PREPARATION**

- A. Prepare floors in accordance with ASTM F710. Install subfloor filler to fill low spots, cracks, construction joints, holes and other defects, and as required to adjust level to meet adjacent finishes. Feather to maximum slope of 1/8 inch in 1 foot; float to smooth, flat, hard surface. Prohibit traffic over filler.

**3.3 FLOORING INSTALLATION**

- A. Install all resilient flooring where scheduled in accordance with the manufacturer's recommendations.
- B. Unless indicated otherwise, install resilient flooring with joints and seams parallel to building lines.
- C. Terminate resilient flooring at centerline of door at door openings where adjacent floor finish is dissimilar, and where no threshold is indicated.
- D. Install edge strips at unprotected or exposed edges where flooring terminates.
- E. Scribe flooring to walls, columns, cabinets, floor outlets and other appurtenances to produce tight joints.
- F. Clean substrate. Spread cement evenly in quantity recommended by manufacturer to ensure adhesion over entire area of installation. Spread only enough adhesive to permit installation of flooring before initial set.
- G. Set flooring in place, press with heavy roller to ensure full adhesion.
- H. Special Requirements for Sheet Flooring:
  - 1. Install sheet flooring to a minimum 1/3 full material width, with length of sheet parallel to length of room. Where cutting is required, double cut and weld as specified. Trim in accordance with manufacturer's instructions.



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**SECTION 096500 – RESILIENT FLOORING**

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2. Heat weld seams in accordance with the manufacturer's printed instructions. Use welding rod in color as selected by the Architect
  3. Unless indicated otherwise, lay flooring with seams parallel to building lines to produce minimum number of seams.
- I. Seal joint between flooring and adjacent materials at restrooms, bathrooms, kitchens, and other moist areas with clear silicone sealant.
- 3.4 PROTECTION**
- A. Unless recommended otherwise by the adhesive manufacturer, prohibit traffic from resilient flooring for 48 hours after installation.
- 3.5 CLEANING**
- A. Upon completion of the installation, immediately remove all surplus adhesive from adjacent surfaces.
- B. As soon as possible after installation, and in accordance with the timing recommended by the manufacturers, clean the entire resilient flooring surface using the materials recommended for that purpose by the manufacturers of the materials being cleaned.

**END OF SECTION**

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**SECTION 096513 – RESILIENT WALL BASE AND ACCESSORIES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Resilient wall base.
  - 2. Resilient molding accessories.
- B. Related Sections:
  - 1. 096500 - Resilient Flooring.
  - 2. 096813 - Tile Carpeting.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 SUBMITTALS**

- A. Make submittals in accordance Section 013300.
- B. Product data, including certification by floor covering manufacturer that products supplied for installation comply with VOC requirements specified. Include CRI Green Label certificate for adhesives.
- C. Samples for verification purposes in manufacturer's standard sizes.

**1.3 QUALITY ASSURANCE**

- A. Fire Performance Characteristics: Test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Critical Radiant Flux: 0.45 watts per sq. cm or more per ASTM E 648.
  - 2. Smoke Density: Less than 450 per ASTM E 662.

**1.4 PROJECT CONDITIONS**

- A. Maintain a minimum temperature of 70 deg F in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F. Do not install products until they are at the same temperature as that of the space where they are to be installed. Close spaces to traffic during installation of products specified in this Section.

**1.5 EXTRA MATERIALS**

- A. Furnish extra materials packaged with protective covering for storage, and identified with labels clearly describing contents. Furnish not less than 51 linear feet for each 500 linear feet or fraction thereof of each different type and color of resilient wall base installed.

**PART 2 - PRODUCTS**

**2.1 REQUIREMENTS**

- A. Refer to VOC limit tables in Section 018119 for VOC limits for adhesive and sealant products in this section.

**2.2 RESILIENT WALL BASE**

- A. Wall Base: As scheduled on Drawings.
- B. Color: Refer to finish schedule.
- C. Style: Cove (with top-set toe).

**SECTION 096513 – RESILIENT WALL BASE AND ACCESSORIES**

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- D. Minimum Thickness: 0.125 inch.
- E. Height: As indicated.
- F. Lengths: Coils in manufacturer's standard length.
- G. Outside Corners: Premolded.
- H. Inside Corners: Job formed or premolded.
- I. Surface: Smooth.

**2.3 RESILIENT MOLDING ACCESSORIES**

- A. Accessory Types: As scheduled on Drawings.
- B. Material: To match wall base.
- C. Profile and Dimensions: As Scheduled on Drawings.

**2.4 INSTALLATION ACCESSORIES**

- A. Resilient Molding Accessories:
  - 1. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
  - 2. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- B. Adhesives:
  - 1. Wall Base: Types as recommended by the manufacturer for specific substrate.
  - 2. Resilient Base and Moldings: Water-resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.
  - 3. Provide products meeting CRI Green Label requirements for VOC content.

**PART 3 - EXECUTION**

**3.1 EXAMINATION AND PREPARATION**

- A. Examine areas where installation of products specified in this Section will occur, with Installer present, to verify that substrates and conditions are satisfactory for installation and comply with manufacturer's requirements and those specified in this Section.
- B. General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.
- C. Resilient Molding Accessories:
  - 1. Use trowelable leveling and patching compounds to fill cracks, holes, and depressions in substrates for resilient molding accessories.
  - 2. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
  - 3. Broom or vacuum clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.
  - 4. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

**3.2 INSTALLATION**

- A. General: Install products specified in this Section using methods indicated according to manufacturer's installation directions.
- B. Apply resilient wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates. Install inside and exterior corners before installing straight pieces.

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**SECTION 096513 – RESILIENT WALL BASE AND ACCESSORIES**

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- C. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.

**3.3 CLEANING AND PROTECTION**

- A. Perform the following operations immediately after completing installation:
  - 1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.
  - 2. Sweep or vacuum floor thoroughly.
  - 3. Do not wash floor until after time period recommended by manufacturer.
  - 4. Damp-mop resilient accessories to remove black marks and soil.
- B. Protect against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by manufacturer of resilient product involved.
- C. Clean products specified in this Section not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products using method recommended by manufacturer.

**END OF SECTION**

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**SECTION 096813 – TILE CARPETING**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes
  - 1. Modular carpet tile.
  - 2. Modular walk off mat tile.
- B. Related Sections:
  - 1. 096500 - Resilient flooring.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 PRE-INSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at Project site. Coordinate with REI Construction Manager.

**1.3 SUBMITTALS**

- A. Make submittals in accordance Section 013300.
- B. Product data, including certification by floor covering manufacturer that products supplied for installation comply with VOC requirements specified. Include CRI Green Label certificate for adhesives.
- C. Samples for verification purposes in manufacturer's standard sizes.
- D. Test Reports: Results of concrete subfloor moisture and alkalinity testing indicating the subfloor surfaces are ready for flooring installation.

**1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floor Covering Installers Association or who can demonstrate compliance with FCIA certification program requirements
- B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with CRI 104.

**1.6 FIELD CONDITIONS**

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

**1.7 WARRANTY**

- A. Special Carpet Warranty: Submit a written warranty, for 5 years from date of Substantial Completion, executed by carpet manufacturer and Installer agreeing to repair or replace carpet that does not meet requirements or that fails in materials or workmanship within the specified warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

**PART 1 - PRODUCTS**

**1.8 REQUIREMENTS**

- A. All carpet products used at the project must meet the CRI Green Label Plus program.

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- B. Refer to VOC limit tables in Section 018119 for VOC limits for adhesive products in this section.

**1.9 CARPET TILE**

- A. Interface Carpet Tile (FOIC): See Section 011100 for contact information.
  - 1. Types and Colors: As scheduled on the Drawings.

**1.10 WALK OFF MAT**

- A. Interface Walk Off Mat Tile: See Section 011100 for contact information.
  - 1. Type and Color: As scheduled on the Drawings.

**1.11 INSTALLATION ACCESSORIES**

- A. Carpet Tile: TacTile adhesive squares.
- B. Walk Off Mat Tile: Adhesive type as recommended by the manufacturer.

**PART 2 - EXECUTION**

**2.1 INSTALLATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Perform moisture tests in accordance with ASTM F2170 to determine the vapor emission rate from concrete floors. Notify the Architect of readings in excess manufacturer's recommendations for flooring installation and to maintain warranty.
- C. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Preparation: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- F. Installation: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- G. Installation Method: As recommended by Carpet Manufacturer.
- H. Maintain dye lot integrity. Do not mix dye lots in same area.
- I. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- J. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- K. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.
- L. Install pattern parallel to walls and borders.
- M. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- N. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

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**END OF SECTION**

**SECTION 097700 – FIBERGLASS REINFORCED PLASTIC PANELS (FRP)**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Reinforced plastic panel wall covering.
  - 2. Adhesives, sealants, and related accessories.
- B. Related Sections:
  - 1. 092116 - Gypsum Board Assemblies: Substrate.

**1.2 SUBMITTALS**

- A. Make submittals in accordance with 013300, unless specified otherwise.
- B. Product Data: Complete published literature for panel products and adhesives.
- C. Samples:
  - 1. Submit minimum 12 inches by 12 inches (300mm square) of panel in the selected color and finish.
  - 2. Submit minimum 12 inches long (300mm) of each type of joint/trim profile.

**1.3 QUALITY ASSURANCE**

- A. Qualifications: Installer Qualifications: Installer should be experienced in performing work of this section and should have specialized in installation of work similar to that required for this project.
- B. Regulatory Requirements: Provide wall panels with USDA acceptance for use in federally inspected food plants, and ASTM-E84 Fire Rating Tested as Class "C".

**1.4 DELIVERY, STORAGE & HANDLING**

- A. General: Comply with Division 01 Product Requirements Sections.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Package sheets on skids or pallets for shipment to project site.
- D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Store panels indoors in a dry place at the project site.
- E. Handling: Remove foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.

**1.5 PROJECT CONDITIONS**

- A. Environmental Requirements:
  - 1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from concrete or other work has dissipated.
  - 2. During installation, and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
  - 3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.
- B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.



**SECTION 097700 – FIBERGLASS REINFORCED PLASTIC PANELS (FRP)**

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**1.6 WARRANTY**

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
  - 1. Warranty Period: One (1) year commencing on Date of Substantial Completion.

**PART 1 - PRODUCTS**

**1.7 REQUIREMENTS**

- A. Refer to VOC limit tables in Section 018119 for VOC limits for adhesive products in this section.

**1.8 FIBERGLASS REINFORCED PLASTIC PANELS (FRP)**

- A. General Use: Wall locations as indicated on Drawings.
- B. Panel Material:
  - 1. Manufacturers/Types:
    - a. Marlite Brand Class I/A Fire Rated FRP by Marlite (Dover, OH 330/343-6621).
    - b. Fire-X Glasbord with Surfaseal, by Crane Composites (Channahon, IL; 800-435-0080).
  - 2. Color: As scheduled in the Interior Finish Schedule.
  - 3. Panel Type: Fiberglass reinforced polyester panels.
  - 4. Surface Appearance: Pebble finish
  - 5. Thickness: 3/32 inch.
  - 6. Size: 48 inches x length required for conditions indicated.
  - 7. Fire Rating: Maximum 25/450 flame spread / smoke developed in accordance with ASTM E84.

**1.9 ACCESSORIES**

- A. Adhesive: Provide panel adhesive as recommended by panel manufacturer. Provide products meeting CRI Green Label requirements for VOC content.
- B. Moldings: Manufacturer's standard PVC cap, corner, and division moldings; color to match panels.
- C. Sealant: Flexible waterproof sealant for bedding panel edges. Per Manufacturer recommendations. Provide products meeting CRI Green Label requirements for VOC content. Color: To match panels.

**PART 2 - EXECUTION**

**2.1 MANUFACTURER'S INSTRUCTIONS**

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

**2.2 EXAMINATION**

- A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
  - 1. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails are countersunk and joints and cracks are filled flush and smooth with the adjoining surface. Do not begin installation until backup surfaces are in satisfactory condition.
  - 2. Where conditions require installation of paneling prior to installation of flooring, coordinate with other trades to establish accurate location of top of base.
  - 3. Do not start work until other work requiring penetration of wall covering has been completed, or accurately located.
  - 4. Commencement of plastic paneling wall covering work constitutes installer's acceptance of the substrate.

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**SECTION 097700 – FIBERGLASS REINFORCED PLASTIC PANELS (FRP)**

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**2.3 FIBERGLASS REINFORCED PLASTIC PANEL (FRP) INSTALLATION:**

- A. General:
  - 1. Inspect panels for any defects immediately. Do not install panels of unacceptable quality.
  - 2. Do not install panels directly over stud framing or furring.
  - 3. When cutting panels, position them so that the saw blade enters the finished HPL side first to avoid chipping or damage. Sand or file all edges smooth without chipping.
  - 4. Protect decorative laminate face of panel by covering work area.
  - 5. Follow adhesive manufacturer's recommendations for appropriate height of adhesive bead left by trowel and do not allow adhesive to skin over.
  - 6. Cut panels accurately to size with proper allowance for expansion and moldings.
  - 7. Cut openings for penetrations in accurate location with approximate 1/8 inch clearance around penetrations.
- B. Install Panels Using Manufacturer's Recommended Adhesive:
  - 1. Plan panel layout so seams are not directly over seams of substrate.
  - 2. Install base molding to wall at proper elevation, in solid bed of adhesive. Allow adhesive to set thoroughly prior to installation of paneling.
  - 3. Seal base molding to top of wall base.
  - 4. Establish centerline of each distinct flat area to be covered. Trim division moldings to mate with base moldings; install in solid bed of adhesive, either on centerline, or offset 24 inches from center, as necessary to maximize panel widths at corners. Molding shall be installed straight and plumb.
  - 5. Cut top cap and division or corner moldings to shape, with edges trimmed to fit to adjacent moldings.
  - 6. Apply sealant into installed moldings in sequence with panel installation.
  - 7. Apply adhesive directly to back of FRP panel with 100% adhesive coverage using crosshatch pattern. Extend adhesive to all edges of panel.
  - 8. Maintain lines and levels of panel edges and moldings.
  - 9. Allow 1/8 inch gap between top cap, corner, or division molding posts, and panel edge; all edges shall be firmly bedded to the moldings in sealant.
  - 10. Promptly remove sealant squeeze out with a damp cloth, as work progresses; remove adhesive with appropriate solvent.
  - 11. Install sealant behind flanges and at penetrations through paneling, and between top cap of panel and substrate.

**2.4 CLEANING**

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace products that have been installed and are damaged.
  - 1. Remove any adhesive or excessive sealant from panel face using solvent or cleaner recommended by panel manufacturer.
  - 2. Use a clean, damp, nonabrasive cotton cloth and a mild liquid detergent or household cleaner.
  - 3. Rinse with clean water using a clean, nonabrasive cotton cloth.
  - 4. Dry panels with a soft, clean nonabrasive cotton cloth.
  - 5. Do not use cleaners containing acid, alkali or sodium hypochlorite.

**2.5 PROTECTION**

- A. Protection: Protect installed product and finish surfaces from damage during construction.

**END OF SECTION**

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**SECTION 099000 - PAINTING**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes surface preparation, painting, and finishing of designated interior and exterior items and surfaces. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.
- B. Paint only designated surfaces. If paint or finish is not designated, do not paint. Note requirements regarding exposed unfinished, unprimed steel in interior spaces.
- C. Painting is not required on prefinished or factory finished items, finished metal surfaces, concealed surfaces, operating parts, and labels.
- D. Related Sections: The following Sections contain requirements that relate to this Section:
  - 2. Division 03 Sections related to concrete finish.
  - 3. Division 05 Sections for shop-priming ferrous metals.
  - 4. Division 08 Sections for shop-priming doors and frames.
  - 5. Division 22, 23 and 26 for specifications for painting mechanical and electrical work.
- E. Paint colors and finishes are specified in the "Finish Schedule" located in the drawings.

**1.2 SUBMITTALS**

- A. Submit the following according to Conditions of Contract and Division 01 Sections:
  - 1. Product data for each paint system specified, including block fillers and primers. Provide the manufacturer's technical information including label analysis and instructions for handling, storage, and application of each material proposed for use. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification. Include Certification by the manufacturer that products supplied comply with VOC limits specified.
    - a. VOC Content: Provide PDS from product manufacturers for each paint, coating and primer highlighting the VOC content.
    - b. Chemical Component Content: Provide manufacturer certification, signed by an authorized company representative, indicating that chemical content for each interior paint system meets or exceeds allowable limits established by Green Seal Paints Standard GS-11.
  - 2. Samples: Resubmit until required sheen, color, and texture are achieved. Submit samples on the following substrates for the Architect's review of color and texture only:
    - a. GWB: (3) 8-1/2" x 11" paintouts on heavy paper of each color and finish.

**1.3 QUALITY ASSURANCE**

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to those indicated for the Project that have resulted in a construction record of successful in-service performance.

**1.4 JOB CONDITIONS**

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F and 90 deg F.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F and 95 deg F.
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

**PART 2 - PRODUCTS**

**2.1 REQUIREMENTS**

- A. Refer to VOC limit tables in Section 018119 for VOC limits for finish products in this section.

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**2.2 MANUFACTURERS**

- A. Products: Subject to compliance with requirements, provide products by manufacturers named in Part 3.

**2.3 PAINT MATERIALS, GENERAL**

- A. Material Compatibility: Provide related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.
- B. Material Quality: Paint material containers not displaying manufacturer's product identification will not be acceptable.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements. Surfaces receiving paint must be thoroughly dry before paint is applied. Do not begin to apply paint until unsatisfactory conditions have been corrected. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

**3.2 PREPARATION**

- A. General: Remove hardware and accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to the manufacturer's instructions for each particular substrate condition and as specified.
  - 1. Provide barrier coats over incompatible primers or remove and reprime.
  - 2. Cementitious Materials: Prepare concrete, CMU, and plaster surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen, as required, to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
    - a. Use abrasive blast-cleaning methods if recommended by the paint manufacturer.
    - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
  - 3. Wood: Clean surfaces of dirt, oil, and other foreign substances as required. Sand surfaces exposed to view smooth and dust off.
    - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
    - b. Prime, stain, or seal wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
    - c. When transparent finish is required, backprime with spar varnish.

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- d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.
  - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery.
- 4. Ferrous Metals: Clean ungalvanized ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC). Spec #SSPC-SP-3 Power Tool.
- 5. Exterior Structural Steel Preparation: Prepare exterior structural steel using the following methodology: SSRC-SP1 Solvent Cleaning, followed by SSPC-SP6 Commercial Blast Cleaning followed by proprietary metal treatment wash coat before priming. All shop and field weld areas should be treated with phosphoric acid solution. Protect adjacent surfaces.
- 6. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- D. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using. Use only thinners approved by the paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

### **3.3 APPLICATION**

- A. General: Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  - 1. The number of coats and the film thickness required are the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce a smooth even surface according to the manufacturer's directions.
  - 2. Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
  - 3. The term exposed surfaces includes areas visible when permanent or built-in fixtures, convactor covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
  - 4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 5. Finish exterior doors on tops, bottoms, and side edges same as exterior faces.
  - 6. Sand lightly between each succeeding enamel or varnish coat.
  - 7. Omit primer on metal surfaces that have been shop-primed and touch-up painted.
- C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

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- D. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.
- E. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer or specified herein.
- F. Mechanical and Electrical Work: Do not paint mechanical or electrical work in interior, except as noted. Paint electrical conduit on exterior of building unless adjacent to galvanized finish.
- G. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- H. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- I. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
- J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with specified requirements.

**3.4 FIELD QUALITY CONTROL**

- A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:
  - 1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
  - 2. If test results show material being used does not comply with specified requirements, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing, repaint surfaces coated with rejected paint, and remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are incompatible.

**3.5 CLEANING AND PROTECTION**

- A. Cleanup: At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.
- B. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
- C. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

**3.6 INTERIOR PAINT SYSTEMS**

- A. Gypsum Board:
  - 1. Water Based Epoxy-Acrylic:
    - a. Janitor Rooms, Break Room, Bike Assembly: One primer coat, two finish coats.
      - 1) Primer: Ultra Spec 500 Interior Primer 534; 1.3 DFM.
      - 2) Intermediate coat: Same as top coat.
      - 3) Top coat: Ultra Spec Scuff-X Satin 486; 2.5 - 3.0 DFM.
    - b. Hall adjacent to Restrooms: One primer coat, two finish coats.
      - 1) Primer: Ultra Spec 500 Interior Primer 534; 1.3 DFM.

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- 2) Intermediate coat: Same as top coat.
      - 3) Top coat: Ultra Spec Scuff-X Eggshell 485; 2.5 - 3.0 DFM.
    - c. Restrooms, Shower Room: One primer coat, two finish coats.
      - 1) Primer: Ultra Spec 500 Interior Latex Primer; 1.3 DFM.
      - 2) Intermediate coat: Same as top coat.
      - 3) Top coat: Corotech Precatalyzed Epoxy Semi-Gloss V341; 2.5 - 3.0 DFM.
  - 2. Eggshell Latex (walls, all spaces, except as noted in 1): One primer coat, two finish coats.
    - a. Primer: Benjamin Moore Ultra Spec Interior Primer 534, 1.8 DFM / Sherwin Williams Harmony Interior Latex Primer; 1.3 DFM.
    - b. Intermediate coat: Same as top coat.
    - c. Top coat: Benjamin Moore Ultra Spec 500 Eggshell; 1.6 DFM / Sherwin Williams Harmony Interior Latex Eg-Shel; 1.6 DFM.
  - 3. Latex, flat: Ceilings: One primer coat, two finish coats.
    - a. Primer: Benjamin Moore Ultra Spec 500 Interior Primer 534, 1.8 DFM / Sherwin Williams Harmony Interior Latex Primer; 1.3 DFM.
    - b. Intermediate coat: Same as top coat.
    - c. Top coat: Benjamin Moore Ultra Spec 500 Interior Flat 536, 1.6 DFM / Sherwin Williams Harmony Interior Latex Flat; 1.6 DFM.
  - 4. Primer (wall at Cashier area where graphics are to be applied and all areas receiving stencil-applied graphics):
    - a. Rust-Oleum "Zinsser Shieldz" White Pigment Universal Wall covering Primer. No substitutions allowed.
    - b. Two coats.
    - c. Product to be left on-site for verification by graphic panel installers. Refer to plans for location.
    - d. Prior to application of each layer, remove dust and debris from surface and ensure previous layer has cured per manufacturer requirements.
- B. Wood Opaque Finish System:
- 1. Painted Wood: Two finish coats over primer.
    - a. Primer: Benjamin Moore Ultra Spec 500 Interior Primer 534, 1.8 DFM / Sherwin Williams Harmony Interior Latex Primer; 1.3 DFM.
    - b. Intermediate coat: Same as top coat.
    - c. Top coat: Benjamin Moore Ultra Spec 500 Semi-Gloss 539, 1.6 DFM / Sherwin Williams Harmony Interior Latex Semi Gloss; 1.6 DFM.
- C. MDO Flush Doors:
- 1. Painted: Two finish coats over primer.
    - a. Primer: Benjamin Moore Fresh Start 024 Alkyd Primer / Preservative 20-96 Overlay Primer, Alkyd.
    - b. Finish: Benjamin Moore Ultra Spec 500 Semi-Gloss 539 / Preservative 3 series Metropolitan Enamel, Alkyd.
- D. Wood - Transparent Finish System:
- 1. Polyurethane:
    - a. Finish: Benjamin Moore Lenmar Megavar 1B.502 Dull Rubbed WB Polyurethane / Rust-Oleum "Ultimate Polyurethane with Soft Touch", matte finish; 2 coats.
    - b. Sand between coats as recommended by the manufacturer.
  - 2. Application: Wood trim and wall paneling scheduled to receive transparent finish.
- E. Metals:
- 1. Includes H.M. doors, frames, relites:
    - a. Water Based Acrylic Urethane, semi-gloss meeting Green Seal Paints Standard GS-11 for total VOC and chemical component limits.
      - 1) Primer: None required.
      - 2) Intermediate coat: Same as top coat.
      - 3) Top coat: Benjamin Moore Ultra Spec HP DTM HP 29 / Sierra Performance Coatings S37 Metalmax DTM Plus , semi-gloss; 1.5 DFM.

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2. Clear Coat over unprimed or unpainted steel columns: Two coats Triple S (800/862-5958) AL-70 Quick Dry Lacquer; flat finish. Clear Coat full height of columns to underside of structure.
- F. Floor Striping:
1. Benjamin Moore Insl-x Latex Traffic Paint TP-2224 (Yellow), TP2220 (Black); (4-8 mils dft).
  2. The Sherwin Williams Co. (Cleveland, OH; 800-474-3794) "SetFast Low VOC Acrylic Traffic Marking Paint"; TM5627 (Yellow), TM5629 (Black).
  3. Provide manufacturers recommended non-slip additive.

**END OF SECTION**



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**SECTION 101100 – VISUAL DISPLAY UNITS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Communication panels.
- B. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to work of this Section.
- C. Substitutions will be considered only under the terms and conditions of Section 012500.

**1.2 SUBMITTALS**

- A. Submit the following according to Conditions of Contract and Division 01 Sections:
  - 1. Product Data for specified adhesive. Include Certification by the manufacturer that products supplied comply with VOC limits specified.
    - a. VOC Content: Provide PDS from product manufacturers for adhesive and related primers, highlighting the VOC content.

**1.3 QUALITY ASSURANCE**

- A. Surface-Burning Characteristics: Comply with ASTM E 84, Class C materials; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

**1.4 DELIVERY, STORAGE AND HANDLING**

- A. Store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Inspect the materials upon delivery to assure that specified products have been received. Report damaged material immediately.
- C. Store materials vertically with packing materials between each unit, in a dry place, indoors or on raised platform protected from weather damage.

**1.5 PROJECT CONDITIONS**

- A. Do not deliver or install panels until building is enclosed, finish work, including painting, is complete, and HVAC is operating and maintaining temperature between 65 deg F and 85 deg F at least 72 hours prior to panel installation and throughout the remainder of the construction period.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Tackboard Panel: PINnacle 440, manufactured by Homasote Company; phone: (609) 883-3300; fax: (609) 883-3497; [www.homasote.com](http://www.homasote.com).
  - 1. Description: Fabricated from FSC certified, 100% post-consumer paper, formaldehyde and asbestos free.
  - 2. Thickness: 1/2 inch.
  - 3. Size: As indicated on drawings.
  - 4. Finish: Soft-textured, finely-sanded finish.
  - 5. Edge Detail: Square.
  - 6. Weight: 31 lbs. per panel
  - 7. No substitution.
- B. Bulletin Board: Colored Cork Board, Manufactured by Platinum Visual Systems; phone 1-800-498-2990, [www.pvusa.com](http://www.pvusa.com):
  - 1. Description: Fine Grain Colored Cork tackable Surface with aluminum frame.
  - 2. Size: As indicated on drawings.
  - 3. Color: Blueberry
  - 4. Edge Detail: 3/4" clear satin anodized aluminum frame.
  - 5. No substitution.

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- C. Bulletin Board: Combination Board, Manufactured by Platinum Visual Systems; phone 1-800-498-2990, [www.pvusa.com](http://www.pvusa.com):
  - 1. Description: Porcelain-on-steel writing surface with fine grain colored cork tackable surface with aluminum frame.
  - 2. Type: Type C (831640831)
  - 3. Size: 4'-0" x 6'-0" (4' white board, 2' cork)
  - 4. Color: Blueberry
  - 5. Edge Detail: 3/4" clear satin anodized aluminum frame.
  - 6. Marker Tray included.
  - 7. Non-Magnetic surface.
  - 8. No substitution.
- D. Bulletin Board: Combination Board, Manufactured by Platinum Visual Systems; phone 1-800-498-2990, [www.pvusa.com](http://www.pvusa.com):
  - 1. Description: Porcelain-on-steel writing surface with fine grain colored cork tackable surface with aluminum frame.
  - 2. Type: Type E (831140831)
  - 3. Size: 4'-0" x 8'-0" (2' cork, 4' white board, 2' cork)
  - 4. Color: Blueberry
  - 5. Edge Detail: 3/4" clear satin anodized aluminum frame.
  - 6. Marker Tray included.
  - 7. Non-Magnetic surface.
  - 8. No substitution.
- E. Magnetic Whiteboards: Quartet Matrix Magnetic White Board, Manufactured by Quartet: Phone: 1-800-541-0094 [www.quartet.com](http://www.quartet.com).
  - 1. Description: dual function dry-erase writing board and magnetic bulletin board.
  - 2. Size: As indicated on drawings.
  - 3. Finish: White Magnetic.
  - 4. Marker Tray Included.
  - 5. Edge Detail: Aluminum.
  - 6. No substitution.
- F. Adhesive: APA AFG-01 approved, low-VOC, mildew-resistant, nonstaining adhesive, for use with specific tack wall panels and substrate application, as recommended in writing by panel manufacturer.
- G. Comply with VOC content limitations.
- H. Primer: As recommended by adhesive and panel manufacturer for intended substrate.
- I. Wall Panel Fasteners:
  - 1. Annular Threaded Nails: Length as required to penetrate into wall framing 3/4-inch minimum.
  - 2. Screws: 20 gauge or heavier, self-tapping drywall type steel screws.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
- B. Examine walls and partitions for proper preparation and backing for visual display units.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Follow manufacturer's instructions by separating and allowing panels to be exposed to environmental temperature and humidity conditions for not less than 24 hours before start of installation.

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**SECTION 101100 – VISUAL DISPLAY UNITS**

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- C. Clean substrates of substances that could impair the performance of and affect the smooth, finished surfaces of visual display units.
- D. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.
- E. Prime wall surfaces indicated to receive direct-applied, visual display tack wall panels, as recommended in writing by primer/sealer manufacturer and panel manufacturer.

**3.3 INSTALLATION**

- A. Install panels in accordance with manufacturer's installation instructions.
- B. Install panels plumb, level, true, and aligned with adjacent materials.
- C. Install panels in only clean dry condition. Do not install wet panels.
- D. Attach panels to wall surface with adhesive and mechanical fasteners.
  - 1. Apply a 3/8-inch bead of adhesive, holding back 3/4-inch from panel edges and in an "X" pattern with the field as shown in manufacturer's "nailing and adhesive pattern". Apply pressure where adhesive is located to ensure positive contact.
  - 2. Screw or nail panels at maximum 24-inch centers along edges and 24-inch centers along all intermediate framing, following manufacturer's nailing pattern. Use proper length ring shank nails or screws to penetrate wall framing 3/4-inch minimum. Position screws or nails 3/8-inch from panel edges.
- E. Space panel joints 1/8-inch apart; 1/4-inch space at floors, ceilings, window and door frames. Panel edges must be supported at all times.

**3.4 ADJUSTING AND CLEANING**

- A. Protect installed products until completion of project. Replace panels that cannot be repaired.
- B. Clean by light sanding using 280-320 grit sandpaper.

**END OF SECTION**

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**SECTION 101473 - CODE SIGNAGE**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Code required signage, not included as a part of the Owner's interior signage work.
- B. Related Sections:
  - 1. Division 26: Illuminated exit signs.
- C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- D. Substitutions: Substitute products will be considered only under the terms and conditions of Division 1.

**1.2 REFERENCES**

- A. American National Standards Institute (ANSI): A117.1 - Accessible and Usable Buildings and Facilities Standards

**1.3 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Samples: Submit samples of each general sign type proposed for the Work.
- C. Schedule: Submit schedule of signage. List text, location, size, and type for each sign to be provided.

**1.4 QUALITY ASSURANCE**

- A. Qualifications:
  - 1. Fabricator Qualifications: Signage manufacturer with five years documented experience in work of similar type and scope.
  - 2. Installer Qualifications: Use only installers skilled and experienced in the installation of graphics of the type scheduled.
- B. Regulatory Requirements: Signage shall conform to the requirements of the jurisdictional code authorities.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Plastic Sheet: 1/8 inch thick acrylic sheet; low gloss finish.
- B. Double Stick Tape: 3M Scotch brand #665 double-stick, double-coated tape, 1/4 inch wide, or as appropriate to installation requirements.

**2.2 FABRICATION**

- A. Signs shall be free of rough edges, irregular surfaces, non uniform finishes, and similar imperfections.
- B. Accessibility Signage:
  - 1. Furnish acrylic plastic signs with international symbol of accessibility, raised letters, and Braille, blue background with white letters, at the following locations:
    - a. Accessible toilet facilities.
    - b. Accessible showers.
    - c. Accessible fitting rooms.
  - 2. Egress signage shall have a tactile sign stating EXIT, which includes raised letters and Braille, and which complies with ANSI A117.1.
- C. Refer to the Drawings for locations.

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**SECTION 101473 - CODE SIGNAGE**

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**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

**3.2 INSTALLATION**

- A. All graphics shall be mounted level and plumb and in accurate alignment, unless indicated otherwise.
- B. Mounting:
  - 1. Clean surfaces as necessary to accept mounting tape.
  - 2. Use double stick tape for mounting unless approved otherwise.

**END OF SECTION**

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**SECTION 102600 – WALL SURFACE PROTECTION SYSTEMS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Metal corner guards.
- B. Drawings, the provisions of the Agreement, the General Conditions, and Division 01 specification sections apply to work of this Section.
- C. Substitutions will be considered only under the terms and conditions of Section 012500.

**1.2 SUBMITTALS**

- A. Submit the following according to Conditions of Contract and Division 01 Sections:
  - 1. Product data for each system component and installation accessory required.
  - 2. Samples for Verification Purposes: Submit 2" square finish samples of metal.
  - 3. Maintenance data for wall surface protection system components for inclusion in the Operating and Maintenance Manuals specified in Division 01.

**1.3 PROJECT CONDITIONS**

- A. Environmental Conditions: Do not install components until the space is enclosed and weatherproof and until the ambient temperature within the building is maintained at not less than 70 deg F for not less than 72 hours prior to beginning of the installation.

**PART 2 - PRODUCTS**

**2.1 CORNER GUARDS**

- A. Surface-Mounted Metal Corner Guards (MCG): Provide custom 16 gage unfinished steel corner guards, 48-inch high. Provide a 90-degree turn unless otherwise indicated, mounting holes 8 inches on center.
  - 1. Wing Size: 2-1/2-inch by 2-1/2-inch wings.
  - 2. Length: 48 inches.
  - 3. Mounting Method: Adhesive install with adhesive recommended by the metal corner guard manufacturer.
  - 4. Provide U-shaped corner guards at stub walls with two adjacent exposed corners.

**PART 3 - EXECUTION**

**3.1 EXAMINATION AND PREPARATION**

- A. Examine areas and conditions in which wall protection systems will be installed. Complete all finishing operations, including painting, before beginning installation of wall surface protection system materials.
- B. Do not proceed with installations until unsatisfactory conditions have been corrected.
- C. Prior to installation, clean substrate to remove dust, debris, and loose particles.

**3.2 INSTALLATION**

- A. General: Install wall surface protection units per manufacturer's instructions, plumb, level, and true to line without distortions.

**3.3 CLEANING**

- A. General: Immediately upon completion of installation, clean metal corner guards using cleaning agents recommended by the manufacturer.

**END OF SECTION**

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REI STORE #235**

**SECTION 102800 – TOILET AND BATH ACCESSORIES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes toilet and bath accessory items as scheduled.

**1.2 SUBMITTALS**

- A. Submit the following according to Conditions of Contract and Division 01 Sections:
1. Product data, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.
  2. Setting drawings where cutouts are required in other work, including templates, and directions for preparing cutouts and installing anchorage devices.
  3. Maintenance instructions including replaceable parts and service recommendations.

**1.3 WARRANTY**

- A. Warranty: Submit a written warranty executed by mirror manufacturer, agreeing to replace any mirrors that develop visible silver spoilage defects within warranty period. Warranty Period: 15 years from date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide toilet accessories by Bobrick Washroom Equipment, Inc., unless indicated otherwise. No substitutions allowed. See Section 011100 for contact information.

**2.2 MATERIALS, GENERAL**

- A. Stainless Steel: AISI Type 302/304, polished No. 4 finish, 0.034" (22-ga.) minimum thickness.
- B. Brass: Leaded and unleaded, flat products, ASTM B 19; rods, shapes, forgings, and flat products with finished edges, ASTM B 16; Castings, ASTM B 30.
- C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 0.04" (20-ga) minimum. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A 527, G60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.
- F. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.
- G. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

**2.3 FABRICATION**

- A. General: Only a maximum 1-1/2" diameter, unobtrusive stamped manufacturer logo, is permitted on exposed face of accessory units. On either interior surface not exposed to view or back surface, provide additional identification by either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.
- B. Surface-Mounted Accessories, General: Fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

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- C. Recessed Accessories, General: Fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six keys to Owner's representative.

**2.4 PRODUCTS**

- A. Refer to Equipment Schedule on the Drawings.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.
- C. Install grab bars to withstand a downward load of at least 250 lbf, complying with ASTM F 446.

**3.2 ADJUSTING AND CLEANING**

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

**3.3 TOILET AND BATHROOM ACCESSORY SCHEDULE**

- A. Refer to Drawings for Toilet and Bathroom Accessory Items.

**END OF SECTION**



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**SECTION 104416 – FIRE EXTINGUISHERS AND ACCESSORIES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes Fire extinguishers, mounting brackets, and signs.

**1.2 SUBMITTALS**

- A. Submit the following according to Conditions of Contract and Division 01 Sections: Product data for fire extinguishers and materials.

**1.3 QUALITY ASSURANCE**

- A. UL-Listed Products: Fire extinguishers shall be UL listed with UL listing mark for type, rating, and classification of extinguisher.

**PART 2 - PRODUCTS**

**2.1 FIRE EXTINGUISHERS**

- A. General: Provide fire extinguishers for locations indicated, and in total quantity not less than noted below, in colors and finishes selected by Architect from manufacturer's standard, that comply with authorities having jurisdiction.
- B. Provide ABC Multi-Purpose Dry Chemical Type, UL rated 2A:10B: C, 5 lb capacity, fire extinguishers for every 3,000 square feet of retail space. Ensure that all portions of space are no more than 75 feet of travel from an extinguisher. In addition provide two additional extinguishers and brackets to be located per Owner's direction.

**2.2 MOUNTING BRACKETS**

- A. Brackets: Designed to prevent accidentally dislodging extinguisher, of sizes required for type and capacity of extinguisher indicated, in plated finish.

**2.3 SIGNS**

- A. Signs: Provide adhesive sign per local Fire Marshall requirements. Architect to select from manufacturer's standard selections.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Follow manufacturer's printed instructions for installation.
- B. Verify locations with local Fire Marshall. Install in locations and at mounting heights indicated or, if not indicated, at locations and at heights to comply with applicable regulations of governing authorities.
  - 1. Fasten mounting brackets to structure, square and plumb.
  - 2. Verify sign location with local Fire Marshall and verify with Architect.
- C. Verify locations of extinguishers not indicated on Drawings with Architect.

**END OF SECTION**

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**SECTION 109013 - MISCELLANEOUS SPECIALTIES**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Wall Mounted Fan.
  - 2. Manually Operated Projection Screens.
  - 3. Plastic Name Tag Holder.
  - 4. Fitting Room Mirrors.
  - 5. Lockers.
  - 6. Hanger Racks.
  - 7. Cleaning Solution Storage Tray.
  - 8. Security key box.
  - 9. Appliances.
  - 10. Boat Lift and Rack.
  - 11. Safety Storage Cabinet
  - 12. Air Compressor and Accessories
- B. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to all work of this Section.
- C. Substitutions: Substitute products will be considered only under the terms and conditions of Section 016000.

**1.2 SUBMITTALS**

- A. Make submittals in accordance with Section 013300.
- B. Product Data: Submit manufacturer's complete product literature and other items as required by individual articles herein.

**PART 2 - PRODUCTS**

**2.1 WALL MOUNTED FAN**

- A. Manufacturer: Dayton; [www.Grainger.com](http://www.Grainger.com)
- B. Fan: Model #2MA10
- C. Size: 24 inches.
- D. Capacity: 5450 cfm.
- E. Power requirements: 115 volt.
- F. Furnish wall mounted bracket.
- G. Installation:
  - 1. Mount in accordance with manufacturer's installation instructions,
  - 2. Secure to wall, mount into backing.
- H. Location: Shipping and Receiving; locate as indicated on the Drawings.

**2.2 PROJECTION SCREEN**

- A. Manufacturer: Da-Lite Screen Company Inc (Warsaw IN; 800-622-3737).
- B. Manual Projection Screen: Model "C."; Da-Lite SKU# 79886
  - 1. Surface: Matte White
  - 2. Black masking borders.
  - 3. Roller: 3 inch diameter roller with ball bearing mount and spring return.
  - 4. Case: Manufacturer's standard 21-gage steel; standard white powder-coated finish.
  - 5. Controlled screen return "CSR."

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- C. Format: HDTV (16:9).
- D. Size: 65" x 116"; 133" diagonal.
- E. Furnish pull down rod; Da-Lite SKU #74689
- F. Installation:
  - 1. Mount in accordance with manufacturer's installation instructions,
  - 2. Secure to wall, mount into concealed backing in new partitions or surface mounted backing at existing partitions as detailed on the drawings.
- G. Location: Indicated on the Drawings.

**2.3 PLASTIC NAME TAG HOLDER**

- A. Manufacturer: Outwater Plastic Industries, Inc
- B. Nametag Holder: Model #6105-01 (100 pack)
- C. Length: 1-1/2 inches.
- D. Location: Employee mailbox, locate as indicated on the Drawings.

**2.4 FITTING ROOM MIRRORS**

- A. Manufacturer: Stylmark, Incorporated (Minneapolis, MN; 800-328-2495 [www.stylmark.com](http://www.stylmark.com)).
- B. Mirrors: "Mirror Solutions - LED-lit Bevel Mirror"
  - 1. Model: 620096-01
  - 2. Description: Bevel: LED-lit, Single Pane Mirror with mounting hardware.
  - 3. Mirror Size: 28 inches x 60 inches.
  - 4. Nominal Wattage: 32.5W
  - 5. Frame Finish: #220 natural brushed satin.
  - 6. LED Color Temperature: 3700K.
- C. Installation:
  - 1. Mount in accordance with manufacturer's installation instructions,
  - 2. Connect all wiring per applicable local codes, refer to manufacturers wiring diagram.
  - 3. Secure to wall, mount into backing.
- D. Location: Locate in fitting rooms as indicated on the Drawings.

**2.5 LOCKERS**

- A. Manufacturer: Grainger (800-Grainger, [www.grainger.com](http://www.grainger.com)).
  - 1. Locker Type - A: "Hallowell Box Locker, Assembled, 12 In. W, 15 In. D, 78 In. H, (1) Wide, (6) Person, 6 Tier; Grainger Item #4HE39"; color: Gray; flat top and 6 inch legs. Refer to Drawings for quantity and location.
    - a. Provide front base, Grainger Item #4HU26; color to match.
    - b. Provide end base, Grainger Item #4HU35; color to match.
  - 2. Locker Type - B: "Hallowell Box Locker, Assembled, 36 In. W, 15 In. D, 78 In. H, (3) Wide, (18) Person, 6 Tier; Grainger Item #4HE40"; color: Gray; flat top and 6 inch legs. Refer to Drawings for quantity and location.
    - a. Provide front base, Grainger Item #4HU26; color to match.
    - b. Provide end base, Grainger Item #4HU35; color to match.
  - 3. Accessible Lockers:
    - a. Provide two ADAAG approved lockers; lever handles;
    - b. Locate Min 18 inches AFF and Max 48 inches AFF.
    - c. Coordinate signage with Owners signage vendor.
- B. Installation: In accordance with manufacturer's installation instructions, secure to wall.
- C. Location: Locate as indicated on the Drawings.

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**2.6 HANGER RACKS**

- A. Manufacturer: IRSG (Itasca, IL; 800-822-4264 [www.irsg.com](http://www.irsg.com)); 21" Hanger Management Systems:
  - 1. Double Storage Starter & Add-On Racks
    - a. Starter: IDS-2110 (Quantity: 1, unless indicated otherwise on the Drawings)
    - b. Add-on: IDA-2110 (Quantity: 4, unless indicated otherwise on the Drawings)
- B. Installation: In accordance with manufacturer's installation instructions, secure to wall.
- C. Location: Locate as indicated on the Drawings.

**2.7 CLEANING SOLUTION STORAGE TRAY AND HOLDER**

- A. Manufacturer: Diversey (Sturtevant, WI; 800-558-2332 [www.diversey.com](http://www.diversey.com))
- B. Wire Basket: Model #3191762
- C. Color: Black
- D. Installation: In accordance with manufacturer's installation instructions, secure to wall.
- E. Location: BIKE ASSEMBLY, locate as indicated on the Drawings.

**2.8 SECURITY KEY BOX**

- A. Manufacturer: ULINE, Pleasant Prairie, WI (800/552-5669).
- B. Type: 120 Key Cabinet
- C. Model: H-2063.
- D. Dimensions: 13W x 3 1/4D x 17"H.
- E. Finish: Manufacturer's standard powder coat finish.
- F. Installation: In accordance with manufacturer's installation instructions, secure to wall.
- G. Location: Locate as indicated on the Drawings.

**2.9 APPLIANCES - REFRIGERATOR**

- A. Approved Manufacturers: Whirlpool or approved.
- B. Features/Capacity/Rating:
  - 1. Top refrigerator compartment, bottom freezer
  - 2. Automatic ice maker.
  - 3. Capacity: 21.9 cf, nominal.
  - 4. Maximum overall dimensions: 33" wide, 34" deep.
  - 5. Doors: Textured steel; reversible door swing required.
  - 6. Interior: Adjustable glass shelves.
  - 7. Color: Manufacturer's standard white.
  - 8. Rating: Energy Star certified.
- C. Location: LOCKER ROOM.

**2.10 BOAT LIFT MOTOR AND STORAGE RACK**

- A. Boat Lift Motor:
  - 1. Approved Manufacturer: Lift & Storage Systems, Inc. (White Bear Lake, MN; 651-777-1554; [www.liftnstore.com](http://www.liftnstore.com)).
  - 2. Motor: Overhead mounted, hoist motor with 8 ft long rack; 1 HP, 208 volts, 6.4 amps.
  - 3. Machine weight: 550 lbs.
  - 4. Lifting Capacity: 2400 lbs.
- B. Boat Storage Rack:
  - 1. Approved Manufacturer: Lift & Storage Systems, Inc. (White Bear Lake, MN; 651-777-1554; [www.liftnstore.com](http://www.liftnstore.com)).

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2. Boat Storage Cart: 8 boat capacity with painted steel support bars, nylon boat sling straps, and heavy-duty casters.
3. Dimensions: 110 inches by 51 inches by 83 inches high.

C. Location: Locate as indicated on the Drawings.

**2.11 SAFETY (FUEL) STORAGE CABINET**

A. Justrite Manufacturing Company, "Sure-Grip EX Flammable Safety Cabinet", available from Grainger (800-472-4643, [www.grainger.com](http://www.grainger.com)), Grainger product number "1YNF1", manufacturer's product number "896020".

1. Fully welded 18 ga. galvanized steel with powder-coated Yellow finish
2. Two self-closing doors
3. Two adjustable interior shelves
4. Volume capacity: 60 gallons
5. Size: 34" W x 65" H x 34" D.

B. Installation: In accordance with manufacturer's installation instructions, secure cabinet to wall.

C. Location: Action Sports storage; locate as indicated on the Drawings.

**2.12 AIR COMPRESSOR AND ACCESSORIES**

A. Portable, Electric Barrel Air Compressor, 2.0 HP, 115/230Volt AC, 20 gal., 135 psi. Available from Grainger (800-472-4643, [www.grainger.com](http://www.grainger.com)), product number "1NNF6".

1. Accessories (Grainger product numbers indicated):
  - a. "4ZF21" - Air Compressor (non-detergent) Oil; 1 Qt. Bottle
  - b. "20Z883" - Drain Extension Kit; For All Stationary Air Compressors.
  - c. "45DV02" - Coupled Assembly Snubber Hose, Yellow.
  - d. "30E692" - 1/4 Inch, Male Thread Steel Industrial Quick Coupler Body.
  - e. "30E657" - 1/4 Inch, Male Thread Steel Industrial Quick Coupler Plug.

B. Provide and fully assemble compressor and accessory parts. Verify installation is complete and operational, and able to connect to copper line terminated in 1/4 inch FNPT fitting, installed under Division 22.

C. Location: Bike shop as indicated on the Drawings.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

A. Install each item in accordance with manufacturer's instructions, as detailed, and in accordance with special requirements of each article. Confirm proper location of backing in wall.

**END OF SECTION**

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**SECTION 111300 – LOADING DOCK EQUIPMENT**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Loading dock light.

**1.2 SUBMITTALS**

- A. Product Data: Manufacturers data on dock light.

**PART 2 - PRODUCTS**

**2.1 LOADING DOCK LIGHT**

- A. Furnish and install Phoenix Model DLA 2 LED Docklite. No Substitutions.
  - 1. Design: Modular LED Loading Dock Light Head, 1100 lumens.
  - 2. Head: Series DLA 2 12LED
  - 3. Arm: Series DLA 2 42" Arm.
  - 4. Electrical Interconnection: By electrician. Provide 120 volt, 3 amp outlet for loading lights.
  - 5. Warranty: Three (3) years Parts & Labor.
  - 6. Lamps: 9 Watt LED.

**PART 3 - EXECUTION**

**3.1 LOADING DOCK LIGHT**

- A. Install per manufacturer's instructions.

**END OF SECTION**

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**SECTION 124813 – FLOOR MATS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Anti-Fatigue floor mats.

**1.2 SUBMITTALS**

- A. Submit the following according to the Conditions of the Contract and Division 01 Sections:
1. Product data, including manufacturer's specifications and installation instructions.
  2. Shop drawings showing layout and types of floor mats, full-scale sections of typical installations, details of patterns or designs, anchors, and accessories.
  3. Samples, 12-inch square.
  4. Maintenance data in the form of manufacturer's printed instructions for cleaning and maintaining floor mats.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. General: Provide colors, patterns, and profiles of materials, including metal finishes scheduled on Drawings.
- B. Smart Cells Anti-Fatigue Floor Mats: Provide size as noted on drawings. Runners are either 3' x any length or 2' x any length. Mat thickness is 1/2" with molded beveled edge transition. Runners are comprised of multiple connectable segments that connect together beneath the mat surface with a male-female mechanism. Along one edge of a segment is a protruding connector that accepts the tubular cells along the edge of the adjacent segment. No substitutions allowed. See Section 01 11 00 for contact information.
1. Color: Black
  2. Composition: Styrene Butadiene Rubber (SBR)
  3. Accessories/Options: Gluing runner segments – Runner segments may be glued together on-site to create a continuous runner. Recommended adhesive is FS-500 Cyanoacrylate adhesive from CA-PLUS Adhesives, Inc. ([www.CA-PLUS.com](http://www.CA-PLUS.com)).
  4. Runners and mats may be temporarily adhered to the floor with a double-sided adhesive tape. Recommended tape is Polyken 105C Multi-Purpose Double-Sided Cloth tape 2" width. (Tape is applied to the back side of the beveled mat edge. Mat is put in place and then release layer is removed from under mat.)

**2.2 FABRICATION**

- A. Shop-fabricate units of floor mat work to greatest extent possible in sizes as indicated. Where not indicated otherwise, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for units intended for removal and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints. Where possible, verify sizes by field measurement before shop fabrication.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Defer installation of floor mats until time of Substantial Completion for Project.

**END OF SECTION**

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SECTION 129313 - BICYCLE RACKS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Interior bicycle racks.

**1.2 SUBMITTALS**

- A. See Section 013300 for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including installation methods.
- C. Shop Drawings: Indicate all special fabrication provisions; indicate methods of anchorage.

**PART 2 - PRODUCTS**

**2.1 INTERIOR WALL-HUNG BICYCLE RACKS**

- A. Manufacturer: Montana Sport International AG.
- B. Model: "Easy Hang" - (3) 150cm
- C. Coordinate additional fittings with REI Project Manager.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Require correction of conditions detrimental to the proper and timely completion of the work.
- B. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

**3.2 PREPARATION**

- A. Coordinate the placement of blocking specified elsewhere.

**3.3 INSTALLATION**

- A. Install bicycle racks in accordance with manufacturer's recommendations.

**END OF SECTION**



**SECTION 210529 - SUPPORTS, HANGERS AND SEALING**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Pipe hangers and supports.
- B. Duct hangers and supports.
- C. Sleeving for mechanical equipment.

**1.2 REFERENCES**

- A. SMACNA HVAC Duct Construction Standards (2005)
- B. SMACNA Seismic Restraint Manual (2008)
- C. Manufacturer's Standardization Society of the Valve and Fittings Industry. Standards MSS SP-58, SP-69, and SP-89.

**PART 2 - MATERIALS AND EXECUTION**

**2.1 PIPE HANGERS, SUPPORT AND SEISMIC RESTRAINTS**

- A. Methods and installation shall comply with all requirements of standards referenced above. In case of conflict between references, the stricter requirements shall apply.
- B. Support horizontal steel and copper piping as follows:

NOMINAL PIPE	DISTANCE BETWEEN SUPPORTS	HANGER ROD DIAMETER SIZE (WHERE HANGING PIPE)
1/2 in.	6 feet	3/8 in.
3/4 to 1 1/2 in.	6 feet	3/8 in.
2 and 2 1/2 in.	10 feet	5/8 in.
3 and 4 in.	10 feet	5/8 in.
6 to 12 in.	10 feet	7/8 in.

- C. Install hangers to provide minimum 1/2" clear space between finished covering and adjacent work.
- D. Place a hanger within 1' of each horizontal elbow.
- E. Support cast iron/DWV pipe near each connection with 10' maximum spacing between hangers. Support ABS/DWV pipe with 4' maximum spacing between hangers.
- F. Pipe hangers: For pipes 2" and smaller, adjustable strap type; For pipes 2½" and larger, clevis type with adjustable nuts on rod. Piping exposed to occupants shall be hung with clevis type hangers for all sizes. Plumbers tape shall not be used.
- G. Support riser piping independently of connected horizontal piping.
- H. Support at connections to equipment piping connected to equipment shall be installed to provide flexibility for thermal stress and vibration. It shall also be supported and anchored so as not to place strain on the equipment.
- I. All hangers and anchors shall be secured to the building structural members in a method proper and typical of current industry practices. The use of nails to secure hangers and anchors is permissible only when the load applied is in shear across the body of the nail. Attachments must not be loaded above manufacturer's recommendations.

**2.2 DUCT HANGERS AND SUPPORTS**

- A. Duct hangers, supports, materials, methods, and installation shall comply with applicable requirements of referenced standards. In case of conflict between references, the stricter requirements shall apply.

**SECTION 210529 - SUPPORTS, HANGERS AND SEALING**

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- B. All hangers and anchors shall be secured to the building structural members in a method proper and typical of current industry practices. The use of nails to secure anchors is permissible only when the load applied is in shear across the body of the nail. Attachments must not be loaded above manufacturer's recommendations.
- C. Concrete inserts in metal decking shall include steel plate and steel threaded rod, B-Line #B3019 or approved equal.

**2.3 SEALING AND SLEEVES**

- A. Set sleeves in position in advance of concrete work. Provide suitable reinforcing around sleeves. Size openings large enough to allow for movement due to expansion and to provide for continuous insulation.
- B. Where piping passes through ceiling, wall, or floors, seal space between pipe or duct and construction with non-combustible insulation as required to maintain fire integrity of partition. Seal with listed fire-safe materials and methods at penetrations of fire rated walls, roof ceiling, and floor ceiling assemblies.
- C. Install chrome plated escutcheons where piping passes through finished surfaces.

**PART 3 - EXECUTION (Execution is included in PART 2)**

**END OF SECTION**

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**SECTION 220500 - BASIC MATERIALS AND METHODS**

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**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Additional general provisions and requirements for all Sections of Divisions 22 and 23.
- B. Related Sections:
  - 1. 01 33 00 - Submittals: Procedures and format.
  - 2. 01 60 00 - Material and Equipment.
  - 3. 01 70 00 - Contract Close-out.
  - 4. Division 26 - Electrical: Electrical connections to mechanical equipment.

**1.2 SCOPE OF WORK**

- A. Furnish all labor, tools, equipment and necessary supplies to provide a complete system as specified in Divisions 22 and 23. All aspects of demolition and construction shall be covered in the proposals and contracts for complete, finished, and operational HVAC and plumbing systems. Verify the extent of demolition required and detail this in the scope of work bid.
- B. Codes, Ordinances, and Permits:
  - 1. Comply with all governing codes and ordinances of the local jurisdiction and the State where the project is located.
  - 2. Secure and pay for all inspection fees and permits, including mechanical, plumbing, and low voltage control wiring permits and any others which may be required to complete scope of work.
  - 3. Safety: Comply with all rules and regulations of the Federal Government, State, OSHA, NFPA 101, "Safety and Health Regulations for Construction" of the Federal Register by the U.S. Department of Labor.
  - 4. Material and equipment for all work shall be installed in compliance with applicable codes of public authorities.
  - 5. Verify metering requirements with the landlord and the General Contractor prior to construction and inform Architect of any differences with the information presented in the plans.
- C. Drawings:
  - 1. Architectural, structural, electrical, and mechanical drawings form a part of the work to be done under this section.
  - 2. When discrepancies exist among scale, dimension, or quantity on architectural, structural, electrical, or mechanical drawings, they shall be called to the attention of the Architect whose decision regarding such discrepancies shall be final and binding.
- D. Bidder Certification: By submitting a bid on the mechanical system, each Contractor acknowledges the following:

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**SECTION 220500 - BASIC MATERIALS AND METHODS**

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1. That he has examined existing conditions at the project site; that he has carefully examined all the Drawings and Specifications (including architectural, site, utility, structural, and electrical drawings and specifications); that he has verified domestic cold water supply, sanitary waste and plumbing vent points of connection locations, inverts and sizes; that he understands the required extent of construction related to units and systems to be built and the location and configuration of the shell systems provided for their build-out.
2. That he fully understands the Contract requirements and has determined to his satisfaction that the contract documents will be adequate to complete the mechanical system; that he fully understands the Drawings and Specifications, and that he can provide a complete finished and operable system in accordance with the intent of the Contract Documents.
3. That any ambiguities discovered in the Specifications and Drawings or questions with regard to the Contract Documents shall have been brought to the attention of the Architect in writing prior to submitting the bid.
4. That he has reviewed the project progress schedule with the General Contractor, fully understands the schedule, and has verified, prior to submitting a bid, availability of all necessary labor and materials including supervision and office backup, and can comply with the schedule requirement.
5. That there may be changes to the scope of work and that he understands that any proposal submitted for performance of additional work over and above that required by the basic Contract will include all costs to the contractor associated with such changes including but not limited to labor, materials, subcontracts, equipment, taxes, fees, schedule impact, loss of efficiency, supervision, overhead, and profit.
6. That he is required to coordinate his work with that of all other trades and that the responsibility for coordination includes the rerouting, offsets, etc. to fit work in the structure in a manner that is compatible with the work of other trades in the same area.
7. That the routing of the elements of the mechanical system will need to be coordinated with other trades and that offsets and rerouting will probably be required in installation and that labor and materials have been included for such in his bid.
8. That he understands that submittals of material and equipment to the Architect is for the purpose of establishing what the Contractor is supplying for the project. Any review undertaken by the Architect does not relieve the Contractor of his responsibility to provide all materials and equipment required for its work in the project nor does such review relieve the Contractor of his responsibility for coordination with contractors, subcontractors, or designers to ensure that such materials and equipment will fit and be suitable for the purpose intended.
9. That he understands that all demolition, salvage and disposal shall be done in accordance with all state and local codes and ordinances

**1.3 REPAIR OF DAMAGE CAUSED**

- A. All subcontractors shall be responsible for damage caused to their work and that of other trades in the execution of their work, and shall make or pay for all necessary repairs to restore damaged work to like-new condition at no cost to the Owner.

**1.4 SUBMITTALS**

- A. Make submittals in accordance with Sections 01 33 00 and 01 25 00, as applicable.
  1. Submit complete, at one time. Partial submittals will not be considered.
  2. Where required, catalog sheets shall be complete, and the item or model number and options to be provided shall be clearly marked.

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3. Form: With the exception of shop drawings, submittals shall be in booklet form. The data shall be arranged and indexed under basic categories. A typewritten index shall be included with dividers and identifying tabs between sections and references to specification Section numbers.
- B. All substitutions require written acceptance by the Architect in accordance with Sections 01 25 00. Substitution of products to those specified are allowed only if they meet all criteria specified including, but not limited to: approved manufacturer and model series, material of construction, capacity, appearance, serviceability, efficiency and control features. In addition, substitute items shall not impact other trades or the building construction due to variations from the specified items electrical, gas requirements, physical size, weight or connection configuration characteristics. Any cost impacts to other divisions resulting from a substitution will be born by the subcontractor. Performance data is required and shall be included with submittals for substitutions.
- C. Material submittals shall include:
  1. Piping materials, valves, hangers, and insulation
  2. Plumbing materials, valves, hangers, and insulation
  3. Ductwork materials, dampers, hangers, and insulation
  4. All plumbing fixtures, faucets, drains, pumps, water heaters, control panels and other equipment
  5. All heating, cooling, and air moving equipment
  6. Diffusers, grilles, fire and smoke dampers, filters
  7. Control components and wiring diagrams

## **1.5 QUALITY ASSURANCE**

- A. The equipment, materials, and workmanship supplied under this contract shall be new, clean, and of the best grade, so that each system will be erected in a practical, complete and first-class manner.
- B. Contractor shall thoroughly acquaint itself with existing conditions, the work involved and verify at the building site all measurements necessary for the proper installation of work. Refer to the Architectural, Structural, Electrical, and other drawings required for building construction and other details which affect the Mechanical installation, and confer with appropriate trades to make the total installation as perfect as is practically possible.
- C. Make every effort to furnish all equipment of one equipment type (such as fans, motors, motor controls, pumps, valves, etc.) from one manufacturer.
- D. Provide corrosion protection for all ferrous metal portions of mechanical work exposed to weather including fans, piping and accessories, supports and other items. All ferrous metal shall be galvanized and painted, cadmium plated and painted, or protected against corrosion by an approved equal method.
- E. Guarantee all materials, equipment, and workmanship for a period of one year from acceptance of the work and remedy any defects without expense to the owner, providing defects are not a result of misuse, abuse or improper maintenance on the part of the owner. Warranties shall be in accordance with Section 01 61 00.

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**1.6 COORDINATION**

- A. Each Subcontractor (HVAC, plumbing, fire protection, electrical) shall coordinate with every other Subcontractor and the General Contractor, their space requirement and routing locations at the earliest possible time. Conflicts shall be resolved before construction is begun. Duct and pipe constrictions or excessive fittings, due to poor or late coordination and planning, are not acceptable. The Contractor shall work with the General Contractor, Architect, and other trades as necessary to satisfactorily resolve clearance conflicts.

**1.7 CLEANUP**

- A. Maintain a clean job site, free of debris, garbage, packing materials as much as is practically possible during the work conducted under its scope of work. Removal and disposal of all materials shall be in conformance with all local codes and ordinances.

**1.8 RECORD DRAWINGS**

- A. Submit shop drawings for approval whenever the intended installation differs from the approved contract drawings.
- B. Contractor shall, during the progress of the work, keep a current and careful record for all changes where the actual installation differs from that shown on the contract drawings. "As-built" drawings shall show dimensions, locations, and depth of all buried and concealed piping, plugged outlets, ductwork, and other equipment. Depth of sewers shall be from a permanent benchmark. Reference dimensions from building structural features, such as bearing walls or columns. "As built" drawings shall be maintained in the project office.
- C. Upon completion of the installation, the Mechanical Contractor will furnish one complete set of record documents as required by Section 01 77 00.

**1.9 OPERATION AND MAINTENANCE MANUALS**

- A. Provide General contractor with two sets of factory operation and maintenance instructions for all mechanical equipment supplied for transmittal to the owner in accordance with Section 01 70 00 and Section 01 61 00.
- B. The manuals must include information on the following equipment:
  - 1. HVAC: Air conditioning equipment, heating equipment, fans, control dampers, control system components.
  - 2. Plumbing: water heater, pressure regulators, meters, backflow preventers, recirculation pumps, flush valves, mixing valves, faucets.
  - 3. In addition, the manuals shall contain a copy of the equipment start, test, and air balance reports under a separate tab

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**1.10 TESTING AND DEMONSTRATION**

- A. Test and Demonstrate operation of systems per the requirements of Section 23 05 93.

**1.11 CLOSEOUT**

- A. Upon completion of installation, thoroughly clean all exposed portions of fixtures, diffusers, grilles, equipment, ductwork, and piping in accordance with Section 01 70 00. Remove all temporary labels and gum from fixtures. Throughout work, remove all construction debris and surplus materials accumulated by this work.
- B. Prepare for observation for certification of Substantial Completion as specified in Section 01 70 00 including all documentation and punch-list preparation. The Architect will observe mechanical and plumbing systems.

**PART 2 - PRODUCTS (not used)**

**PART 3 - EXECUTION (not used)**

**END OF SECTION**

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SECTION 220529 - PIPE AND FITTINGS

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Drain, Waste, and Vent (D W & V).
- B. Domestic water system piping.
- C. Compressed Air piping
- D. Natural Gas piping
- E. Storm / Rainleader

**1.2 REFERENCES**

- A. American Society of Testing and Materials (ASTM)
  - 1. A-53 Black and Hot Dipped Galvanized Welded and Seamless Steel Pipe.
  - 2. B-88 Seamless Copper Water Tube.
  - 3. A-74 Hub & Spigot Cast Iron.
  - 4. A-888 No-hub Cast Iron.
  - 5. D2665 Polyvinyl Chloride plastic (PVC).

**PART 2 - PRODUCTS**

**2.1 MINIMUM PIPE STANDARDS**

<u>SERVICE</u>	<u>APPROVED MATERIALS</u>
Natural Gas	Steel-Schedule 40; Black Iron (Welded or Seamless) ASTM A-53
Rainleader Below/Above Grade	PVC ASTM D-2665
Waste Above Grade	CI ASTM B-888, CISPI 301
Vent Above Grade	CI ASTM B-888, CISPI 301
Waste Below Grade	PVC ASTM D-2665
Domestic Water Above Grade	Type "L" Copper, ASTM B-88
Domestic Water Below Grade	Type "K" Copper, ASTM B-88
Compressed Air Piping	Type "K" Copper, ASTM B-88



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Condensate Waste Piping Above Roof      Type "M" Copper, ASTB B-88

Condensate Waste Piping Below Roof

Plenum Return      Type "M" Copper, ASTB B-88

Ducted Return      PVC ASTM D-2665

## **2.2 MINIMUM FITTING STANDARDS**

<u>SERVICE</u>	<u>APPROVED MATERIAL</u>	<u>APPROVED JOINT</u>
Natural Gas	Malleable Iron, 125 psi, air tested For sizes 2" and smaller ASME B16.3	Threaded
	Steel for sizes 2 1/2" and larger	Welded
Waste & Vent Above Grade	Cast Iron	No-Hub Mech. Coupling-CISPI 301
Waste & Vent Below Grade	Cast Iron	Lead and oakum or hemp fiber
Rainleader Below/Above Grade	PVC	Adhesive Primer and Solvent Cement
Waste Below Grade		
Domestic Water	Copper ANSI B 16.23	95-5 solder
Below/Above Grade		Press-connect
Compressed Air		
Condensate Waste		

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Ream pipes and tubes. Clean off scale and dirt, inside and outside, before assembly. Remove welding slag, burrs or other material from piping.

### **3.2 CONNECTIONS FOR PIPING SYSTEMS**

- A. Field verify relevant waste, vent and tenant cold water points of connection locations, pipe sizes and inverts prior to bid and construction.
- B. Provide screw joints for steel and iron piping up to and including 2". Weld piping 2½" and larger, including branch connections.
- C. Make screwed joints with full cut standard taper pipe threads and with approved non-toxic joint compound or Teflon tape applied to male threads only.

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- D. Provide no-hub mechanical fasteners for joints in cast iron piping. Comply with CISPI 310.
- E. Make connections to equipment with unions.
- F. Provide non-conducting type connections wherever jointing dissimilar metals.

**3.3 ROUTE AND GRADES**

- A. Route piping in orderly manner and maintain proper grades. Install to conserve headroom and interfere as little as possible with use of space. Exposed piping will not be permissible in any location unless explicitly approved by the architect. All valves are to be mounted behind contractor provided flush mounted access panels. Group piping whenever practical at common elevations. Install concealed pipes close to building structure to keep furring to a minimum.
- B. Grade horizontal drainage and vent piping per section 22 30 00.
- C. Install piping to allow for expansion and contraction without stressing pipe or equipment connected.
- D. Provide clearance for installation of insulation and for access to valves, air vents, drains, and unions.
- E. Install same type piping material for waste system specified for inside building to 5' outside of building.
- F. Install same type piping material for cold water service specified for inside building to 5' outside of building.
- G. Install valves with stems upright or horizontal, not inverted.
- H. Install ball valves for shut-off and isolating service, to isolate equipment, part of systems, or vertical risers.
- I. Provide drain valves at main shut-off valves, low points of piping, and apparatus.
- J. Provide suitably sized access panels to concealed valves. Coordinate final size and final location with project superintendent prior to installation.
- K. In all instances, a valve shall be provided with access.

**END OF SECTION**

**SECTION 223000 - PLUMBING SYSTEMS**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Sanitary sewer and vent service.
  - B. Domestic water service.
  - C. Natural gas service.
  - D. Compressed Air
  - E. Rainleader and storm water service
1. Storm water piping is not anticipated to be in the Tenant Plumbing Contractor's scope of work. These items are left in place in case later design modifications or unforeseen circumstances require the addition of or modification to the existing storm water system.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Provide hydromechanicals from the following manufacturers:
  1. Zurn
  2. J R Smith
  3. Josam

**2.2 CLEANOUTS AND CLEANOUT ACCESS COVERS**

- A. Cleanout Access Covers: Floor cleanouts shall include round polished bronze scoriated tops. Wall cleanouts shall have stainless steel caps, Zurn Z-1400 series or approved equal.

**2.3 TRAP PRIMERS**

- A. Trap Primer Valves: Use J.R. Smith figure 2005 trap primer tap connection with 1/2" primer tube and Precision Plumbing Products Trap Primers.

**2.4 PLUMBING INSULATION**

- A. Insulation Materials:

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1. Elastomeric - Closed cell neoprene, Armaflex AP, or approved equal.
  2. Fiberglass - Preformed snap-on fiberglass pipe insulation with self sealing Kraft reinforced foil vapor barrier, Owens Corning ASJ/SSL-II, or approved equal.
  3. All pipe insulation shall have surface burning characteristics of less than a flame spread of 25 or smoke developed of 50 per UL723 test methods.
- B. Insulation Thickness:
1. Cold water above grade:
    - a. All pipes: Provide minimum ½" for elastomeric insulation and 1" for fibrous glass insulation.
  2. Hot water:
    - a. Provide minimum of 1" fibrous glass insulation.
  3. Rainleader:
    - a. Provide minimum ½" for elastomeric insulation and 1" for fibrous glass insulation for indoor piping.
  4. Condensate and Equipment Drain Water below 60 Deg F:
    - a. Provide minimum of 1" fibrous glass insulation.
- C. Cover fittings and valves with equivalent thickness of insulation material. All insulation shall be installed according to the manufacturer's recommendations for application. Vapor barriers shall be continuous.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Bury outside water and drainage pipe minimum 3 feet.
- B. Lubricate cleanout plugs with mixture of graphite and linseed oil. Prior to building turnover, remove cleanout plugs, re-lubricate and re-install using only enough force to ensure permanent leak-proof joint.
- C. Provide cleanouts extended to finished floor or wall surface. Ensure ample clearance at cleanout for rodding of drainage system. Floor Cleanouts shall be installed to be perfectly flush with floor.
- D. Provide vacuum breakers or backflow preventers on plumbing lines where contamination of domestic water may occur and on hose bibs and flush valves, except where provided as integral in equipment.
- E. Disinfecting: After the entire system is completed flush system thoroughly, take sample, and have tested for compliance with local Health Department requirements. If sample is not in compliance,

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perform sterilization with 50 parts per million chlorine concentration. After flushing system, retest for compliance with Health Department requirements. Repeat as required.

- F. All waste piping shall slope a minimum of 1/4" per foot (2%) unless otherwise noted. Where noted otherwise, secure approval from the plumbing inspector prior to installation.
- G. All vents shall be free from drops or sags and each vent shall be so graded and connected as to drip back by gravity to the drainage pipe it serves.
- H. Sanitary Sewer Vents: Plumbing vents shall not terminate within 15 feet of outside air intakes to ventilation units.
- I. Provide seismic restraints for tank-type water heaters. Provide plastic or galvanized steel drain pan under water heater. Pipe indirect drain from pan to mop sink, where applicable.
- J. Pressure test piping systems before cover in accordance with applicable plumbing code and local jurisdiction requirements.
- K. Cover fittings and valves with equivalent thickness of insulation material. All insulation shall be installed according to the manufacturer's recommendations for application. Vapor barriers shall be continuous.
  - 1. Insulate all hot water pipes.
  - 2. Insulate all horizontal cold water piping and vertical elbows and tees.
  - 3. Insulate all horizontal rain leader piping. All undersides of roof drain bodies shall be insulated.

### **3.2 SERVICE CONNECTIONS**

- A. Provide a new sanitary sewer service per plan and connect to existing sewer lines. Before commencing work, check invert elevations required for sewer connections, confirm proposed and existing sewer inverts, ensure that these can be properly connected with slope for drainage, and cover to avoid freezing.
- B. Connect to 2" cold water stub provided by landlord. Verify the existence and proper function of the existing backflow preventer and any pressure reducing valves. Verify the existence of tenant shutoff valves and provide for reinstallation if not included in landlord stub. Verify with landlord any sub-metering requirements for water service to REI.

### **3.3 EXCAVATION AND BACKFILL**

- A. Scope - Provide all slab saw cutting, excavation, trenching, and backfilling, dewatering required to install underground piping systems. Provision of all select fill material which may be required shall be included by the Contractor.
- B. Excavate trenches with side slopes to prevent collapse and in conformance with all safety codes and standards. Provide dewatering if required. Do not undermine existing or planned footings and foundations.

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- C. Select bedding from trench excavation if suitable. Use granular material, free from large stones, debris, and frozen material. If suitable bedding is not available, import from approved sources. Place bedding material under, around, and over pipe. Work material around pipes, taking care to keep any oversize stones out of contact with the pipe and to provide uniform support for the pipe. Cover pipe with bedding material to building subgrade or to a minimum of 12" depth.
- D. Backfill remaining trench with backfill material from trench excavation if suitable. If not suitable, import material from approved source. Compact all bedding and backfill to a minimum of 95% maximum density in lifts not exceeding 12" in depth.
- E. After completion of backfilling, dispose of excess material and smooth the surface to grade.
- F. Safety is key and precautions must be taken. Coordinate location, depth, and timing with all other trades and the building foundation.

**END OF SECTION**

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**SECTION 224000 - PLUMBING FIXTURES AND TRIM**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Plumbing fixtures and trim.

**1.2 GENERAL PROJECT REQUIREMENTS**

- A. Provide new fixtures free from flaws and blemishes with finished surfaces clear, smooth, and bright.
- B. Provide plumbing fittings. Visible parts of fixture brass and accessories shall be heavily chrome plated.
- C. Protect fixtures against use and damage during construction.
- D. All fixtures shall include accessible loose key stops installed above floor slab.

**1.3 JOB CONDITIONS**

- A. Check millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Water Closet:
  - 1. See Plumbing Fixture Schedule
- B. Urinal:
  - 1. See Plumbing Fixture Schedule
- C. Lavatory:
  - 1. See Plumbing Fixture Schedule
- D. Break Room Sink:
  - 1. See Plumbing Fixture Schedule
- E. Shop Sink:
  - 1. See Plumbing Fixture Schedule
- F. Shower:
  - 1. See Plumbing Fixture Schedule

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- G. Drinking Fountain:
  - 1. See Plumbing Fixture Schedule
- H. Wall Hydrant:
  - 1. See Plumbing Fixture Schedule
- I. Deck Faucet:
  - 1. See Plumbing Fixture Schedule
- J. Instantaneous Water Heater:
  - 1. See Plumbing Fixture Schedule
- K. Electric Water Heater:
  - 1. See Plumbing Fixture Schedule
- L. Expansion Tank:
  - 1. See Plumbing Fixture Schedule

**2.2 FIXTURES**

- A. See fixture schedules on plumbing plans.
- B. Provide .5 gpm flow restrictors for lavatory faucets.
- C. Sink and Lavatory traps and supplies: Chrome plated brass compression loose key valves, and chrome plated brass escutcheons, and chrome plated copper flared tube supplies. Eastman Speedflex or Brasscraft.
- D. Sink and Lavatory P-traps: 17ga chrome plated tubular brass with escutcheons.
- E. Scald covers for p-traps and supplies: Truebro P-trap and hot water supply safety covers.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install each fixture with trap, easily removable for servicing and cleaning. At completion, thoroughly clean plumbing fixtures and equipment.
- B. Provide chrome plated rigid or flexible supplies to fixtures with keyed stops, reducers, and escutcheons.
- C. Install faucets according to manufacturers' instructions. Cold faucet handles and stop valves shall always be on right side. Retain manufacturers' installation instructions for O & M manuals.
- D. Install wall mounted fixtures with approved wall carriers, model to suit installation.
- E. Install vacuum breakers on all hose connections.



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- F. Install "furnished by owner appliances" according to manufacturers instructions.
- G. Install fixtures in accordance with the Americans with Disabilities Act and applicable State regulations for Barrier-Free facilities.

**END OF SECTION**

**SECTION 230593 - TESTING, ADJUSTING AND BALANCING**

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**PART 1 - GENERAL**

**1.1 QUALITY ASSURANCE**

- A. Use only testing, adjusting, and balancing firms certified by Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).
- B. All testing, adjusting, and balancing shall be performed per the procedural standards for AABC or NEBB.

**PART 2 - PRODUCTS (Not used)**

**PART 3 - EXECUTION**

**3.1 EXECUTION**

- A. At the substantial completion of the project all systems shall be started and tested to ensure that the systems are in proper working order.
  - 1. No air balancing shall be performed until a system is indicated 100% complete by the Installing Contractor.
  - 2. Install clean filters immediately before testing.
- B. All air moving systems will be balanced to the quantities shown on the contract drawings.
  - 1. At the direction of the air balance team, the Contractor shall provide sheaves, to be changed by the balance crew, as necessary to achieve the total design air quantities, within accepted tolerances, at each air moving device.
  - 2. The balance crew is responsible for final verification that installed equipment complies with approved submittal data.
  - 3. The balance crew is responsible for final verification that installed diffusers, grilles, and registers are the size indicated on the design documents.
  - 4. The balance crew and the Installing Contractor shall work together to resolve all system deficiencies, to the extent of the project specifications and drawings, prior to final submittal of the air balance logs.
  - 5. The Installing Contractor is specifically directed to include in his bid a reasonable allowance to make the above-mentioned changes and corrections to achieve an acceptable air balance
- C. All air conditioning equipment shall be cycled through all modes of control, including but not limited to:
  - 1. First and second stage mechanical cooling stages and economizer cooling stage.
  - 2. First and second stage heating.
  - 3. Fire/smoke alarms.
  - 4. Each of these modes is to be tested to verify that compressors, auxiliary heat, and fans function per the manufacturers' intentions. A completed report including inlet and outlet flows and temperatures in each mode is required on each piece of equipment. All outside air intakes shall be adjusted to the air quantities indicated on the drawings.

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5. Each piece of equipment shall be tested according to the manufacturer's start up and test procedures including checking refrigerant operating pressures, gas manifold pressures, exhaust gas CO<sub>2</sub>/O<sub>2</sub> concentrations, and fan belt alignment.
- D. Completed logs shall include.
  1. Air apparatus test report for each HVAC unit and heating unit indicating supply, return and outside airflows, pressures, and supply/return temperatures in each mode.
  2. Air outlet test report including all supply, return, and exhaust outlets.
  3. Fan test report for all exhaust fans.
  4. Electrical tests to measure fan amperages and unit amperages.
  5. As built drawing with numbered outlets corresponding to air outlet test report.

**3.2 COMPLETION**

- A. At the completion of balancing, testing, and adjusting, provide 4 copies each of the start-up and test logs to be incorporated into O&M Manuals and submit an additional (fifth) copy to the Architect for Engineer review. See sections 01 60 00, 01 61 00, and 01 77 00.

**END OF SECTION**

SECTION 230713 - DUCT INSULATION

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Duct insulation.
- B. Adhesive, tie wires, and tapes.
- C. Recovering.

**1.2 JOB CONDITIONS**

- A. Deliver material to job site in original non-broken factory packaging, labeled with manufacturer's density and thickness.
- B. Perform work at ambient and equivalent temperatures as recommended by the adhesive manufacturer. Insulation shall be kept clean, protected, and dry at all times.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Provide insulation materials from one of the following:
  - 1. Certainteed.
  - 2. Johns-Mansville.
  - 3. Owens-Corning.

**2.2 GENERAL**

- A. Adhesives and Insulation Materials: Composite fire and smoke hazard ratings maximum 25 for Flame Spread and 50 for Smoke Developed. Adhesives shall be waterproof.
- B. Concealed ducts shall be thermally insulated with external duct wrap. Internal duct lining shall be used as required and specified for sound attenuation. Exposed ducts shall be internally lined for sound attenuation where indicated.

**2.3 MATERIALS**

- A. Concealed Round Ducts and Concealed Rectangular Ducts: Flexible glass fiber insulation, .25 "K" value at 75F with factory applied reinforced foil kraft vapor barrier for systems where indicated on drawings. Owens Corning All Service Faced Duct Wrap or approved equal.

**SECTION 230713 - DUCT INSULATION**

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- B. Acoustic Lining: Glass fiber insulation with .25 "K" value at 75F. Absolute roughness of exposed surface not to exceed 0.0013. Coated to prevent fiber erosion at air velocities up to 4,000 fpm, 1.5 lb./cu ft minimum density. Owens Corning Aeroflex Duct Liner or approved equal.
- C. Exposed Round Duct Lining: Certainteed ToughGard Ultra Duct Spiral Duct Liner. Internal liner for spiral round sheet metal ducts: Glass fiber duct liner; ASTM C 1071 Type II, minimum NRC value for 1" thickness of 0.70 and a maximum k rating @ 75F of 0.23. Glass fiber liner shall have a coated abrasion resistant airside surface. Duct sizes given are net inside clear dimensions. Make allowance for lining thickness.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Ensure surface is clean and dry prior to installation. Ensure insulation is dry before and during application.

**3.2 INSTALLATION**

- A. Duct insulation shall be installed by a specialist who is trained and experienced in application of ductwork insulation.
- B. Finish insulation neatly at hangers, supports, and other protrusions.
- C. Install duct wrap insulation strictly following manufacturer's guidelines. Adhere, staple, clip, and seal seams as directed by insulation guidelines published by insulation manufacturer.
- D. Vapor barrier shall be continuous and unbroken. Cover breaks in jacket material with patches of the same material as the vapor barrier. Seal patches with tapes and sealants as recommended by insulation manufacturer.
- E. Acoustic Lining for rectangular sheet metal ducts: Apply to interior of ducts. Secure to ductwork with adhesive using 50% coverage gauge. Impale anchor tabs on 16" centers. Provide metal nosings at all exposed leading edges (facing airstream) per SMACNA recommendations.
- F. Install spiral duct liner for exposed spiral round ducts according to the insulation manufacturer's published instructions.
- G. Externally insulate all non-lined concealed metal supply and return ducts with duct wrap.
- H. Internally insulate all supply and return ducts for acoustic noise control where indicated on drawings.

**3.3 INSULATION THICKNESS**

- A. Insulate all cooling/heating sheet metal supply air ducts with a minimum 2" thickness to provide a minimum "R" value of R-6, or higher if required by the local code requirements.

**END OF SECTION**

**SECTION 230900 – CONTROLS AND INSTRUMENTATION**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Control Contractor work defined:
  - 1. Part of the work described in this Section will be furnished by the owner's Controls Supplier to HVAC equipment manufacturer for factory installation. Other parts will be furnished to Contractor for installation. Contractors shall provide all other components, wiring and devices necessary for a complete and operational control system.
- B. Complete system of automatic controls to control HVAC system.
- C. Control devices, components, wiring, and material.
- D. Instructions for Owners.

**PART 2 - PRODUCTS**

**2.1 CONTROL SYSTEM AND CONTRACTOR SELECTION**

- A. Control system manufacturer:
  - 1. Novar Controls [Contact Robert Jackson at (216)-682-1355].

**2.2 CONTROL SYSTEM DESCRIPTION**

- A. HVAC units shall be controlled by the Novar Control system. Install remote sensors per Controls Supplier design at locations per HVAC drawings. Wire remote sensors back to AC unit mounted Novar controllers. Novar controllers are furnished to HVAC unit manufacturer for factory mounting. HVAC unit economizer controls shall be by Novar global enthalpy control serving the HVAC unit modulating economizer section and which shall communicate with the Novar control panel and room air temperature sensors.
- B. Mount Novar Supplied 8-button control monitor in the managers' office per HVAC plan sheet M-3.
- C. Scheduling functions: Each thermostat shall provide 365 day scheduling independent of any other thermostat. The optimal start feature shall be programmed to bring the space to comfort temperature in the most energy efficient manner possible. Unoccupied set-back and set-up temperatures shall be programmable in order to maintain minimum and maximum space temperature during unoccupied periods. The Controls Supplier shall confer with the Owner's representative as to provide the proper temperature and time schedule settings and shall provide instruction to the Owner's representative on the control system's use.
- D. HVAC unit manufacturer shall provide duct smoke detectors in accessible locations for HVAC units. Contractor shall coordinate wiring to the fire control panel for unit shutdown upon smoke detection.

**SECTION 230900 – CONTROLS AND INSTRUMENTATION**

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**2.3 CONTROL WIRING**

- A. All wiring installation shall comply with all electrical code requirements.
- B. All control wiring and electrical control items shall be provided by Contractor.
- C. Line Voltage Control Wiring: #14 AWG, stranded copper, 600 V insulation.
- D. Low Voltage Control Wiring: #18 AWG twisted shielded pair. 100% foil shielding. Beldon 8760 or equal.
- E. Low voltage wiring shall be routed as to be hidden from view or enclosed in conduit in exposed ceiling areas. Coordinate with Architect and General Contractor prior to installation.
- F. Conduit, Electrical Metallic Tubing and Raceways: Shall be installed where required to comply with electrical codes wherever exposed locations may be subject to physical damage.

**PART 3 - EXECUTION (Not used.)**

**END OF SECTION**

**SECTION 233100 - DUCTWORK**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Ductwork and plenums.
- B. Fasteners.
- C. Sealants.
- D. Duct cleaning.

**1.2 DEFINITIONS**

- A. Duct Sizes: Inside clear dimensions. For acoustically lined or internally insulated ducts, maintain sizes inside lining or insulation.

**1.3 REFERENCES**

- A. SMACNA HVAC Duct Construction Standards - 1995
- B. ASHRAE Handbooks.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Ducts: Galvanized sheet steel of lock forming quality with G90 zinc coating. Sheet steel shall comply with ASTM A653 Standard specification for steel sheet metal, zinc coated (galvanized) or zinc-iron alloy – coated (galvanized) by the hot dip process, and A924 standard specification for general requirements for sheet, metallic coated by the hot dip process.
- B. Fiberglass ductboard is not permitted.
- C. Fasteners: Use rivets, bolts, and sheet metal screws.
- D. Sealant: Water resistant, fire resistive, compatible with mating materials, specifically manufactured and listed for use in sealing duct system. United McGill United Duct Sealer or equal.
- E. Duct tape: Not permitted
- F. Flexible Ducts: Provide factory assembled Class 1 air duct (UL181) with 1" thick 1 PCF fiberglass insulation and reinforced outer protective cover/vapor barrier. Flexible duct shall meet NFPA 90A with flame spread under 25, smoke developed under 50, and shall be rated for a minimum 2" w.g. pressure



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**SECTION 233100 - DUCTWORK**

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and 2 to 250°F temperature. Provide screw-operated metal adjustable clamping devices. Use twistlock tap collars at connections into rectangular sheet metal duct. Maximum extended length of flexible duct shall not exceed 6 feet.

- G. Round Ductwork: Provide spiral seam (all sizes) or snap lock (duct sizes up to 10") galvanized steel complying with SMACNA standard. Spiral seam ductwork shall have SMACNA seam Type RL-1.

## **2.2 FABRICATION**

- A. Ductwork shall be fabricated in strict accordance with SMACNA HVAC Duct Construction Standards. Ducts shall be constructed to 1" w.g. pressure class, seal Class A.
- B. Construct tees, bends, and elbows with radius of not less than 1½ times the width of the duct on center line. Where not possible and where square throat elbows are used, provide turning vanes per SMACNA Duct Standards figure 2-3.

## **2.3 DUCT OFFSETS**

- A. Duct transitions shall be constructed within limits of Figure 2-7 of SMACNA Duct Standards (Reference A) unless specifically noted on the plans.

## **2.4 JOINTS IN RECTANGULAR SHEET METAL DUCTS**

- A. Ducts under 18" on longest dimension - joints shall be "S" and "Drive".
- B. Ducts 18" and over - joints shall be "T.D.C.", Duct-Mate or equal.
- C. Longitudinal seams shall be either Pittsburgh or snap-lock.

## **2.5 JOINTS IN ROUND AND OVAL SHEET METAL DUCTS**

- A. Joints shall be beaded sleeve joints except for concealed ducts under 12" in diameter, crimp joint may be used.
- B. Longitudinal seams for all exposed duct shall be spiral wound.
- C. Concealed 1" pressure class duct may be snap lock.

## **2.6 DUCT GAUGES**

- A. Duct gauges shall comply with SMACNA HVAC Duct Construction Standards for 1" w.g. and 2" pressure class.

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**SECTION 233100 - DUCTWORK**

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**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install ducts in conformance with SMACNA HVAC Duct Construction Standards and applicable Mechanical code.
- B. Connect diffusers to low pressure ducts with flexible duct at connections.
- C. Flexible ducts shall be installed as straight as possible and with minimum sag. Bends shall be made with not less than one duct diameter inside radius. Ducts shall extend six inches beyond sheet metal collar before bending.
- D. At each point where ducts pass through partitions, seal joints around duct with non-combustible material.
- E. Ducts shall be routed in the straightest possible line. Use of offsets and fittings shall be held to an absolute minimum. Secure the necessary clear space required to provide the most effective air distribution paths.
- F. All joints in metal duct systems, inclusive of exhaust, return, and supply, shall be sealed. All supply ducts shall be sealed with a mastic type duct sealer, applied under conditions recommended by the manufacturer. Exposed ducts shall be internally sealed so as to hide duct sealer.
- G. Ducts shall be kept dry and clean and free of construction debris during fabrication, transportation, storage, and installation.
- H. Special care shall be taken in manufacturing and installing exposed ducts. Dents, exposed sealants, or other flaws or poor workmanship will not be accepted. Exposed ducts shall be hung level and in-line with the building structure and as detailed on the mechanical and architectural plans.

**END OF SECTION**

SECTION 233300 - DUCT ACCESSORIES

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Access doors.
- B. Grilles, Registers, Diffusers, Louvers
- C. Balancing dampers.
- D. Backdraft dampers.
- E. Flexible connections.
- F. Bellmouth fittings.

**1.2 QUALITY ASSURANCE**

- A. Diffuser/grille performance shall be tested according to ANSI/ASHRAE Standard 70-1991.
- B. Accessories shall meet the requirements of NFPA 90A, Air Conditioning and Ventilating Systems.
- C. Fabricate and install in accordance with ASHRAE handbooks and SMACNA HVAC Duct Construction manuals.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Provide products of each type by one of the following:
  - 1. Greenheck
  - 2. Ruskin
  - 3. Krueger
  - 4. Titus
  - 5. Price

**2.2 ACCESS DOORS**

- A. Fabricate rigid and close fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum 1" thick insulation with sheet metal cover.
- B. Provide 2 hinges and 2 sash locks for sizes up to 18" square, 2 hinges and 2 compression latches with outside and inside handles for sizes up to 24" X 48".
- C. Provide an additional hinge for larger sizes.

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**SECTION 233300 - DUCT ACCESSORIES**

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**2.3 SUPPLY, RETURN, EXHAUST GRILLES, LOUVERS**

- A. Refer to schedules on mechanical drawings.
- B. Wall and duct mounted supply, transfer, return and exhaust grilles shall be unpainted, galvanized sheetmetal to be left bare for duct mounting or to be painted to match wall paint.
- C. Ceiling mounted grilles, registers and diffusers shall have standard white finish.

**2.4 BALANCING AND BACKDRAFT DAMPERS**

- A. Balance dampers shall be fabricated of galvanized steel, provided with quadrants or adjustment rod and lock set. Dampers shall be cut  $\frac{1}{4}$ " under duct size.
- B. Backdraft dampers shall be factory furnished multi-blade type.
- C. Dampers shall be rattle-free.
- D. Barometric relief dampers shall be adjustable, counter-balanced aluminum style.
  - 1. Ruskin CBD or approved equal.

**2.5 FLEXIBLE CONNECTIONS**

- A. Fabricate of neoprene coated flameproof fabric approximately 2" wide, tightly crimped into metal edging strip, and attached to ducting and equipment by screws or bolts at 4" intervals or sheet metal cleats.

**2.6 BELLMOUTH FITTINGS**

- A. All bellmouth fittings shall be single piece sheet metal construction with a 2" radius bellmouth curvature.

**PART 3 - EXECUTION**

**3.1 APPLICATION**

- A. Provide access doors for inspection and adjustment at dampers, at fire and smoke dampers, and elsewhere as necessary. Review locations prior to fabrication.
- B. Provide balancing dampers at points on low pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing.
- C. Locate all dampers in a location that are accessible through the ceiling.
- D. Diffusers shall be balanced by balance dampers located at branch duct take-off. Balancing with opposed blade dampers located at diffusers is not acceptable.

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**SECTION 233300 - DUCT ACCESSORIES**

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**3.2 INSTALLATION**

- A. Install items in accordance with manufacturer's printed instructions.
- B. Paint ductwork visible behind air outlets matte black.
- C. Equip diffusers with equalizer or diffuser cap designed to provide uniform airflow through diffusers. Provide equalizing grids at diffusers connected to exposed ducts. Use low pressure drop assemblies.
- D. Fit discharge end of bellmouth fittings to inside diameter of the spiral sheetmetal duct liner for a tight and flush connection to a sheet metal collar and nosing. Fit the inlet end of the bellmouth fitting to the rectangular sheet metal duct end cap. The end cap shall have a minimum hole diameter equal to two inches less than the large diameter of the bellmouth fitting to allow one inch bellmouth flange overlap each side and a smooth air path. Center end cap hole to the bellmouth fitting hole. Do not install insulation liner to bellmouth interior surface.

**END OF SECTION**

**SECTION 233400 - EXHAUST FAN AND BAROMETRIC RELIEF CAP UNITS**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Roof mounted fans.
- B. Inline centrifugal exhaust fans.
- C. Fan accessories
- D. Barometric relief hoods/louvers
- E. Inline dryer booster exhaust fans.

**1.2 QUALITY ASSURANCE**

- A. Conform to AMCA Bulletins regarding construction and testing. Fans shall bear AMCA certified rating seal.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Provide products of each type by one of the following:
  - 1. Jenn Air.
  - 2. Penn Ventilator.
  - 3. Greenheck.
  - 4. Fantech.

**2.2 GENERAL REQUIREMENTS**

- A. Refer to schedules on mechanical drawings.
- B. Single phase 115V fan motors shall be factory equipped with internal thermal overload protection.
- C. Belt drive fans shall be provided with adjustable sheaves.
- D. Direct drive fans shall be provided with variable speed controls mounted at the fans for balancing.
- E. Fans shall be factory dynamically balanced to minimize vibration.
- F. The shop exhaust fan shall be factory furnished with an explosion proof motor and an aluminum rub ring.

**SECTION 233400 - EXHAUST FAN AND BAROMETRIC RELIEF CAP UNITS**

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- G. Rope Cutter exhaust fan shall be an inline duct dryer booster fan equipped with a shop built back-draft damper mounted on the interior side of the exterior wall penetration.

**2.3 BAROMETRIC RELIEF**

- A. Acceptable manufacturers:
  - 1. Greenheck.
  - 2. Fabrahood.
  - 3. Penn Airette.
  - 4. Ruskin.
- B. Factory manufactured aluminum roof hood with field installed adjustable counterbalanced vertical air flow backdraft damper mounted in hood throat.
- C. Exterior wall louvers with counterbalanced back draft dampers for building air relief mounted inboard.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Provide sheaves as necessary for final air balancing. Coordinate line voltage control requirements with other trades for wiring and low voltage control requirements with the controls contractor.
- B. Coordinate size, location and rough opening requirements for roof curbs. Verify curb dimensions used in plans and details will mate with unit cap dimensions with proper allowances for roofing material, flashing, etc.
- C. Set roof mounted fans and relief caps on curbs. Furnish and field install backdraft dampers as specified per plans and details verifying proper operation. Provide acoustic insulation in duct where indicated. Secure fans to curbs. Verify tight seal of duct connection.
- D. Adjust counterbalanced back draft dampers on barometric relief hoods and louvers for opening at 0.04" minimum positive building pressure. Secure hoods to curbs.
- E. Mount wall fans and sleeves and fan guards at louvers per plans and manufacturers instructions. Verify tight seal at louvers.
- F. Provide neoprene isolators to fans suspended from structure. Further isolate fan from structure with flexible connection at fan inlet and discharge connections.

**END OF SECTION**

**SECTION 260126 - TESTING**

---

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Perform tests of the electrical system to assure code compliance and proper system operation according to the intent of the contract documents. Retain the services of approved testing agency(s) to comply with the ground fault requirements of this section.
- B. Applicable Codes, Standards & References for Tests:
- C. All inspections and tests shall be in accordance with the following applicable codes and standards except as provided otherwise herein.
  - 1. National Electrical Code - NEC
  - 2. National Electrical Manufacturer's Association - NEMA
  - 3. American Society for Testing and Materials - ASTM
  - 4. Institute of Electrical and Electronic Engineers - IEEE
  - 5. National Electrical Testing Association - NETA
  - 6. American National Standards Institute - ANSI
  - 7. State and Local Codes and Ordinances
  - 8. Insulated Cable Engineers Associate - ICEA
  - 9. Association of Edison Illuminating Companies – AEIC.

**1.2 CIRCUIT TESTS**

- A. The Contractor shall perform routine insulation resistance, continuity and grounding tests for all distribution and utilization equipment prior to their connection and energization. A standard megger-type instrument shall be used to demonstrate that insulation values are acceptable, ground system is continuous and the neutral system is isolated from the grounding system except at the systems' single ground point.
- B. System defects, indicated by the circuit tests, shall be corrected. Tests shall be repeated until satisfactory results are obtained.

**1.3 GROUNDING TEST**

- A. Measure the ohmic value of the Electrical Service Entrance "System Ground" with reference to "Earth Ground" using multiple terminal, fall of potential methods and suitable test instruments.
- B. Maximum resistance to ground shall be less than 10 ohms. Notify the Architect/Engineer if this resistance value is not obtained for the initially installed system; and then provide corrective measures as required to reduce ground resistance to less than 10 ohms.

**1.4 MOTOR AND EQUIPMENT TESTS**

- A. Verify proper rotation of all motors before placing into service.



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**SECTION 260126 - TESTING**

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- B. Measure and record electrical data for each motor installed under this contract. Data shall include these items:
  - 1. Motor description
  - 2. Controller description
  - 3. Motor nameplate amperes
  - 4. Actual measured motor running amperes
  - 5. Overload heater manufacturer and catalog numbers
  - 6. Overload heater ampere range
  - 7. Voltage (measured) and phase
- C. Motor controller overload heaters shall be sized to the actual motor nameplate full load current; do not oversize overload heaters.

**1.5 PHASE BALANCE TESTS**

- A. Verify the balance of the electrical system's phase currents; reassign load connections if necessary to obtain a balance that is acceptable to the Engineer.

**1.6 GROUND FAULT PROTECTION SYSTEMS TEST**

- A. Visual and Mechanical Inspection
  - 1. Inspect neutral main bonding connection to assure:
    - a. Zero sequence is grounding upstream of sensor.
    - b. Ground connection is made ahead of natural disconnect link.
  - 2. Inspect control power transformer to insure adequate capacity for system.
  - 3. Monitor panels (if present) shall be manually operated for:
    - a. Trip test.
    - b. No trip test.
    - c. Non-automatic reset.
  - 4. Proper operation and sequence shall be recorded.
  - 5. Zero sequence systems shall be inspected for symmetrical alignment of core balance transformers about all current carrying conductors.
  - 6. Ground fault device circuit nameplate identification shall be verified by device operation.
  - 7. Pickup and time delay settings shall be set in accordance with Engineer's instructions.
- B. Ground Fault System Electrical Tests
  - 1. System neutral insulation resistant shall be measured to insure no shunt ground paths exist, neutral-ground disconnect link shall be removed, neutral insulation resistance measured and link replaced.
  - 2. The relay pickup current shall be determined by current injection at the sensor and the circuit interrupting device operated.
  - 3. The relay timing shall be tested by injecting one hundred fifty percent (150 %) and three hundred percent (300%) of pickup current into sensor. Total trip time shall be electrically measured.
  - 4. System operation shall be tested at fifty five percent (55%) rated voltage.

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**SECTION 260126 - TESTING**

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5. Zone interlock systems shall be tested by simultaneous sensor current injection and monitoring zone blocking function.

**C. Test Parameters**

1. System neutral insulation resistance shall comply with applicable industry standards.
2. Relay pickup current shall be within ten percent (10%) of device dial or fixed setting.
3. Relay timing shall be in accordance with manufacturer's published time-current characteristic curves.

- D.** For Ground Fault System Testing, Contractor shall retain the services of a National Electrical Testing Association member firm, or a firm approved by the Engineer.

- E.** Apply label certifying satisfactory test completion in accordance with NETA Labeling Procedure.

**PART 2 - PRODUCTS**

**2.1 MATERIALS AND INSTRUMENTATION**

- A.** Contractor and/or testing agency shall supply all apparatus and materials required for indicated tests.
- B.** Contractor shall include all costs associated with testing in bid proposal.

**2.2 TEST REPORT(S)**

- A.** Furnish four (4) bound copies of test reports, as specified herein, for inclusion into the project operation and maintenance manuals. Each test report shall include the following items:
1. Name, address and telephone number of the testing agency.
  2. Name(s) of personnel conducting the tests.
  3. Type of test.
  4. Description of test procedure.
  5. List of items tested.
  6. List of actual test equipment including make, model(s), serial number(s) and calibration date(s) as applicable.
  7. Test results.
  8. Conclusion and recommendations.
  9. Appendix, including appropriate test forms.

**PART 3 - EXECUTION**

**3.1 TESTING PROCEDURE**

- A.** Submit a copy of test procedure(s) to the Engineer prior to testing.
- B.** All tests shall be conducted according to applicable industry standards.

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**3.2 SCHEDULING**

- A. Notify Architect/Engineer and Owner at least five (5) working days prior to performance of any test.

**3.3 TRANSMITTAL OF REPORTS**

- A. Transmit test reports to the Architect/Engineer per Section 26 05 00, "FINAL ACCEPTANCE."

**END OF SECTION**

**SECTION 260500 - GENERAL ELECTRICAL PROVISIONS**

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**PART 1 - GENERAL**

**1.1 GENERAL CONDITIONS**

- A. Bidding documents including Division 1 General Conditions, Supplementary General Conditions, Published Addenda and related work in other Divisions form an integral part of these Specifications and shall be binding on the Division 26 Contractor for all work performed under Division 26, Electrical.

**1.2 DEFINITIONS**

- A. The term "provide" shall mean furnish, install and connect equipment and materials complete in operating condition.
- B. The term "approved" as used herein shall mean the written approval of the Engineer.
- C. The term "General Contractor" as used herein shall mean the organization responsible for accomplishing all work within the contract documents.
- D. The term "contractor" as used herein shall mean the organization responsible for accomplishing Division 26 work. The plural term "contractors" as used herein shall include all of the trade organizations that comprise the project workforce.
- E. The term "drawings" as used herein shall mean all contract drawings for all divisions of work.
- F. NEC means National Electrical Code.
- G. The term "code" as used herein shall mean all applicable National, State and local codes.

**1.3 SCOPE OF ELECTRICAL WORK**

- A. The Electrical work consists of furnishing, installing, testing and placing in satisfactory operation all equipment, materials, devices and appurtenances, necessary to provide a complete electrical system according to the intent of the Drawings and Specifications. In general this includes all labor, materials, equipment, tools, etc. to complete the electrical work.
- B. All low voltage wiring exposed to view shall be routed in an orderly and workman like manner, perpendicular to the structural grid and concealed to the maximum extent possible. The routing of low voltage wiring in areas exposed to view shall be as approved by the Architect. The color of low voltage wiring exposed to view shall be selected from manufacturer's standard colors as approved by Architect.

**1.4 INTENT OF DRAWINGS**

- A. The Electrical drawings are intended to serve as working drawings for general layout. Equipment, receptacles and raceway are partially diagrammatic and do not necessarily indicate actual routings or all appurtenances required for a complete installation.

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- B. The drawings and specifications are complementary. What is called for in either is binding as if called for in both.
- C. Take all working dimensions, outlet heights, door swings, light fixture locations, and the like from architectural drawings.
- D. Motor horsepower and apparatus wattages indicated on the plans are requirements of equipment furnished under other Divisions of this contract. Advise the Architect/Engineer in writing of any deviations in actual equipment supplied that affect the electrical installation.

**1.5 MANUFACTURER'S RECOMMENDATIONS**

- A. Make all installations in strict accordance with manufacturers' published recommendations and details. All equipment and materials recommended by them shall be considered as part of this contract.

**1.6 SUPERVISION AND COORDINATION**

- A. Coordinate utility power and metering work with the local electrical utility and telephone work telephone utility to ensure compliance with their specific requirements. Contact both power and telephone utilities and make arrangement for their services to this project.
- B. Contact the local electrical inspector and obtain an electrical permit for the work.
- C. Maintain adequate supervision of the Division 26 work and have a responsible person in charge at the site any time work is in progress or when necessary for coordination with other trades.

**1.7 CODES AND REGULATIONS**

- A. All work shall conform to current applicable National, State and local Codes; these shall be regarded as the minimum standard of quality for material and workmanship. Contractor shall familiarize himself with all the following codes prior to bidding.
  - 1. ASTM American Society for Testing and Materials
  - 2. NBFU National Board of Fire Underwriters
  - 3. NEC National Electrical Code
  - 4. NESC National Electrical Safety Code
  - 5. NEMA National Electric Manufacturers Association
  - 6. NFPA National Fire Protection Association
  - 7. UL Underwriters Laboratories, Inc.
  - 8. ICEA Insulated Cable Engineers Associations
  - 9. CBM Certified Ballast Manufacturers
  - 10. --- Federal, State and Local Building Codes
  - 11. ETL Electrical Testing Laboratories
  - 12. --- Local Electrical Code
  - 13. --- Service Policies of local utilities
  - 14. ANSI American National Standards Institute
  - 15. IEEE Institute of Electrical and Electronic Engineers
  - 16. --- ASHRAE 90.1
  - 17. UBC Uniform Building Code & City Supplements
  - 18. UFC Uniform Fire Code & City Supplements

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- B. Nothing in these Drawings and Specifications shall be construed as permitting work not conforming to governing codes.
- C. The Contractor shall not be relieved from complying with any requirements of these contract documents which may exceed, but not conflict with, requirements of the governing codes.

**1.8 PERMITS AND FEES**

- A. Obtain and pay all fees for licenses, permits and inspections required by laws, ordinances and rules governing work specified herein. Arrange for inspection of work and provide inspectors with all necessary assistance.
- B. Owner will pay the local electrical utility for permanent electrical power to the building. Contractor shall be responsible for costs related to temporary construction power to the site.

**1.9 OPERATING INSTRUCTIONS**

- A. Fully instruct the Owner's designated representatives in the operation and maintenance of all components of the electrical system upon completion of the work and after all tests and final inspection(s) by the Authority(s) Having Jurisdiction.
- B. Arrange scheduled instruction periods with the designated personnel of the Owner. The instruction period shall consist of a minimum of eight hours to review the electrical installation and shall be included in the Bid.

**1.10 AS-BUILT RECORD DRAWINGS**

- A. Continuously maintain a set of AS-Built Drawings to indicate all significant deviations from the original design and the actual placement of equipment and underground conduits. Changes shall be shown with red colored pencil while work is in progress. This "As-Built" set shall be clearly marked: "AS-BUILT RECORD DRAWINGS - Do Not Remove From Office."

**1.11 ELECTRICAL EQUIPMENT OPERATION AND MAINTENANCE (O&M) MANUALS**

- A. Prepare two (2) copies of O & M manuals that contain operating and maintenance information, replacement parts list, shop drawings, wiring diagrams and equipment test data for all equipment and systems installed under this contract. Manuals shall be organized as follows:
  - 1. Each O & M manual shall be assembled in a loose leaf, 3 ring hard cover binder.
    - a. The covers shall have a typewritten adhesive label with the name of the Project, Owner, Electrical Contractor/Engineer, and year of completion. The back edge shall have a typewritten adhesive label with the name of the Project, Owner and year of completion.
    - b. Deliver two (2) complete, O & M manuals at least four weeks before final review of the project.

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**SECTION 260500 - GENERAL ELECTRICAL PROVISIONS**

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**1.12 GUARANTEE**

- A. The Division 26 Contractor shall provide written guarantee to repair or replace (without additional expense) any defective materials or workmanship which become evident within a period of one (1) year after final acceptance.
- B. Any material guaranteed by a specific manufacturer for a period in excess of one year shall be specifically noted on the Owner's written guarantee.

**PART 2 - PRODUCTS (Not applicable)**

**PART 3 - EXECUTION (Not applicable)**

**END OF SECTION**

**SECTION 260505 - BASIC MATERIAL AND METHODS**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. General requirements for materials and installation methods.

**PART 2 - PRODUCTS**

**2.1 GENERAL**

- A. All materials shall be new, free from defects, of the quality specified herein and on the drawings. Materials shall be designed to insure satisfactory operation and rated life in the prevailing environmental conditions where they are being installed. They shall be listed by Underwriter's Laboratories (or a recognized testing laboratory) for use under these conditions.
- B. Each type of material shall be of the same make and quality throughout the job. The materials furnished shall be the latest standard design products of manufacturers regularly engaged in their production.

**2.2 TECHNICAL DATA**

- A. Technical information contained herein relies entirely on tests and ratings provided by manufacturers who are solely responsible for their accuracy. The Engineer, by use of this information in no way implies this has been tested or otherwise has verified the results of published manufacturer's information.

**2.3 AS SPECIFIED EQUIPMENT**

- A. This specification generally lists only one make and model number for each item of equipment or material required for the project. This is not intended to be restrictive but is intended to indicate the standard of quality, design and features required. In addition, the listed product is the basis of the design regarding physical size, electrical power requirements and performance. The product so identified is designated "as specified."

**2.4 SUBSTITUTION OF MATERIALS**

- A. Listing of approved materials is not intended to prevent acceptance of other materials provided the substitute products are submitted for approval and have been approved in accordance with the Substitution of Materials requirements.
- B. Approval Prior to Installation.
  - 1. All substitution requests shall be made on the Substitution Request form provided in the specification. All substitution requests shall be initially sent to the Architect for forwarding to the Engineer. Provide three (3) copies. One (1) will be returned with comments.



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**SECTION 260505 - BASIC MATERIAL AND METHODS**

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2. The Contractor shall be responsible for a substitute item suiting the space limitations shown and for any additional installation costs incurred by the substitution.
  3. Approval of substitution materials shall not be construed as authorizing any deviation from the contract drawings and specifications except where such deviation is clearly described in writing by the Contractor on the SUBSTITUTION REQUEST FORM for the Architect/Engineers review and is approved in writing by the Engineer.
  4. Requests shall clearly define and describe the proposed substitute product. Such requests shall be accompanied by samples, record of performance, certified test reports and such additional information as the Engineer may require to satisfactorily evaluate the substitute product(s).
- C. Approval Prior to Bid Opening.
1. Prior Approval requests for substitute materials that are similar in appearance, quality and performance to those specified herein or on the drawings may be submitted by bidders or vendors.
  2. All requests shall be made in writing and received in the Architect's office at least ten (10) days prior to date of bid opening using the SUBSTITUTION REQUEST FORM. Telephone requests for approval and written requests received less than ten (10) days prior to bid opening will not be accepted.
  3. Approved substitute materials will normally be included in addenda published prior to bid opening.
- D. Approval After Contract Award: Substitute products will be considered after contract award only under these conditions:
1. Non-Availability of Specified Materials: The Contractor shall have placed orders for specified materials promptly after contract award and have received written confirmation of non-availability from the supplier(s). The reason of non-availability shall be beyond the contractor's control such as: discontinuation of manufacture, strikes and acts of God.
  2. Contract Price Adjustments: The Contractor may submit substitution requests for Owner cost savings. All substitute request forms submitted after award of contract shall clearly indicate the proposed contract price change or the request will not be accepted.
  3. Where permitted in the Specifications: For items where "approval prior to bidding" is not required in these specifications. It shall be the contractors' responsibility to show that a substitute item is equal to the specified item.
- E. No substitute:
1. It is the intent of this specification to require specific materials to be compatible with the design concept and installation. Certain materials and systems, consequently, are indicated "No Substitute" and shall be provided as specified.

## **2.5 COMPLETE SYSTEMS**

- A. All systems specified herein and shown on the drawings shall be complete and operational in every detail. Mention of certain materials in bidding documents shall not be construed as releasing the Contractor from furnishing such additional materials and performing all labor required to provide a complete and operable system.

## **2.6 SUBMITTALS**

- A. Purpose of Submittals

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1. Submittals processed by the Engineer are not change orders. The Contractor, by the submittal process, demonstrates an understanding of the design concept by indicating equipment and materials intended to be provided and fabrication/installation methods intended to be utilized to meet all requirements of the contract documents.
2. The Engineer's review is for general conformance with the design concept and the contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract documents.

**B. General Requirements:**

1. The Contractor shall provide (5) five submittal brochures as follows:
  - a. Material Lists and Catalogs Data: Submit, within 10 days after contract award, complete lists of materials, marked catalog sheets, dimensions and other information necessary to properly identify each item. Submittals shall include the most significant materials for each section of these specifications.
  - b. Shop Drawings: Submit, within 20 days after contract award, shop drawings for equipment and materials unique to this installation.

**C. Submittal Items:**

1. Submittals shall include, but not be limited to the following items:
  - a. Panels
  - b. Time Switch
  - c. Wiring Devices
  - d. Fire alarm
  - e. Wires and Cables
  - f. Disconnects
  - g. Floor Boxes
  - h. Fused Disconnects
  - i. Fuses
  - j. Nameplates
  - k. Items Requested by Engineer

**D. Submittal Format**

1. All submittals shall be accompanied by a transmittal letter with reference identification (i.e., Electrical Submittal No. 1, material lists and catalog data, etc.)
2. Submittal brochures shall be separately bound in ACCO fastened or 3-ring type binders appropriate for the quantity of submittal items. Provide typewritten adhesive identification labels on each cover that include Project Name, Electrical Submittal Reference, and Contractor's Name, address and telephone/fax numbers.
3. All information contained in the brochures shall be grouped by specification sections. Provide a typewritten index and identifying divider tabs for all project submittal items to facilitate future reference.

**E. Submittal Completeness**

1. The Contractor shall make every effort to ensure the completeness of the initial submittal. Availability of certain shop drawings and catalog materials, however, may prevent this. Submittal shall not be delayed past specified time periods to await delivery of the missing items. The Contractor, instead, shall identify missing items on the transmittal letter and provide index listings and divider tabs for later insertion of these materials into the completed submittal brochure.

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**F. Engineer's Selection of Materials for Installation:**

1. The Engineer may select specified items that the Contractor shall provide, without change in contract price or time of completeness, under these circumstances:
  - a. Late and/or Unqualified Partial Submittals: Submittals must be made within the specified time periods; all partial submittals shall indicate manufacturer(s) catalog numbers, pertinent technical information and status of missing items.
  - b. Failure to follow Re-submittal Procedures: Contractor, within 14 days after the Engineer rejects any items, shall re-submit new materials for approval.
  - c. Substitute materials submitted by the Contractor have been rejected twice by the Engineer.

**G. Contractor's Responsibilities:**

1. The Contractor is responsible for all submittal details, accuracy of quantities and dimensions, selection of fabrication processes and techniques of assembly.
  - a. The Contractor shall furnish equipment/material suppliers with all Drawings and Specifications pertinent to their equipment.
  - b. The Contractor shall review all submittals and shop drawings, prior to submittal to Engineer, and correct them as necessary to insure compliance with the specifications and drawings. This review shall be indicated on the submittal catalog data sheets. Obtain Engineer's written approval before manufacture is started on any special equipment.
  - c. Deviation from Shop Drawings in fabrication and/or installation of equipment is not permitted unless proposed changes are clearly noted in writing by the Contractor and approved in writing by the Architect/Engineer at the time of submittal.
  - d. Maintain at least one complete approved Submittal Brochure on the jobsite for reference during construction.

**2.7 ELECTRICAL EQUIPMENT IDENTIFICATION**

**A. General:**

1. These items shall be provided with nameplates:
  - a. All motors, pushbutton stations, control panels and time switches.
  - b. Disconnect switches, panelboards, circuit breakers, contactors and relays in separate enclosures.
  - c. Wall switches controlling outlets, lighting fixtures or equipment where the outlets are not located within sight of the controlling switch.
  - d. Special systems shall be properly identified at outlets, junction and pull boxes, terminal cabinets and equipment racks.
2. Nameplate Inscription:
  - a. All nameplates shall adequately describe the function or operation of the identified equipment.
  - b. Panelboard and Switchgear nameplates shall include equipment designation, voltage, AIC withstand rating and phase of supply, i.e., Panel A, 208/120V, 3 phase, 4 wire, 10,000 AIC.
  - c. Nameplate designations shall be consistent for all components of a particular piece of equipment, such as disconnect switch, Push Button control station(s) and the like.
  - d. Contractor shall submit a complete list of nameplates for approval.
3. Nameplate Construction:

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- a. Nameplates shall be laminated phenolic plastic with minimum 3/16" high black engraved characters on white background.
- b. Nameplates shall be securely fastened to the equipment with No. 4 round-head phillips, cadmium plated steel, self-tapping screws. Contact cement adhesive only is not acceptable.
- c. Motor nameplates may be non-ferrous die-stamped metal; minimum 0.03 inch thick, in lieu of separate phenolic nameplate. Device plates may be identified by engraving directly on the plate. All engraved or stamped lettering shall be filled with contrasting enamel.

**PART 3 - EXECUTION**

**3.1 PROTECTION OF WORK**

- A. Protect all work, wire, cable, materials and equipment installed under this Division against damage by other trades, weather conditions or any other causes. Equipment found damaged or in other than new condition will be rejected as defective.
- B. Transformers, panels, light fixture and electrical equipment shall be kept covered or enclosed to exclude moisture, dust, dirt, plaster, cement, or paint and shall be free of all such contamination before acceptance. Enclosures and trims shall be in new condition, free of rust, scratches or other finish defects. Properly refinish in a manner acceptable to the Engineer if damaged.
- C. Keep conduit and raceways closed with suitable plugs or caps during construction to prevent entrance of dirt, moisture, concrete or foreign objects. Raceways shall be clean and dry before installation of wire and at the time of acceptance.
- D. Make up and insulate wiring promptly after installation of conductors. Wire shall not be pulled-in until raceways are complete, all bushings are installed and raceway terminations are completed nor pulled into conduit embedded in concrete until after the concrete is placed and forms are removed.

**3.2 CUTTING AND PATCHING**

- A. Obtain permission from the Architect/Engineer prior to cutting. Locate cuttings so they will not weaken structural components. Cut carefully and only the minimum amount necessary. Cut concrete with diamond core drills or saws except where space limitations prevent the use of such equipment.
- B. Cut asphalt with diamond core saws, repair all areas to match existing or to the standards described in other sections of these specifications.
- C. Penetrations of fire rated elements shall be carefully made to maintain that rating after the installation is complete. Seal all penetrations with AHJ approved caulking.
- D. All construction materials damaged or cut into during the installation of Division 26 work must be repaired or replaced with materials of like kind and quality as original materials by skilled labor experienced in that particular building trade.

**3.3 EXCAVATIONS**

- A. All excavations are to be so conducted that no walls or footings shall be disturbed or injured in any way.

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- B. Remove all surplus earth not needed for backfilling and dispose of same as appropriate at a licensed disposal facility.

**3.4 PAINTING**

- A. Painting in general will be covered under another Division of this specification. Item furnished under this Division that are scratched or marred in shipment, or installation, are to be refinished by the Contractor to the satisfaction of the Engineer.

**3.5 CLEAN-UP**

- A. Contractor shall continually remove debris, cuttings, crates, cartons, etc., created by his work. Such clean up shall be done at sufficient frequency to minimum hazard to the public, other workmen, the building and the Owner's employees. Before acceptance of the installation, Contractor shall carefully clean cabinets, panels, wiring devices, coverplates, etc., to remove dirt, cuttings, paint, plaster, mortar, concrete, etc. Blemishes to finished surfaces or apparatus shall be removed and new finish equal to the original applies.

**3.6 LABELING**

- A. Clearly and properly label the complete electrical system, as specified herein, to indicate the loads served or the function of each item of equipment connected under this contract.
- B. Control circuits shall utilize combinations of colors with each conductor identified throughout using wrap around numbers or letters. Identification shall be consistent with the contract drawing requirements and operation and maintenance shop drawings.

**3.7 MECHANICAL EQUIPMENT CONNECTIONS**

- A. Provide complete electrical connections for all items of equipment, including incidental wiring, materials, devices and labor necessary for a finished working installation.
- B. Provide all code required disconnect switches and starters under this work unless specifically noted otherwise on the drawings or in the specifications that these items are provided by others or are part of a complete package.

**3.8 SUPPORT AND ALIGNMENT**

- A. Each fastening device and support for electrical equipment, fixtures, panels, outlets and cabinets shall be capable of supporting not less than four times the ultimate weight of the objects fastened to or suspended from the building structure.
- B. Install panels, cabinets and equipment level and plumb, parallel with structural building lines, panels and all electrical enclosures shall fit neatly without gaps, openings or distortion. Properly and neatly close all unused openings with approved devices.
- C. Fit surface panels, devices and outlets with neat, appropriate trims, plates or covers, (without over-hanging edges, protruding corners or raw edges) to leave a finished appearance.

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- D. All junction boxes, pull boxes or other conduit terminating housings located above a suspended ceiling shall be securely suspended from structure or ceiling grid system to prevent sagging or swaying.

**3.9 NOISE CONTROL**

- A. Back-to-back or straight-through installation of wall or partition boxes is not permitted to minimize noise transmission between occupied spaces.
- B. Contactors, transformers, starters and similar noise producing devices shall not be placed on walls which are common to occupied spaces. Where such devices must be mounted on walls common to occupied spaces, they shall be shock mounted or isolated in such a manner as to effectively prevent the transmission of their inherent noise to the occupied space.
- C. Ballasts, contactors, starters, transformers and like equipment which are found to be noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced.

**END OF SECTION**

**SECTION 260513 - WIRE AND CABLES**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all wire, cable and terminations for a complete installation.

**PART 2 - PRODUCTS**

**2.1 PACKAGING**

- A. Conductors shall be delivered to the job site in approved original cartons, or on reels as recommended by the manufacturer, and shall bear the Underwriter's Label. Reels shall be provided with suitable protection to prevent fork-lift damage to conductors during shipment or storage prior to use.

**2.2 SPECIALIZED CONDUCTORS**

- A. Conductors for specialized systems shall be as recommended by the equipment manufacturer.
- B. All low voltage conductors for telephone, data, security, closed circuit television and Division 23 EMCS controls will be provided by others.
- C. Low voltage conductors from light switches to low voltage lighting control panels shall be provided by the Division 26 contractor.

**2.3 CONDUCTORS – 600 VOLTS**

- A. Copper type THW, THWN, or THHN.

**2.4 CONNECTORS – 600 VOLTS**

- A. Branch Circuit Conductor Splices:
  - 1. Pre-insulated "twist-on" type or "crimped-on" type as approved (Scotch-lok, Ideal or equal).
- B. Cable Splices:
  - 1. Split-bolt or tool applied sleeves with pre-formed insulated cover, heat shrinkable tubing or approved plastic insulating tape.
- C. Terminator lugs of No. 12 wire and smaller:
  - 1. Spade, insulated type to be tool applied.
- D. Terminator lugs for No. 10 wire or larger:

**SECTION 260513 - WIRE AND CABLES**

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1. Two bolt (or approved positive restraint), tool applied compression type (Burndy or equal).

**2.5 INSULATING MATERIALS**

- A. Insulating tape or heat shrink tubing shall have the equivalent rating of the applicable conductor insulation (Scotch 3M, RAYCHEM or equal).

**2.6 PLASTIC CABLE TIES**

- A. Nylon, or equivalent, locking type (T&B or equal).

**PART 3 - EXECUTION**

**3.1 MINIMUM WIRE SIZE**

- A. Lighting and Power System: No. 12 AWG.
- B. Low Voltage Wiring: As recommended by Manufacturer.

**3.2 CONDUCTOR TYPES, REFERENCED ON PLAN**

- A. Copper.

**3.3 CONDUCTOR COLORING CODE**

- A. Conductor color coding shall be as follows:
  1. 208/120 volt system
    - a. A Phase - Black
    - b. B Phase - Red
    - c. C Phase - Blue
    - d. Neutral - White
    - e. Grounding - Green
  2. 480/277 volt system
    - a. A Phase - Orange
    - b. B Phase - Brown
    - c. C Phase - Yellow
    - d. Neutral - Gray
    - e. Grounding - Green with yellow strip
    - f. Other Colors - Switched Wires
- B. Conductors shall have colored insulation except wires larger than #8 may be black with colored tape identification at all terminations and splices.



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**SECTION 260513 - WIRE AND CABLES**

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- C. Additional colors may be used where such colors will help in identifying wires and different systems.

**3.4 MOISTURE PROTECTION**

- A. Cable ends shall be protected at all times from moisture. Provide approved heat-shrink end caps or equivalent for all unterminated cable ends.

**3.5 CONDUCTORS IN PANELS AND SWITCHBOARDS**

- A. Conductors in panels, switchboards and terminal cabinets shall be neatly grouped and formed in a manner to "fan" into terminals with regular spacing.

**3.6 CABLE SUPPORTS**

- A. Provide conductor support devices as required by code in vertical cable runs.

**3.7 INSULATION REMOVAL**

- A. Insulation shall be removed with approved wire stripping tools. Conductors that are nicked or ringed are unacceptable and shall be cut off and re-stripped.

**3.8 INSULATION ENERGIZED TERMINATIONS**

- A. Insulate all exposed energized connections and splices with approved tape or heat shrink tubing. Tape, if used, shall be half-lapped in two directions.

**3.9 TERMINATIONS – COPPER CONDUCTORS 600 VOLTS**

- A. Control and special systems wires shall be terminated with a crimped on lug when terminating at a screw connection.
- B. All screw and bolt type connectors shall be made up tight and retightened after an eight hour period. Tighten all bolted connections with a ratcheting type torque wrench per manufacturer's standards.
- C. All tool applied crimped connectors shall be applied per manufacturer's recommendations and physically checked for tightness.

**END OF SECTION**

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**SECTION 260526 - GROUNDING**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide a complete grounding system that complies with the current edition of the National Electrical Code (NEC), and all applicable regulatory codes.

**PART 2 - PRODUCTS**

**2.1 BUILDING GROUNDING SYSTEM**

- A. Grounding system for the building to include a No. 4/0 AWG bare copper conductor which is extended to:
  - 1. A minimum of two 5/8" x 10' copper clad ground rods spaced 30 feet apart.
  - 2. The re-bar in a building column footing at two different locations.
  - 3. The building structural steel.
  - 4. The water service.
- B. Bond all metallic piping systems in the building. Adjacent to the main service switchboard or panelboard, provide a 1/4" x 6" x 24" copper bus wall mounted (using insulators) and drilled for future lugs. The bus bar is to be connected to the grounding system described above by a No. 4/0 copper ground wire.

**2.2 GROUND CONDUCTORS**

- A. Grounding conductors shall be soft drawn, bare, stranded copper. Size as shown on the plans and per the National Electrical Code (NEC) Article 250.
  - 1. GROUNDING ELECTRODE CONDUCTORS FOR A.C. SYSTEMS: See NEC table 250-94
  - 2. EQUIPMENT GROUNDING CONDUCTORS:
    - a. See NEC table 250-95
    - b. Equipment grounding conductors may be insulated; provide green insulation and/or approved permanent identification for conductors larger than No. 6 AWG.

**2.3 GROUND ELECTRODE CONNECTORS**

- A. Connectors for grounding electrode conductor to ground rod shall be of the thermal fusion type; conductor-to-conductor connections may be either thermal fusion or approved hydraulically applied compression type.

**SECTION 260526 - GROUNDING**

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**2.4 GROUNDING BUSHINGS**

- A. Grounding bushings shall be matched to the ampacity of the grounding conductor and shall have approved set-screw type grounding lug connectors.

**2.5 GROUNDING CONNECTORS**

- A. Shall meet the requirements of ground bushings, cast, set-screw or bolted type.

**2.6 GROUNDING CLAMPS**

- A. Clamps shall be matched to the ampacity of the grounding conductor. Provide approved raceway hub where grounding conductor is shown protected by conduit or armored cable. Clamps shall be U-bolt type for connection to water pipes.

**PART 3 - EXECUTION**

**3.1 GROUND CONTINUITY**

- A. Maintain ground continuity throughout the entire electrical system except where isolated ground systems are noted on the drawings.
- B. Permanently connect the electrical system neutral to the water service. (The system shall be grounded only at transformer secondaries and at the main distribution board; branch panel neutrals must be isolated from additional points of grounding).

**3.2 GROUNDING CONNECTIONS**

- A. All grounding connections shall be carefully made to insure low system impedance. Locate grounding connections to allow future servicing and expansion.

**3.3 PREPARATION**

- A. Prior to making mechanical or thermal connections, all conductors shall be clean, dry and bright with the bonding surface thoroughly cleaned of any oxides, mill, scale or other foreign matter.

**3.4 PROTECTION**

- A. Ground conductors shall be protected from mechanical injury during construction. Provide protective coverings or rigid non-ferrous conduit where shown on the drawings.

**3.5 GROUND RODS**

- A. Ground rods shall be driven into undisturbed soil to full depth. Provide additional rods, ionic salt solutions and the like where special low-resistant grounds are specified.

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**SECTION 260526 - GROUNDING**

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**3.6 THROUGH-SLAB GROUND PENETRATIONS**

- A. Ground conductors extending through the slab shall be protected by a rigid conduit sleeve; the void portion of the sleeve shall be packed with a non-hardening type duct seal.

**3.7 TESTING**

- A. Shall conform to Section 26 01 26.

**END OF SECTION**

**SECTION 260533 - RACEWAYS**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all raceways concealed in construction for a complete electrical system. Include all fittings, hangers and appurtenances required for a complete installation.
- B. In areas where raceway will be exposed to view the raceway shall be routed in an orderly and workman like manner, perpendicular to the structural grid and concealed to the maximum amount possible.
- C. For areas requiring raceway exposed, the Contractor shall submit two (2) copies of scaled floor plans (copies of Architectural) and details indicating proposed route of raceway prior to rough-in. These will be reviewed and approved by the Architect. One copy will be returned to remain on-site for reference. Allow a minimum of two weeks for review after drawings are received by Architect.

**PART 2 - PRODUCTS**

**2.1 CONDUITS**

- A. Galvanized Rigid Steel, thick wall (GRS)
- B. Intermediate Metal Conduit (IMC)
- C. Electrical Metallic Tubing (EMT)
- D. Flexible Metal Conduit with and without polyvinyl chloride jacket.
- E. Non-metallic, polyvinyl chloride (PVC), schedule 40.

**2.2 FITTINGS**

- A. GRS and IMC: fittings shall have threaded connections. Galvanized malleable iron or non-corrosive alloy compatible with galvanized conduit. Erickson couplings, watertight split couplings (OZ type or equivalent) are permitted.
- B. EMT - FITTINGS: couplings and connectors shall be rain tight, steel or malleable iron type utilizing a split corrugated compression ring and tightening nut or stainless steel locking disk. Steel set screw fittings are permitted in dry locations (not in wet locations or in concrete). Zinc, pot metal, die cast fittings and indenter fittings are not acceptable.
- C. Flexible Metallic Conduit.
  - 1. Dry Locations: malleable iron or steel, Thomas & Betts "Squeeze" type or equal.
  - 2. Damp or Wet Locations: Thomas & Betts "Super Liquid-Tight" with external ground lug.
- D. PVC: Fittings shall be solvent welded types.

SECTION 260533 - RACEWAYS

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**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Arrange conduit to maintain headroom and present a neat appearance.
- B. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping. Exposed conduits shall not be installed without prior approval of the routing by the Architect.
- C. Maintain minimum 6 inch clearance between conduit and piping. Maintain 12 inch clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.
- D. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit. Verify height and routing of racks with Architect prior to installation.
- E. Support conduit at a maximum of eight feet on center.
- F. No more than the equivalent of three 90-degree bends shall occur between boxes.
- G. Use conduit bodies to make sharp changes in direction, as around beams.
- H. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 1-1/4 inch size.
- I. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.
- J. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.
- K. Provide No. 12 AWG insulated conductor or suitable pull string (labeled with source and end points) in empty conduit, except sleeves and nipples.
- L. Install expansion-deflection joints where conduit crosses building expansion or seismic joints.
- M. Where conduit penetrates fire-rated walls and floors, provide mechanical fire-stop fittings with UL listed fire rating equal to wall or floor rating or seal opening around conduit with UL listed foamed silicone elastomer compound as required by the authority having jurisdiction.
- N. Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack with pitch pocket. Exposed horizontal raceway runs on roof in excess of five (5) feet are not permitted.
- O. Conduit shall NOT be used as grounding method. All branch and feeder conduits to have grounding conductor installed with phase and neutral conductors. Size of ground conductor to be in accordance with The National Electrical Code

**SECTION 260533 - RACEWAYS**

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**3.2 CONDUIT SIZING**

- A. Conduits shall be sized per code for conductors with type THHN insulation, although thinner insulation types are permitted in some cases. Conduit size shall not be reduced if large size is specified on the drawing. Minimum conduit size shall be 3/4" trade diameter.

**3.3 GRS AND IMC**

- A. Install GRS or IMC for all conduits in wet locations, concrete, underground, exposed to weather, hazardous locations, and where subject to physical damage.
- B. Connections shall be watertight in damp locations.

**3.4 EMT**

- A. EMT may be installed for wiring in masonry block, frame construction, furred ceilings, above suspended ceilings and in dry location concrete, exposed dry location unfinished spaces not subject to physical damage. EMT shall not be installed underground, under concrete slabs-on-grade, in concrete slabs-on-grade, exposed to weather, on exterior of buildings or on roofs.
- B. Contractor shall coordinate assembly and installation of EMT in masonry block construction to avoid construction delays. Avoid surface cut masonry units wherever such masonry units are to remain unplastered or exposed.

**3.5 FLEXIBLE CONDUIT**

- A. Provide flexible conduit connection, in lengths of 6'-0 or less, to motors and equipment subject to vibration with at least a 60 degree loop to allow for isolation and flexibility. Use liquid-tight for pumps, equipment which is regularly washed down, and for equipment in damp locations. Provide bonding jumper as required by N.E.C.

**3.6 PVC CONDUIT**

- A. PVC conduit may be used underground when permitted by code. Field bends, when necessary, shall be formed with factory recommended heater. Rigid steel elbows must be installed where conduit is stubbed-up above grade.

**3.7 CONTINUITY OF CONDUIT SYSTEM**

- A. Conduits shall be assembled continuous and secured to boxes, panels, etc., with appropriate fittings to maintain electric continuity.

**3.8 PULL-LINES**

- A. Provide 150 pound plastic pull-lines to conduit-only systems and spare conduits to facilitate future conductor installation.

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SECTION 260533 - RACEWAYS

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END OF SECTION



**SECTION 260534 - OUTLET AND PULL BOXES**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide outlet and pull boxes as required to enclose devices, permit pulling conductors, for wire splices and branching.

**PART 2 - PRODUCTS**

**2.1 GENERAL**

- A. Provide boxes suitable for the location. Boxes shall meet NEMA Standards for various types and location installed.

**2.2 INTERIOR WIRING, NEMA 1**

- A. Flush and concealed outlet boxes: Metallic with screw ears, knock-out plugs, mounting holes, fixture studs, if required, RACO or approved.
- B. Surface outlet boxes: Galvanized stamped steel same as above for use in accessible ceiling locations. Provide cast iron gray painted "Bell" box for surface use on walls.
- C. Boxes exceeding 4-11/16 inches square: When required shall be welded steel construction with screw cover and painted, steel gauge as required by physical size, Hoffman, Circle AW or approved.
- D. Concrete and Masonry: Boxes for casting in concrete or mounting in masonry walls shall be galvanized steel (not aluminum or zinc die castings), specifically designed for that purpose. Raco, Steel City or approved.

**2.3 BELOW GRADE**

- A. Where exposed to earth, pull boxes shall be constructed of precast concrete with size, configuration, cover, grade, grates and reinforcing as required by the particular installation.

**PART 3 - EXECUTION**

**3.1 ANCHORING**

- A. All interior boxes shall be firmly anchored directly to building studs or joints. Boxes must be so attached that they will not "rock" or "shift" when devices are operated.
- B. Exterior boxes shall be fastened to approved hot dipped galvanized mounting supports and racking appropriate for size of enclosure.

**SECTION 260534 - OUTLET AND PULL BOXES**

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**3.2 FLUSH MOUNTING**

- A. Except for surface mounted boxes or boxes above accessible ceilings, all boxes shall have front edge (box or plaster ring) even with the finished surface of the wall or ceiling. Use of long screws with spaces or shims for mounting devices will not be acceptable.

**3.3 ELECTRICAL OUTLETS**

- A. General: Coordinate the work of the Section with the work of other Sections and trades. Study all drawings that form a part of this contract and confer with the various trades involved to eliminate conflicts between the work of this Section and the work of other trades. Check Architectural drawings and verify outlet locations with respect to door swings, installation details, cabinet work, and layouts of suspended ceilings indicated on Architectural drawings, and locations of all plumbing, heating, and ventilating or other equipment indicated on the contract drawings of all trades.
- B. Centered on Built-In Work: In the case of doors, cabinets, recessed or similar features, or where outlets are centered between two such features, such as between a door jamb and a cabinet, make these outlet locations exact.
- C. Vertical and Horizontal Relationships: Where more than one outlet is shown or specified to be at the same elevation or one above the other, align them exactly on centerlines horizontally or vertically.
- D. Device Outlet Height:
  - 1. Switches, Receptacles, and Telephone/Data: See drawing schedules.
  - 2. Other: As shown on the plans or as directed by the Architect/Engineer

**3.4 LIGHTING FIXTURES**

- A. In Ceiling of Acoustical Material: Locate in accordance with approved ceiling layout plans and so fixtures replace full size ceiling tiles wherever possible.

**3.5 ELECTRICAL WORK IN COUNTERBACKS, MILLWORK, STEEL COLUMNS, CASEWORK AND ADJACENT TO MERCHANDISING PANELS**

- A. Provide as shown and/or specified. Provide templates, where required, to other trades for drilling and cutting to insure accurate location of electrical fixtures (outlets and devices) as verified with the Architect.

**3.6 CONNECTION TO EQUIPMENT**

- A. Provide outlet boxes of size and at locations necessary to serve equipment furnished under this or other Divisions of the specifications or by others. An outlet box is required if equipment has pigtail wires for external connection, does not have space to accommodate circuit wiring or requires a wire different from circuit wiring used. Study equipment details to assure proper coordination.

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**SECTION 260534 - OUTLET AND PULL BOXES**

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**3.7 BLANK COVERS**

- A. Provide blank cover or plate over all boxes that do not contain devices or are not covered by equipment.

**3.8 JUNCTION BOXES OR PULL BOXES IN SUSPENDED CEILINGS**

- A. Shall be supported from structure independently from ceiling suspension system.

**3.9 ELECTRICAL BOXES IN STEEL WALL PANELS**

- A. Contractor shall provide gray painted "Bell" boxes at locations which interface with steel wall panels and coordinate with steel wall panel installer.

**END OF SECTION**

**SECTION 262416 - SWITCHGEAR AND PANELBOARDS**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all switchgear (integrated power center) and panelboard equipment for complete installation. All equipment shall be dead front type construction and shall bear the U.L. label. Load centers with plug-in breakers are not acceptable. Electrical contractor shall provide and install CT cans, disconnects, meters, etc.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Basis-of-Design Product: Subject to compliance with requirements.
- B. Coordinate panelboards and switchgear with Eaton.

**2.2 SWITCHGEAR / INTEGRATED POWER CENTER DESCRIPTION**

- A. Integrated and coordinated assembly of power-line-conditioning and distribution components packaged in a single cabinet or modular assembly of cabinets. Include the following components:
  - 1. Input-power, circuit breaker section.
  - 2. Isolation transformer.
  - 3. Output panelboard(s).
  - 4. SPD system.
  - 5. Owner provided Novar system.
- B. Comply with NFPA 70.
- C. Top and Bottom wiring access.
- D. Input-Power, Circuit Breaker Section: Three-pole, thermal-magnetic-type circuit breaker, rated for indicating interrupting capacity and 125 percent of input current of unit at 100 percent rated load at unit capacity rating.
- E. Transformer Section: Dry-type, electrostatically shielded, three-phase, common-core, convention-air-cooled isolation transformer. Comply with UL 1561. Copper windings, 220 deg C insulation class.
- F. SPD Section: Integrated SPD system. Manual, three-pole, fused disconnect switch to de-energize SPD system while permitting power distribution units to continue operation. Fuses are rated at 200-kA interrupting capacity. System shall accommodate rated-load current with a minimum 3.0 crest factor and 85 percent total harmonic distortion.
- G. Output Panelboards Section: Panelboards shall comply with below section 2.3 Panelboard Description. Mount panelboards on power distribution unit behind flush doors.

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**SECTION 262416 - SWITCHGEAR AND PANELBOARDS**

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- H. Enclosure Requirements: A single, freestanding, galvanized steel, NEMA Type 1 enclosure. Opening of an exterior door shall not provide access to any live parts. Panels and covers that expose hazardous voltages shall require tools to remove.
- I. Provide manufacturer's standard finish over corrosion-resistant pretreatment and primer.

**2.3 PANELBOARD DESCRIPTION**

- A. Voltage, arrangement, and capacity of bus and overcurrent protective devices shall be as shown on the drawings. Bus shall extend behind all spaces ready for future overcurrent protective devices.
- B. Buss bars shall be plated aluminum or copper with ampere density not-to-exceed 1200/1000 amperes per square inch. Bussing will generally be 3 phase, 4 wire, 100 percent neutral, braced to match the interrupting rating of the breakers or fuses unless otherwise noted on the drawings.
- C. Provide multiple lugs where parallel or "feed-through" connections are shown on drawings.
- D. Provide separate neutral and ground buses at the bottom of each panelboard. Provide 200% neutral for 208Y/120V power panelboards.

**2.4 OVERCURRENT PROTECTIVE DEVICES**

- A. Provide thermal-magnetic type circuit breakers.
- B. The interrupting capacity shall be as specified on the panel schedules and drawings.
- C. Mount breakers in all panelboards so that breaker handles operate in a horizontal plane. Provide common trip on all multiple pole breakers.
- D. Breakers shall be bolt-in type.
- E. Circuit Breakers 15 thru 30A shall be U.L. rated for 60/75°C conductors; Breakers 35A and larger shall be rated for 75°C conductors.
- F. Circuit breakers intended for switching 120 volt loads shall be switching duty rated (SWD).
- G. Provide a minimum of 15% spare overcurrent devices and 5% space only in each panelboard for future circuit connections. Do not delete spare devices or spaces if more are indicated on drawings.
- H. Provide "Space" for future overcurrent devices, where noted on the drawings, including all bussing and device mounting hardware.

**2.5 ENCLOSURE GENERAL CONSTRUCTION**

- A. Provide cabinets with door-in-door construction with keylock.
- B. Provide factory primer coat for cabinets located in finished areas. Where cabinets are located in unfinished areas, standard lacquer or enamel finish, gray or blue-gray color, shall be substituted for factory primer coat.

**SECTION 262416 - SWITCHGEAR AND PANELBOARDS**

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- C. All electrical distribution equipment locks shall be keyed identically.
- D. Fasten panelboard front with machine screws with oval counter-sunk heads, finish hardware quality, with escutcheons or approved trim clamps. Clamps accessible only when dead front door is open are acceptable.
- E. Surface mounted panelboards with fronts greater than 48 inches vertical dimension shall be hinged at right side in addition to hinged door over dead front. Provide three point latching mechanism with one T-handle operator.
- F. Provide matching trim of same height for adjacent panels or control devices in finished areas.

**PART 3 - EXECUTION**

**3.1 GENERAL INSTALLATION**

**A. Integrated Power Center**

- 1. Install switchgear and accessories according to NECA 400.
- 2. Equipment Mounting: Install switchboards on concrete floor.
  - a. For supported equipment, install epoxy-coated anchor bolts that anchor into structural concrete floor.
  - b. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - c. Install anchor bolts to elevations required for proper attachment to switchboards.
- 3. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.
- 4. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.
- 5. Install filler plates in unused spaces of panel-mounted sections.
- 6. Install overcurrent protective devices, and instrumentation.
  - a. Set field-adjustable switches and circuit-breakers trip ranges
- 7. Comply with NECA 1

**B. Panelboards**

- 1. Secure panelboards in place with top of cabinet at 6'-0", above finished floor or grade. Top of cabinet and trim shall be level; trim and door shall fit neatly without gaps, openings or distortion.
- 2. Top edges of adjacent panels shall be even.
- 3. Securely anchor panelboards to structural framing or walls with approved fasteners and concealed bracing as required. Provide steel channel support framing where panelboard is free standing. Submit support rack shop drawings for approval prior to fabrication.
- 4. Install panelboard interiors only after building structure is completely enclosed.

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**SECTION 262416 - SWITCHGEAR AND PANELBOARDS**

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**3.2 CIRCUIT INDEX**

- A. Each panelboard shall be provided with a typewritten index listing each circuit in the panel by number, with its proper designation. Listing shall match circuit breaker arrangements, typically with odd numbers on the left and even numbers on the right. Room numbers shall be the final room numbers used in the building as verified with the Owner. Mount index with a transparent protective cover inside the cabinet door.

**3.3 PANELBOARD NAMEPLATE**

- A. Provide phenolic engraved nameplate for each panelboard.

**3.4 CABINET PAINTING**

- A. Cabinets furnished as prime painted shall be field painted to match color of adjacent wall. (See Division 09, Section "Painting").

**3.5 SPACE**

- A. Verify space available with equipment sizes and code required working clearances prior to submittal of shop drawings.

**END OF SECTION**

**SECTION 262726 - WIRING DEVICES**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all wiring devices and plates for a complete installation.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. Hubbell.
- B. Arrow Hart.
- C. Leviton.
- D. Pass & Seymour.
- E. Bryant.
- F. Eagle.
- G. Eaton

**2.2 MATERIALS**

- A. Wiring devices shall be the product of a nationally recognized manufacturer regularly engaged in their production.
- B. All wiring devices specified in this section shall be the product of one manufacturer. Each type shall have identical appearance and characteristics.

**2.3 DEVICE COLOR**

- A. Switch handles and receptacles: Gray.
- B. Orange for isolated ground receptacles.
- C. Paint or other surface finish treatments are not acceptable.

**2.4 SWITCHES**

- A. "Specification Grade," quiet - type with toggle handle, heavy duty type, plastic back and side wired rated 277 volts, 20 amps.



**SECTION 262726 - WIRING DEVICES**

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**2.5 DEVICE PLATES**

- A. Interior: Provide pressed steel zinc coated plates for all areas.
- B. Exterior and Interior: Weathertight Taymac 10510.

**PART 3 - EXECUTION**

**3.1 MOUNTING**

- A. Rigidly fasten each device to the outlet box at proper position with the wall to bring receptacle flush with plate or switch handle the proper distance through the plate.

**3.2 ORIENTATION**

- A. Set switches vertical with handle operating vertically, up position "ON" and +48" above finished floor or as indicated.
- B. Set interior receptacles vertical with ground slot up; +18" above finished floor or as indicated.
- C. Set interior receptacles above counters, horizontal, centered in backsplash or as directed by Architect. Verify location with Architect prior to rough-in.
- D. Set exterior receptacles vertical at +36" above finished grade or as indicated.
- E. Devices and finish plates shall be installed plumb with building lines.

**3.3 RECEPTACLE GROUNDING**

- A. Provide bare bonding wire between receptacle grounding terminal and box. Plaster ear screws connecting the receptacle frame to the box will not be acceptable for grounding.

**3.4 HANDICAPPED ACCESS**

- A. Comply with requirements of State handicapped access code.

**END OF SECTION**

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SECTION 262813 - FUSES

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide fusing and appurtenances for all fusible equipment provided under this contract.

**PART 2 - PRODUCTS**

**2.1 LOW VOLTAGE FUSES**

- A. The low voltage fuse range is considered to extend over the range 600 volts or less. Fuses in this category shall be current limiting types, UL Class R, unless specified otherwise. Provide rejection style fuse clips for all current limiting applications.
- B. Fuses shall be as follows or Little Fuse, Gould Shawmutt, Edison, equal.

<u>APPLICATION</u>	<u>AMPERE RANGE</u>	<u>UL CLASS</u>	<u>BUSSMAN</u>
Motor & Branch Circuit	1-100	RK 5 Time Delay	Fusetron
Feeder	60-100	RK 5 Fast	Fusetron
All	125-600	RK 1 Time Delay	Low Peak
Switchboard	601-6000	KRP-C	Low Peak

- C. Provide six (6) spares of each size and type installed.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install fuses in all fusible devices provided under this contract.

**END OF SECTION**

**SECTION 262816 - DISCONNECTS AND FUSED SWITCHES**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all disconnect switches required by NEC for equipment furnished under this and all other divisions of these specifications.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

- A. General Electric.
- B. Square D
- C. Westinghouse.
- D. Siemens.
- E. Eaton.

**2.2 DISCONNECT SWITCHES**

- A. Switches shall be quick make, quick break, dual rated with electrical characteristics as required by the system voltage and the load served. Switches shall be single throw and have blades as required to open all ungrounded conductors.
- B. Enclosure shall have interlocking cover to prevent opening door when switch is closed. Interlock shall include a defeating scheme for authorized service work.
- C. Operator handle shall be lockable in the "off" position.
- D. Disconnect enclosures shall be suitable for mounting locations: NEMA 1 for dry locations, NEMA 3R for damp or exterior locations.
- E. All disconnect switches shall be the product of one manufacturer to facilitate future maintenance.

**2.3 FUSIBLE DISCONNECTS**

- A. Provide fusible disconnect switches where indicated on the drawings. Fusible disconnects shall be per 2.2 above with the addition of fuse space and clips to accept only Class R fuses.

**SECTION 262816 - DISCONNECTS AND FUSED SWITCHES**

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**2.4 TOGGLE SWITCHES**

- A. Toggle type disconnect switches are acceptable where shown on the drawings. Switches shall be suitable for the intended load and provided with handle guard/lock-off feature (similar to Square D Class 2510).

**2.5 NAMEPLATES**

- A. Provide nameplates on all disconnects and fused switches. Nameplates shall be engraved laminated phenolic mounted with screws (adhesive will not be accepted). Each nameplate shall include the following information: Load served, voltage, phase, panel, circuit number, fuse size and type where applicable.

**PART 3 - EXECUTION**

**3.1 DISCONNECT LOCATIONS**

- A. Install disconnects in the same relative location as the equipment being served unless that location is difficult to access or is in an unsuitable environment. Discrete disconnect switches of similar size may be grouped in a central location. If mounted directly to equipment, ensure that disconnect switch location does not interfere with maintenance access. Do not cover up equipment nameplates. See drawings for suggested locations.

**3.2 SUPPORT**

- A. Secure disconnect switches to building structure, equipment unit or approved mounting frame. Support by conduit system only is not acceptable.

**3.3 SPLICES**

- A. Wiring space within disconnect switches shall not be used for splicing; provide suitable wire gutters or junction boxes for this purpose.

**END OF SECTION**

**SECTION 265000 - LIGHTING FIXTURES**

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**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide all light fixtures for complete installation.
- B. Provide the lighting system complete and operational.

**PART 2 - PRODUCTS**

**2.1 SUBSTITUTES**

- A. Provide light fixtures per lighting fixture schedule. No substitutions are allowed.

**2.2 FLUORESCENT INTERIOR LIGHTING**

- A. Ballasts for Linear Fluorescent Lamps: Comply with UL 935 and with ANSI C82.11. Ballasts shall be designed for full light output unless another BF, dimmer, or bi-level control is indicated.
- B. Luminaires controlled by occupancy sensors shall have programmed-start ballasts.
- C. Electronic Programmed-Start Ballasts for T8 and T5HO lamps shall comply with ANSI C82.11 and the following:
  - 1. Lamp end-of-life detection and shutdown circuit for T5 diameter lamps.
  - 2. Automatic lamp starting after lamp replacement
- D. Electromagnetic ballasts shall be energy saving, high-power factor, Class P, and have automatic-reset thermal protection.
- E. Ballasts for dimmer-controlled luminaires shall be the electronic type. Dimming range shall be 100 to 5 percent of rated lamp lumens. Shall be certified by manufacturer for use with specific dimming control system and lamp type indicated. Coordinate wiring from ballast to control device to ensure that ballast, controller, and connecting wiring are compatible.
- F. Ballast for Bi-Level controlled luminaires shall be the electronic type. Ballast circuit and leads provide for remote control of the light output of the associated lamp between high and low-level operation and off. High-Level operation shall be 100 percent of rated lamp lumens and the Low-Level operation shall be 30 percent of rated lamp lumens. Ballast shall provide equal current to each lamp in each operating mode. Certified by manufacturer for use with specific bi-level control system and lamp type indicated.
- G. Ballast for Compact Fluorescent Lamps: Electronic-programmed rapid start type, complying with UL 935 and with ANSI C82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated.
- H. Fluorescent Lamps:

**SECTION 265000 - LIGHTING FIXTURES**

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1. T8 rapid-start lamps, rated 32-W maximum, nominal length of 48 inches, 2800 initial lumens (minimum), CRI of 75 (minimum), color temperature of 3500 K, and average rated life of 20,000 hours unless otherwise noted.
2. T5HO rapid-start, high-output lamps, rated 54-W maximum, nominal length of 45.2 inches, 5000 initial lumens (minimum), CRI of 85 (minimum), color temperature of 4100 K, and average rated life of 20,000 hours unless otherwise indicated.
3. Compact Fluorescent lamps: Four-pin, CRI of 80 (minimum), color temperature of 3500 K, average rated life of 10,000 hours at three hours of operation per start and suitable for use with dimming ballasts unless otherwise indicated.
  - a. 26 W: T4, double or triple tube, rated 1800 initial lumens (minimum).

**2.3 LED INTERIOR LIGHTING**

- A. Recessed fixtures shall comply with NEMA LE 4, bulb shape complying with ANSI C79.1 and lamp base complying with ANSI C81.61 or IEC 60061-1.
- B. Lamps dimmable from 100 percent to 0 percent of maximum light output.
- C. Housing shall be extruded-aluminum and heat sink.
- D. CRI of minimum 70 and CCT of 3000K.

**2.4 LED EXTERIOR LIGHTING**

- A. Comply with UL 1598 and listed for wet location.
- B. Lamp base complying with ANSI C81.61 or IEC 60061-1. Bulb shape complying with ANSI C79.1.
- C. CRI of minimum 70 and CCT of 3000K.
- D. Provide with internal driver.
- E. Lamp marked for outdoor use.

**2.5 HID EXTERIOR LIGHTING**

- A. Comply with UL compliance for wet location listed.
- B. Comply with IES RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- C. Lamp base complying with ANSI C81.61 or IEC 60061-1.
- D. EMI Filters: Factory installed to suppress conducted EMI as required by MIL-STD-461E. Fabricate luminaires with one filter on each ballast indicated to require a filter.
- E. Lamp marked for outdoor use.

**SECTION 265000 - LIGHTING FIXTURES**

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**PART 3 - EXECUTION**

**3.1 LIGHTING FIXTURES, GENERAL**

- A. Verify weight and mounting method of all fixtures and provide suitable supports. Fixture mounting assemblies shall comply with all local seismic codes and regulations.
- B. Refer to Architectural reflected ceiling plans for coordination of lighting fixture locations with mechanical and fire safety equipment. Where conflicts occur, coordinate with Architect prior to installing systems.
- C. Install fixtures with vent holes free of air blocking obstacles.
- D. Lighting fixtures located in recessed ceilings with a fire resistive rating of one hour or more shall be enclosed in an approved fire resistive rated box equal to that of the ceiling.
- E. Adjust aperture rings on all recessed fixtures to be flush with the finished ceiling.
- F. For fluorescent lamps operated on dimming ballasts, operate lamps at full output for 100 hours (continuous burn) before dimming.
- G. Adjust variable position lampholders for proper lamp position prior to fixture installation.
- H. Blemished, damaged or unsatisfactory fixtures or accessories shall be replaced.
- I. For pendant mounted fixtures, mounting height is from finished ceiling to top of pendant light fixture. For wall mounted fixtures, center on outlet box unless otherwise noted.
- J. In accessible suspended ceilings, provide 72" flexible conduit wiring connection (flexible tubing not permitted) from a rigidly supported junction box.
- K. All finishes shall be unmarred upon project completion. All damaged finishes repaired or replaced.
- L. Replace all burned out or inoperative lamps at the end of the construction prior to Owner occupancy.

**3.2 DIFFUSERS AND ENCLOSURES**

- A. Remove protective plastic covers from lighting fixture diffusers only after construction work, painting and clean up are completed. Remove all dirty lamps, reflectors and diffusers; clean and reinstall. When cleaning "Alzak" reflectors, use a manufacturer recommended cleaning solution. Reflectors damaged or soiled with fingerprints shall be replaced at the contractor's expense.

**3.3 ADJUSTMENT OF LIGHT FIXTURES**

- A. Focus all adjustable light fixtures under the direction of the Lighting Designer during a scheduled period of time prior to the completion of the project, after hours if required. Include in the base bid all equipment and personnel expenses (including overtime) required for adjustment.

**SECTION 265000 - LIGHTING FIXTURES**

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**3.4 SUPPORT OF COMPACT FLUORESCENT AND LED LIGHT FIXTURES**

- A. Surface or Pendant Type: Attach heavy formed steel straps to the outlet box by means of threaded stems with locknuts, or directly to the outlet box where the light fixture is specifically so designed.
- B. Recessed Type: Mount in frames suitable for the ceiling, with recessed portion of the fixture securely supported from the ceiling framing. Bottom of light fixture to be flush with adjacent ceiling. Fixture trim shall totally conceal ceiling opening. Provide two #14 earthquake chains or #12 wires when fixture is supported by ceiling suspension system.

**3.5 SUPPORT OF FLUORESCENT AND LED LIGHT FIXTURES**

- A. Recessed Type: For light fixtures supported by the ceiling suspension system, provide four Caddy #515 supports clips (one each corner) which lock light fixture to ceiling tees after light fixture is installed. In addition, provide for each light fixture two (#14 earthquake chains or #12 wires secured at diagonally opposite fixture corners (for fixtures weighing less than 56 pounds) to structural members above suspended ceiling. For plaster or GWB ceilings, provide plaster frame compatible with light fixture. Contractor shall coordinate fixture trim with ceiling type.
- B. Surface Mounted Type: Where mounted on accessible ceilings, support from structural members above ceiling by means of hanger rods through ceiling or as approved.
- C. Continuous Runs of Fixtures: Laser sight to ensure fixtures are straight when sighting from end to end, regardless of irregularities in the ceiling. Where light fixtures are so installed, omit ornamental ends between sections.
- D. Pendant Mounted Type: For fixtures with rigid pendants, supply swivel ball aligners at canopy to comply with local seismic requirements. Contractor shall provide safety chain in addition to swivel ball aligners.
- E. Where suspended from accessible ceiling, support fixture from structural members above ceiling by means of hanger rods through ceiling or as approved.

**3.6 SUPPORT OF HIGH INTENSITY DISCHARGE FIXTURES**

- A. As specified for incandescent light fixtures, except provide access as required for ballast. Provide earthquake chains when light fixture is supported by the ceiling suspension system. For remote ballasts, isolate ballasts from structure.

**3.7 CEILING LIGHT FIXTURE SUPPORT**

- A. Where ceiling is of insufficient strength to support weight of lighting fixture(s) installed, provide additional framing to support as required.

**END OF SECTION**