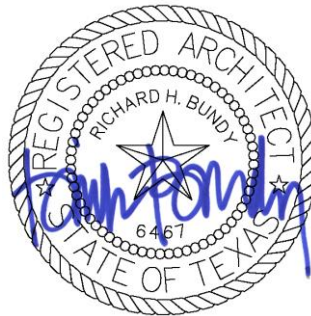


PROJECT MANUAL WITH SPECIFICATIONS
OF THE CONTRACT DOCUMENTS
FOR THE:

**DANIEL BUILDING RENOVATION
J.S. Bridwell Activities Center
& Cannedy Greek Commons**

FOR

Midwestern State University
Wichita Falls, Texas
MSU RFP #735-20-8225



August 24, 2020

**A MANDATORY PRE-BID MEETING WILL BE
HELD ON SEPTEMBER 17, 2020 AT 10:00AM AT
THE DILLARD BUILDING, ROOM 389.**

BYSP PROJECT NO. 18071

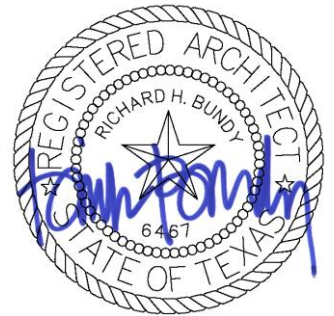
SET NO. _____

August 24, 2020

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DANIEL BUILDING RENOVATION
**J.S. Bridwell Activities Center
& Cannedy Greek Commons**

FOR:
Midwestern State University
Wichita Falls, Texas



August 24, 2020

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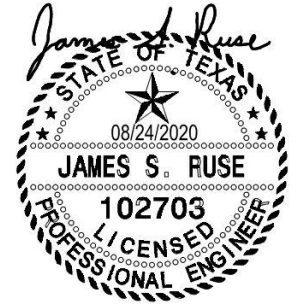
**J.S. Bridwell Activities Center
& Cannedy Greek Commons**



FOR:

Midwestern State University
Wichita Falls, Texas

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Midwestern State University

Purchasing & Contract Management Department
3410 Taft Blvd., Daniel Bldg., Room 200
Wichita Falls, TX 76308



Request for Proposal

Competitive Sealed Proposals for

Bridwell Activities Center Renovation Project

RFP 735-20-8225

September 1, 2020

Anticipated Schedule of Events

September 1, 2020	Issuance of RFP
September 17, 2020 (10:00 am CT)	Mandatory Pre-Bid Meeting
September 24, 2020 (12:00 pm CT)	Deadline for Submission of Questions
September 25, 2020 (5:00 pm CT)	Release of Official Responses to Questions (or as soon thereafter as practical)
October 1, 2020 (2:00 pm CT)	Deadline for Submission of Offers
November 1, 2020	Services Commencement Date (or as soon thereafter as practical)

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Section 1
Summary

- 1.1 Type of Solicitation: Request for Proposal
- 1.2 Issuing Office: Midwestern State University
Purchasing & Contract Management Department
3410 Taft Blvd., Daniel Bldg., Room 200
Wichita Falls, TX 76308
- 1.3 Responses to RFP: Competitive Sealed Proposals
- 1.4 Anticipated Schedule of Events:**
- Issuance of RFP:** September 1, 2020
- Pre-Bid Meeting (Mandatory):** September 17, 2020 (10:00 am CT)
@ Midwestern State University
Dillard Building (Room 329)
- Deadline for Submission of Questions:** September 24, 2020 (12:00 pm CT)
- Deadline for Response to Questions:** September 25, 2020 (5:00 pm CT)
or soon as possible thereafter as practical
- Deadline for Offers:** In issuing office no later than:
October 1, 2020 (2:00 pm CT)
- 1.5 Initial Contract Term: November 1, 2020 to August 15, 2021
- 1.6 Optional Contract Terms: ~~The anticipated term of any resulting agreement will begin on the date an agreement is executed, and expire on August 31, 2019. MSU will have the option of two (2) additional one (1) year renewal periods.~~
- 1.7 Contact Person for this RFP: Tracy Nichols
tracy.nichols@msutexas.edu
- 1.8 Offers Submitted:
- By mail or hand delivery: Accepted
- By email: Not Accepted
- By fax: Not Accepted
- 1.9 RFP Addenda: Notice of changes to items directly affecting the original RFP or offer process will be posted on the Electronic State Business Daily (ESBD) located at: <http://esbd.cpa.state.tx.us> and the MSU Purchasing webpages located at: <http://www.msutexas.edu/purchasing>
Amendments to the solicitation will be posted as RFP an addendum. It is the responsibility of an interested party to check periodically the ESBD and/or MSU Purchasing webpage for updates to the RFP prior to submitting an offer. Each respondent is solely responsible for verifying receipt Addendum, if applicable, and offer by the deadlines specified.
- 1.10 Questions & Responses: Questions regarding this RFP must be in writing and must be submitted to contact person for this RFP noted in Section 1.7.

Telephone inquiries will not be accepted. MSU intends to post responses to the questions received in the form of an addendum on the MSU Purchasing web site @ <http://msutexas.edu/purchasing/>. Each bidder is solely responsible for verifying receipt addendum, if applicable, and offer by the deadlines specified.

1.11 Bidder Presentations:

Presentations/interviews are an option of the evaluation team and may or may not be conducted; therefore, proposals should be complete when submitted by the deadline indicated in the Part 5. The presentation will be conducted at a location, date and time to be arranged. MSU will determine the number of top-scoring respondents in its sole discretion.

1.12 Contact with MSU Staff:

Upon issuance of this RFP, employees and representatives of MSU, other than the MSU contact person identified in Section 1.7, will not discuss the contents of the RFP with any bidder or its representatives. **Failure of a bidder or any of its representatives may result in disqualification of any related offer.** This restriction does not preclude discussions between affected parties for the purpose of conducting business unrelated to this procurement.

1.13 Additional Requirements/Qualifications: N/A

1.14 Evaluation of Offer under Best Value Standard (Texas Government Code §2157.003):

The proposal analysis will include:

Criteria	Weight
Respondent's Past Performance, Qualifications & Experience, References, Delivery Time	15%
Compliance with MSU Specifications	10%
Cost	75%
Total:	100%

The factors listed in Texas Government Code §215.074, 2156.007 & 2157 shall also be considered in making an award when specified.

Section 2 General Information

2.1 Introduction

Midwestern State University seeks proposals from qualified vendors for **Competitive Sealed Proposals for Bridwell Activities Center Renovation Project**. Services are specifically described in Section 6 (Specifications/Scope of Work).

2.2 General Terms & Conditions

These General Terms and Conditions apply to all offers made to Midwestern State University (herein after referred to as "University") by all prospective vendors (herein after referred to as "Bidders") on behalf of Solicitations including, but not limited to, Invitations to Bid and Request for Proposals.

Section 3
Notice to Bidders
PLEASE NOTE CAREFULLY

Review this document in its entirety. Be sure your proposal is complete, and double-check your proposal for accuracy.

THIS IS THE ONLY APPROVED INSTRUCTION FOR THIS PROPOSAL. ITEMS BELOW APPLY TO AND BECOME PART OF TERMS AND CONDITIONS OF PROPOSAL. ANY EXCEPTIONS THERETO MUST BE IN WRITING.

PROPOSALS SUBMITTED AFTER THE SUBMISSION DEADLINE SHALL BE RETURNED UNOPENED AND WILL BE CONSIDERED VOID AND UNACCEPTABLE.

This is a Quotation inquiry only and implies no obligation on the part of the University. All costs quotations must include all the various features needed to satisfy the requirements. Note: No amounts will be paid for the items in this PROPOSAL in excess of the amounts quoted.

The contractor agrees to protect the University from claims involving infringement of patents or copyrights.

3.1. Clarification of Instructions or Specifications

Questions requiring only clarification of instructions or specifications will be handled through the email process. **Telephone inquiries will not be accepted.** If any questions result in a change or addition to this Proposal, the change(s) and addition(s) will be addressed to all vendors involved as quickly as possible in the form of an addendum. It is the responsibility of the bidder to view the posting on the MSU purchasing web page located at <http://mwsu.edu/purchasing/>. Written inquires pertaining to proposals must give Proposal Number. Oral or other written interpretations or clarifications shall be without legal effect.

3.2. Group Purchasing Procurement

Texas law authorizes institutions of higher education (defined by Texas Education Code §61.003) to use the group purchasing procurement method (Texas Education Code §51.9335, 73.115, and 74.008). Additional Texas institutions of higher education may therefore elect to enter into a contract with the successful Bidder under this RFP.

3.3 Availability of Funds

Award of this proposal will be contingent on availability of Midwestern State University funds.

3.4 Non-Bid Solicitations

Phone calls/emails from vendors using this bid in an attempt to make a sales call (which circumvents the bid process) will not receive a response.

Section 4
Proposal Submission Procedures

4.1 Proposal Submission

Each proposal shall be properly identified with the name and number of proposal and name of bidder submitting proposal. Proposals must be in the MSU Purchasing Office **BEFORE** the hour and date specified in accordance with Section 1.8. Submitted proposals will be date/time stamped upon receipt.

One (1) original individually bound completed proposal and one (1) electronic version (USB Drive) are required if submissions are to be mailed or hand delivered. See Section 1.8 for acceptable submission requirements.

Mailed or hand delivered submissions must be received **in** the issuing office noted in Section 1.2 before the scheduled deadline for submissions. Submissions received after the deadline will not be accepted. This includes submissions using overnight or next day mailing services that do not arrive in the issuing office by the scheduled deadline for submission.

BIDDERS SHALL SUBMIT PROPOSAL ON THE FORM PROVIDED, SIGN THE VENDOR AFFIDAVIT NOTICE, BIDDER'S CHECKLIST AND RETURN ENTIRE PROPOSAL PACKET. In the event of inclement weather and the University Offices are officially closed on a proposal opening day, proposals will be received until 2:00 p.m. of the next business day. At which time said proposals will be privately opened.

Proposals MUST give full firm name and address of the bidder. Failure to manually sign proposal will result in disqualification. Person signing proposal should show TITLE or AUTHORITY TO BIND HIS FIRM IN A CONTRACT.

References shall be included. Three current customers with a comparable purchase shall be listed with complete name, address, telephone number and contact person.

Any catalog, brand name or manufacturer's reference used in a proposal invitation is descriptive-NOT restrictive-it is to indicate type and quality desired unless otherwise indicated. Proposals on brand of like nature and quality may be considered. If proposal is based on other than referenced specifications, proposal must show manufacturer, brand or trade name, lot number, etc., of article offered. If other than brand(s) specified is offered, illustrations and complete description should be made part of the proposal. If bidder takes no exception to specifications or reference data, he will be required to furnish brand names, numbers, etc., as specified.

4.2 Freight Terms

QUOTE F.O.B. DESTINATION. If otherwise, show exact cost to deliver. Proposal unit price on quantity specified – extend and show total. In case of errors in extension, UNIT prices shall govern. Proposals subject to unlimited price increase will not be considered.

4.3 Altered/Amended Proposals

Proposals CANNOT be altered or amended after opening time. Any alterations made before opening time must be initialed by bidder or his/her authorized agent. No proposal can be withdrawn after opening without the approval by the Vice-President of Administration & Finance based on a written acceptable reason.

4.4 State Sales Tax

The University is exempt from State Sales Tax and Federal Excise Tax. **DO NOT INCLUDE TAX IN PROPOSAL.**

4.5 Samples

Samples, when requested, must be furnished free of expense to the University. If not destroyed in examination, they will be returned to the bidder on request, at his/her expense. Each sample should be marked with bidder's name, address, and University proposal number. **DO NOT ENCLOSE OR ATTACH SAMPLE TO PROPOSAL.**

4.6 Condition of Items

All items proposed shall be new, in first class condition suitable for shipment and storage (the University prefers recycled packaging whenever possible), unless otherwise indicated in proposal. Verbal agreements to the University will not be recognized. All materials and services shall be subject to Purchaser's approval. Unsatisfactory materials will be returned at Seller's expense.

4.7 Right to Reject

The University reserves the right to accept or reject all or any part of any proposal, waive minor technicalities and award to the Bidder that proposals to the Best Value to the University. The University reserves the right to award by item or by total proposal. Prices should be itemized.

All proposals meeting the intent of this request for proposal will be considered for award. Bidders taking exception to the specifications, or offering substitutions, shall state these exceptions by attachment as part of the proposal. The absence of such a list shall indicate that the bidder has not taken exception and shall hold the bidder responsible to perform in strict accordance with the specifications of the invitation. The University reserves the right to accept any and all or none of the exception(s)/substitution(s) deemed to be in the best interest of the University.

4.8 Delivery

Proposal must show number of days required to make delivery to place material in receiving agency's designated location under normal conditions. Failure to state delivery time obligates bidder to complete delivery in 14 calendar days. A five-day difference in delivery promise may break a tie. Unrealistically short or long delivery promises may cause proposal to be disregarded. Consistent failure to meet delivery promises without valid reason may cause removal from bidder list. Delivery shall be made during normal working hours only, 8:00 a.m. to 5:00 p.m., unless prior approval for late delivery has been obtained from the Director of Purchasing.

If delay is foreseen, contractor shall give written notice to Director of Purchasing. The University has the right to extend delivery date if reasons appear valid. Contractor must keep University advised at all times of status of order. Default in promised delivery (without accepted reasons) or failure to meet specifications, authorizes the University to purchase supplies elsewhere and charge full increase in cost and handling to defaulting contractor.

Consistent and continued tie bidding could cause rejection of proposals by the University and/or investigation for Anti-Trust violations.

4.9 Variation in Quantity

The University assumes no liability for commodities produced, processed or shipped in excess of the amount specified herein.

4.10 Bid Deposit

Bid Deposit - A deposit required with submitted proposals from bidders to protect the State in the event a low bidder attempts to withdraw its bid or otherwise fails to enter into a contract with the State. A Bid Deposit of five percent (5%) will be required if your bid is \$25,000 or above.

4.11 Accessibility & Section 508 Compliance

Bidders are required to supply detailed information on how their proposed products, services and solutions address the requirements of Section 508 of the Rehabilitation Act of 1973 (revised)(if applicable). For each Information Communication Technology recourse (ICT) product or service included in solicitation responses subject to Texas Administrative Code 1 TAC 206 & 1 TAC 213 (which includes the U.S. Section 508 technical specifications), the Vendor shall provide documentation of how each requirements or specification is met.

It is the Bidder's responsibility to maintain the integrity of any accessibility documentation provided to the University. Any documentation shall be considered a self-attestation unless expressly affirmed otherwise.

If the bidder plans to provide commercial off the shelf (COTS) software as part or all of a solicitation response, the bidder shall provide a completed Voluntary Product Accessibility Template (VPAT) for each COTS product offered. For third party COTS products, the bidder must obtain and submit VPATS or links to them from the third party as part of the solicitation response. The VPAT template can be obtained at ITI's website:

<https://www.itic.org/dotAsset/db71ce67-c44a-4925-8d46-f8a76c3a1db2.doc>

The VPAT consists of a long series of tables. The initial one, the Summary Table, is used to provide a sense of your product's overall "level of compliance" with Texas Administrative Codes ITAC 206 & ITAC 213 Accessibility Requirements. Subsequently, the Section 1194.xx Tables contain the detailed subparagraphs the Section 508 requirements are comprised. It is within these tables you shall define in detail how your product did or did not comply with a specific requirement.

Section 5 **Award/Post Award**

5.1 Award

A written purchase order or notice of award mailed or otherwise furnished to the successful bidder within the time of acceptance specified in this package results in a binding contract without further action by either party.

No substitutions or cancellations permitted without written approval of Director of Purchasing.

SUCCESSFUL VENDOR WILL BE NOTIFIED BY EMAIL OR MAIL. All responding vendors will receive written notification regarding the outcome of the award.

5.2 Public Information

Bidders are hereby notified that the University strictly adheres to all statutes, court decisions and the opinions of the Texas Attorney General with respect to disclosure of public information.

The University may seek to protect from disclosure all information submitted in response to this RFP until such time a final agreement is executed

Upon execution of a final agreement, the University will consider all information, documentation, and other materials requested to be submitted in response to this RFP, to be of a non-confidential and non-proprietary nature and, therefore, subject to public disclosure under the Texas Public Information Act (Texas Government Code, Chapter 552.001, et seq.). Bidders will be advised of a request for public information that implicates their materials and will have the opportunity to raise any objections to disclosure to the Texas Attorney General. Certain information may be protected from release under Texas Government Code § 552.101, 552.110, 552.113, and 552.131, Government Code.

5.3 Invoicing

Bidder shall submit two (2) copies of an itemized invoice showing proposal number and purchase order number to:

Midwestern State University
ATTN: Accounts Payable
3410 Taft Blvd.
Wichita Falls, TX. 76308

5.4 Payments

The University, after receipt of completed order will make payment to the contractor within 30 days from the receipt of goods or invoice whichever is later in accordance with Texas Government Code §2251.021. All partial shipment must be pre-approved by the Director of Purchasing. In the event of partial shipments, the University is not required to make payments until the order is complete. Acceptance of and final payment for the item will be contingent upon satisfactory performance of the product received by the University.

5.5 Discrimination

In order to comply with the provisions of fair employment practices, the contractor agrees as follows:

- 1.) The contractor will not discriminate against any employee or applicant for employment because of race, sex, religion, handicap, or national origin.

2.) in all solicitations or advertisements for employees, the contactor will state that all qualified applicants will receive consideration without regard to race, color, age, sex (including pregnancy, gender identity and sexual orientation), religion, disability, genetic information, veteran status, or national origin, or any other legally protected category, class, or characteristic;

3.) The contractor will furnish such relevant information and reports as request by the University for the purpose of determining compliance with these regulations; and

4.) Failure of the contractor to comply with these laws will be deemed a breach of contract and it may be cancelled, terminated or suspended in whole or in part.

5.6 Assignment

Any contract entered into pursuant to this request is not assignable, nor the duties thereunder, by either party without the written consent of the other party in the contract.

5.7 Other Remedies

In addition to the remedies stated herein, the University has the right to pursue other remedies permitted by law or in equity.

5.8 E-Verify

Bidders certifies that for contract for services, bidders shall utilize the U.S. Department of Homeland Security E-Verify system during the term of the contract to determine the eligibility of:

- All persons employed by bidders to perform duties within Texas; and
- All persons, including subcontractors, assigned by bidders to perform work pursuant the contract within the United States.

5.9 Bonds

Payment Bond - A deposit, pledge, or contract of guaranty supplied by a contractor to protect the State against loss due to the contractor's failure to pay subcontractors and material suppliers. If awarded the project a Payment Bond will be required if your bid is \$25,000 or above.

Performance Bond - A deposit, pledge, or contract of guaranty supplied by a contractor to protect the State against loss due to the contractor's inability to complete the contract as agreed. If awarded the project a Performance Bond is required for bids of \$100,000 or above.

5.10 HUB Subcontracting Plan

A HUB Subcontracting Plan ("HSP") is required as part of bidder's proposal if your proposal is \$100,000 or above. Each bidder must complete and return the HSP in accordance with the terms and conditions of this RFP. HSP can be found at the below listed link:

<http://www.window.state.tx.us/procurement/prog/hub/hub-subcontracting-plan/>

Bidders that fail to do so will be considered non-responsive to this RFP in accordance with Texas Government Code §2161.252. The University has reviewed this RFP in accordance with Title 34, Texas Administrative Code, §20.13 (a), and has determined that subcontracting opportunities are probable under this RFP.

5.11 Ethics Commission Reporting

The University is required under Texas Legislature House Bill 1295 (Texas Government Code §2252.908) to request Ethics Commission Reporting from contractors with agreements that has a value of at least \$1 million (value of an agreement is based on the amount of consideration received or to be received by the contractor from the University).

The Business Entity must file Form 1295 electronically with the Texas Ethics Commission using the online filing application: https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

5.12 (N/A)**5.13 Contract Management**

Contract management is the process of directing contract planning, formation, execution, and assessment through closeout to maximize financial and operational performance and minimize risk.

The University shall comply with Texas Government Code § 2261.256 & Midwestern State University Policy 2.24 the University regarding contract management

This contract shall remain in effect until completion and acceptance by the University. Midwestern State University reserves the right to enforce the performance of this contract in any manner prescribed by law or deemed to be in the best interest of the University in the event of breach or default if this contract. The University reserves the right to terminate the contract immediately in the event the successful bidder fails to make delivery in accordance with the specifications.

**Section 6
Specifications/Scope of Work**

It is the intent of these specifications to describe the minimum requirements for the above titled project at Midwestern State University in sufficient detail to secure comparable proposals.

Each bidder must confirm he/she fully understands these specifications and the University's needs and satisfies himself/herself that he/she is cognizant of all factors relating to requirements contained in these specifications.

The proposal analysis will include compliance to proposal specifications, past performance with vendor, references, delivery time and overall cost. Weighted averages are calculated as noted in Section 1.14. The University reserves the right to consider deviations from these specifications.

Please note the following:

- Specifications and drawings at the below Link under current proposal opportunities listed under the RFP number: <http://msutexas.edu/purchasing/>
- Supply schedule and lead time for project with proposal.
- Supply an insurance certificate with your Proposal.
- Supply a W-9 with your Proposal if new to Midwestern State University.
- 2010 Uniform General Conditions apply to this Proposal and can be found at the below listed link:
- <http://msutexas.edu/purchasing/contract-management>

6.1 Specifications & Scope of Work

Refer to the specifications in this Project Manual for detailed definition of the scope of work of the project.

6.2 Proposal Sheet/Pricing Schedule

Provide pricing based on the information in Section 6.1 preferably in the following format:

Base Proposal:	
Additive Alternate #1 Price: (Greek Courtyards)	
Additive Alternate #2 Price: (Finish-out NE Quadrant)	
Construction Time:	
Additional Notes:	

Vendor Name:	
Contact Name:	
Title:	
Street Address:	
City, State, Zip Code	
Phone Number:	
Contact E-Mail:	
*Signature of Authorized Representative:	

*Proposals must be signed by the responding company's official authorized to commit such proposals. Failure to sign the Proposal Sheet/Pricing Schedule will be basis for proposal disqualification.

Appendix A
BIDDER'S CHECKLIST
SUBMITTAL

Vendor Name:	
Contact Name:	
Title:	
Street Address:	
City, State, Zip Code	
Phone Number:	
Contact E-Mail:	
*Initials of Authorized Representative:	

Due Date: October 1, 2020

Request Number: RFP 735-20-8225

Check-off

1. ___ Response to Solicitation
2. ___ *Completed Proposal Sheet/Pricing Schedule (ref Section 6.2)
3. ___ Signed and Completed HUB Subcontracting Plan (if necessary)
4. ___ Voluntary Product Accessibility Template (VPAT) (if necessary)
6. ___ Signed and Completed Bidder's Checklist (ref Appendix A)
7. ___ Completed References (ref Appendix B)
8. ___ Signed and Completed Affidavit (ref Appendix C)
9. ___ Completed and initialed Addenda Checklist (ref Appendix D)
10. ___ Bid Deposit (if necessary)
11. ___ Certificate of Liability Insurance
12. ___ Completed & Signed W9

*Proposals must be signed by the responding company's official authorized to commit such proposals. Failure to sign the Execution of Offer will be basis for proposal disqualification.

Deliver Proposal to:

Midwestern State University
Purchasing & Contract Management Department
3410 Taft Blvd., Daniel Bldg., Room 200
Wichita Falls, TX 76308
Appendix B

VENDOR REFERENCES

Please list three (3) references of current customers who can verify the quality of service your company provides. The University prefers customers of similar size and scope of work to this proposal. **THIS FORM MUST BE RETURNED WITH YOUR PROPOSAL.**

REFERENCE ONE

Government/Company Name _____

Address: _____

Contact Person and Title: _____

Phone: _____ Fax: _____

Contract Period: _____ Scope of Work: _____

REFERENCE TWO

Government/Company Name _____

Address: _____

Contact Person and Title: _____

Phone: _____ Fax: _____

Contract Period: _____ Scope of Work: _____

REFERENCE THREE

Government/Company Name _____

Address: _____

Contact Person and Title: _____

Phone: _____ Fax: _____

Contract Period: _____ Scope of Work: _____

Appendix C
AFFIDAVIT

The undersigned certifies that the bid prices contained in this proposal have been carefully checked and are submitted as correct and final and if bid is accepted (within 90 days unless otherwise noted by vendor), agrees to furnish any and/or all items upon which prices are offered, at the price(s) and upon the conditions contained in the Specifications.

STATE OF _____

COUNTY OF _____

BEFORE ME, the undersigned authority, a Notary Public in and for the State of _____,

on this day personally appeared _____

who, after having first been duly sworn, upon oath did depose and say;

That the foregoing proposal submitted by _____ hereinafter called "Bidder" is the duly authorized agent of said company and that the person signing said proposal has been duly authorized to execute the same. Bidder affirms that they are duly authorized to execute this contract, that this company, corporation, firm, partnership or individual has not prepared this bid in collusion with any other Bidder, and that the contents of this bid as to prices, terms or conditions of said bid have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this bid.

Name and Address of Bidder:

Telephone: _____

Email: _____

Signature: _____

Name: _____

Title: _____

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ day of _____,
20 _____.

Notary Public in and for the State of _____.

Appendix D
ADDENDA CHECKLIST

Proposal of: _____
(Bidder's Company Name)

To: Midwestern State University

The undersigned bidder hereby acknowledges receipt of the following Addenda to the captioned RFP (initial if applicable).

No. 1 _____ No. 2 _____ No. 3 _____ No. 4 _____ No. 5 _____

Contact Name:	
Title:	
*Initials of Authorized Representative:	

CERTIFICATE OF INSURANCE FORM

For the DANIEL BUILDING RENOVATION at Midwestern State University, Wichita Falls, Wichita County, Texas

Name of Insured Contractor and address with zip code.

Area Code and Phone Number

Insurance requirements - The Contractor shall purchase and maintain insurance that will protect him from claims that may arise out of or result from his activities under this Contract, whether those activities are performed by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable.

The Contractor shall not commence work until he has obtained the minimum Insurance required below and such Insurance has been approved by the Owner. This approval shall not relieve or decrease the Contractor's liability. The Insurance shall be kept in force until the work is completed and accepted by the Owner. Changes in the Insurance policies shall not be made until Thirty (30) DAYS AFTER written notices have been delivered to the General Contractor and the Owner.

Liability Insurance shall include all major divisions of coverage and be on a comprehensive basis.

- 1. Premises Operations
2. Independent Contractor's Protective
3. Products and Completed Operations
4. Personal Injury Liability with Employment Exclusion deleted.
5. Contractual - Including specified provision for Contractor's obligation under paragraph 4.18 of the General Conditions of the Contract for Construction.
6. Owned, non-owned, and hired motor vehicles.
7. Broad Form Property Damage including Completed operations
8. Umbrella Excess
9. Statutory Workman's Compensation.

The insurance required shall be written for not less than the following, or greater if required by law and the insurance company shall be authorized to do business in the State of Texas and appear on an approved list of the United States Treasury.

- 1. Workers' Compensation
(a) State Statutory
(b) Applicable Federal Statutory
(c) Employer's Liability \$1,000,000.00 or
(1) Each Accident \$ 500,000.00
(2) Disease - Policy Limit \$ 500,000.00
(3) Disease - Each Employee \$ 500,000.00
(Waive rights of subrogation against owner)
2. Comprehensive General Liability (including Broad Form Comprehensive General Liability On occurrence basis):
(a) General Aggregate \$2,000,000.00
(Other than products and completed operations)
(b) Products Completed Operations Aggregate \$2,000,000.00
(c) Personal Injury Limit \$1,000,000.00

- (1) Each Occurrence \$1,000,000.00
 - (2) Fire Damage \$ 50,000.00
 - (3) Medical Payments \$ 5,000.00
- (Waive rights of subrogation and show Owner as additional insured)

- 3. Comprehensive Automobile Liability:
 - Bodily Injury & Property Damage
 - \$500,000.00 COMBINED SINGLE LIMIT

Coverage to include owned, hired and non-owned automobiles.

- 4. Excess Liability (Umbrella) each occurrence \$1,000,000.00
- Builder's Risk Insurance
- (All Risk Form) with Owner named as additionally insured.

Completed Value (Equal at all times to insurance value of material delivered, stored in bonded warehouses, & labor performed).

The above designated limits of coverage are minimum requirements of insurance.

PROPERTY INSURANCE

The Contractor shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. Such insurance shall be in a company or companies against which the Owner has no reasonable objection. This insurance shall include the interests of the Owner, the Contractor, subcontractors, and sub--subcontractors in the Work and shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism, and malicious mischief. If not covered under all risk insurance or otherwise provided in the Contract Documents, the Contractor shall effect and maintain similar property insurance on portions of the Work stored off the site or in transit when such portions of the Work are to be included in an Application for Payment.

The form of policy for this coverage shall be completed value to be purchased and paid for by the Contractor.

If by the terms of this insurance any mandatory deductibles are required, or if the Contractor should elect to increase the mandatory deductible amounts or purchase this insurance with voluntary deductible amounts, the Contractor shall be responsible for payment of the amount of the deductible in the event of a paid claim.

The Contractor shall file two certified copies of all policies with the Owner before exposure to loss can occur. If the Owner is damaged by the failure of the Contractor to maintain such insurance and to so notify the Owner, then the Contractor shall bear all reasonable costs properly attributable thereto.

**AGREEMENT BETWEEN
MIDWESTERN STATE UNIVERSITY
AND
Vendor**

CONTRACT NO. RFP 735-20-8225

This Agreement made the _____ day of _____ in the year 2020, by and between _____, located at _____, hereinafter called the Contractor, and the Board of Regents of Midwestern State University, hereinafter called the Owner,

WITNESSETH, that the Contractor and the Owner for the consideration hereinafter named agree as follows:

ARTICLE 1. SCOPE OF WORK: The Contractor shall furnish all of the materials and perform all of the work shown on the drawings and described in the specifications for the project entitled, the DANIEL BUILDING RENOVATION. These drawings and specifications prepared for Midwestern State University by BYSParchitects, acting as and in these Contract Documents entitled the Project Architect. The Contractor shall do everything required by this Agreement, the General and Supplemental Conditions of the Contract, the Special Conditions, the Addenda, the Specifications, the Drawings, the Historically Underutilized Business (HUB) Subcontracting Plan, and the Proposal attached as **Exhibit 1** (including any unit prices stated therein).

The Specifications and Drawings are enumerated as follows:

SPECIFICATIONS: See attached as **Exhibit 2**.

DRAWINGS: See attached as **Exhibit 2**.

ADDENDA: See attached as **Exhibit 2**.

ALTERNATES: The following Alternate Proposals, fully described in the Specifications, are included as a part of this Contract.

ARTICLE 2. TIME OF COMPLETION: The Owner shall provide a Notice to Proceed in which a date for commencement of the work shall be stated; such commencement date shall be 10 or more days after the date of the notice. The Contractor shall achieve substantial completion of the work by September 1, 2021. Completion date may be extended by approved Change Orders. The time set forth for completion of the work is an essential element of the Contract.

ARTICLE 3. THE CONTRACT SUM: The Owner shall pay the Contractor for performance of the Contract, subject to additions and deductions provided therein, the sum of _____, and make payment on account as hereinafter provided.

ARTICLE 4. HUB SUBCONTRACTING PLAN: The Owner has adopted Exhibit H, Policy on Utilization of Historically Underutilized Business ("Policy"), which is incorporated herein by reference. Contractor, as a provision of the Agreement must comply with the requirements of the Policy and adhere to the HUB Subcontracting Plan submitted with Contractor's Proposal and attached as **Exhibit 3**. No changes to the HUB Subcontracting Plan can be made by the Contractor without the prior written approval of the Owner in accordance with the Policy.

Contractor will use good faith efforts to subcontract the work performed under this Agreement in accordance with the HUB Subcontracting Plan (ref. **Exhibit 3**). Except as specifically provided in the HUB Subcontracting Plan, Contractor will not subcontract any of its duties or obligations under the Agreement, in whole or in part. The Agreement is subject to 34 TAC Section 20.14. Contractor will comply with all of its duties and obligations under 34 TAC Section 20.14. In addition to other rights and remedies, Owner may exercise all rights and remedies authorized by 34 TAC Section 20.14.

ARTICLE 5. LIQUIDATED DAMAGES: NONE

ARTICLE 6. CERTIFICATION OF NO ASBESTOS CONTAINING MATERIALS OR WORK:

The Contractor shall provide a certification statement, included with each materials submittal, stating that no asbestos containing materials or work is included within the scope of the proposed submittal.

The Contractor shall insure that Texas Department of Health licensed individuals, consultants or companies are used for any required asbestos work including asbestos inspection, asbestos abatement plans/specifications, asbestos abatement, asbestos project management and third-party asbestos monitoring.

The Contractor shall provide at Substantial Completion, a notarized affidavit to the Owner and the Architect stating that no asbestos containing materials or work was provided, installed, furnished or added to the Project.

The Contractor shall take whatever measures he deems necessary to insure that all employees, suppliers, fabricators, materialmen, subcontractors, or their assigns, comply with this requirement.

All materials used on this Project shall be certified as non Asbestos Containing Building Materials (ACBM). The Contractor shall insure compliance with the following acts from all of his subcontractors and assigns:

Asbestos Hazard Emergency Response Act (AHERA—40 CFR 763-99 (7));

National Emission Standards for Hazardous Air Pollutants (NESHAP—EPA 40 CFR 61, National Emission Standard for Asbestos;

Texas Asbestos Health Protection Rules (TAHRP—Tex. Admin. Code Title 25, Part 1, Ch. 295C, Asbestos Health Protection.

Every subcontractor shall provide a notarized statement that no ACBM has been used, provided, or left on this Project.

The Contractor shall provide, in hard copy and electronic form, all necessary material safety data sheets (MSDS) of all products used in the construction of the Project to the Texas Department of Health licensed inspector or Project Architect or Engineer who will compile the information from the MSDS and, finding no asbestos in any of the product, make a certification statement.

At Final Completion the Contractor shall provide a notarized certification statement per TAC Title 25 Part 1, Ch. 295.34, par. c.1 that no ACBM was used during construction of the Project.

ARTICLE 7. ACCEPTANCE OF BID OR AWARD OF CONTRACT: By signing this Agreement, the undersigned certifies as follows:

Indemnification. Contractor shall defend, indemnify, and hold harmless the State of Texas, its officers, and employees, and Owner, its officers, and employees and contractors, from and against all claims, actions, suits, demands, proceedings, costs, damages, and liabilities, including without limitation attorneys' fees and court costs, arising out of, connected with, or resulting from any acts or omissions of Contractor or any agent, employee, subcontractor, or supplier of Contractor in the execution or performance of this Agreement. Contractor shall coordinate its defense with the Texas Attorney General as requested by Owner.

Sovereign Immunity. Contractor and Owner stipulate and agree that no provision of, or any part of this Agreement between Contractor and Owner, or any subsequent change order, amendment, or other Agreement modification shall be construed: (1) as a waiver of the doctrine of sovereign immunity or immunity from suit as provided for in the Texas Constitution and the laws of the State of Texas; (2) to extend liability to Owner beyond such liability provided for in the Texas Constitution and the laws of the State of Texas; or (3) as a waiver of any immunity provided by the 11th Amendment or any other provision of the United States Constitution or any immunity recognized by the Courts and the laws of the United States.

This subsection is not intended to and shall not be construed to require Contractor to indemnify or hold harmless the State of Texas or Owner for any claims or liabilities resulting solely from the negligent acts or omissions of Owner or its employees.

Independent Contractor. Contractor shall be an independent contractor in all matters relating to this Agreement. Contractor and its employees or agents shall not be deemed or construed to be the employees or agents of Owner for any purposes whatsoever.

Assignment. This Agreement is a personal service contract for the services of Construction, and Contractor's interest in this Agreement, duties hereunder and/or fees due hereunder may not be assigned or delegated to a third party.

Records of expenses pertaining to Additional Services and services performed on the basis of a Worker Wage Rate or Monthly Salary Rate shall be kept on the basis of generally accepted accounting principles and in accordance with cost accounting standards promulgated by the Federal Office of Management and Budget Cost Accounting Standards Board and shall be available for audit by the Owner or the Owner's authorized representative on reasonable notice.

Representations and Warranties by Contractor. If Contractor is a corporation or a limited liability company, Contractor warrants, represents, covenants, and agrees that it is duly organized, validly existing and in good standing under the laws of the state of its incorporation or organization and is duly authorized and in good standing to conduct business in the State of Texas, that it has all necessary power and has received all necessary approvals to execute and deliver the Agreement, and the individual executing the Agreement on behalf of Contractor has been duly authorized to act for and bind Contractor.

Family Code Child Support Certification. Pursuant to Section 231.006, *Texas Family Code*, Contractor certifies that it is not ineligible to receive the award of or payments under this Agreement and acknowledges that this Agreement may be terminated and payment may be withheld if this certification is inaccurate.

Eligibility Certifications. Pursuant to Section 2155.004 and 2155.006, *Texas Government Code*, Contractor certifies that the individual or business entity named in this Agreement is not ineligible to receive the award of or payments under the Agreement and acknowledges that the Agreement may be terminated and payment withheld if these certifications are inaccurate.

Tax Certification. If Contractor is a taxable entity as defined by Chapter 171, *Texas Tax Code*, (“Chapter 171”), then Contractor certifies that it is not currently delinquent in the payment of any taxes due under Chapter 171, or that Contractor is exempt from the payment of those taxes, or that Contractor is an out-of-state taxable entity that is not subject to those taxes, whichever is applicable.

Payment of Debt or Delinquency to the State. Pursuant to Sections 2107.008 and 2252.903, *Texas Government Code*, Contractor agrees that any payments owing to Contractor under the Agreement may be applied directly toward any debt or delinquency that Contractor owes the State of Texas or any agency of the State of Texas regardless of when it arises, until such debt or delinquency is paid in full.

Products and Materials Produced in Texas. If Contractor will provide services under the Agreement, Contractor covenants and agrees that in accordance with Section 2155.4441, *Texas Government Code*, in performing its duties and obligations under the Agreement, Contractor will purchase products and materials produced in Texas when such products and materials are available at a price and delivery time comparable to products and materials produced outside of Texas.

Entire Agreement; Modifications. This Agreement supersedes all prior agreements, written or oral, between Contractor and Owner and shall constitute the entire Agreement and understanding between the parties with respect to the subject matter hereof. The Agreement and each of its provisions shall be binding upon the parties and may not be waived, modified, amended or altered except by a writing signed by Contractor and Owner.

Captions. The captions of paragraphs in this Agreement are for convenience only and shall not be considered or referred to in resolving questions of interpretation or construction.

Venue; Governing Law. Wichita County, Texas will be the proper place of venue for suit on or in respect of the Agreement. This Agreement and all of the rights and obligations of the parties and all of the terms and conditions shall be construed, interpreted and applied in accordance with and governed by and enforced under the laws of the State of Texas without reference to its conflicts of law provisions.

Breach of Contract Claims. To the extent that Chapter 2260, *Texas Government Code*, is applicable to the Agreement and is not preempted by other applicable law, the dispute resolution process provided for in Chapter 2260 and the related rules adopted by the Texas Attorney General pursuant to Chapter 2260, will be used by Owner and Contractor to attempt to resolve any claim for breach of contract made by Contractor that cannot be resolved in the ordinary course of business. The chief business officer of Owner will examine Contractor's claim and any counterclaim and negotiate with Contractor in an effort to resolve such claims. The parties specifically agree that (i) neither the execution of the Agreement by Owner nor any other conduct, action, or inaction of any representative of Owner relating to the Agreement constitutes or is intended to constitute a waiver of Owner's or the state's sovereign immunity to suit; and (ii) Owner has not waived its right to seek redress in the courts.

Loss of Funding. Performance by Owner under the Agreement may be dependent upon the appropriation and allotment of funds by the Texas State Legislature (the "Legislature") and/or allocation of funds by the Board of Regents of Midwestern State University (the "Board"). If the Legislature fails to appropriate or allot the necessary funds, or the Board fails to allocate the necessary funds, then Owner will issue written notice to Contractor and Owner may terminate the Agreement without further duty or obligation hereunder. Contractor acknowledges that appropriation, allotment, and allocation of funds are beyond the control of Owner.

State Auditor's Office. Contractor understands that acceptance of funds under the Agreement constitutes acceptance of the authority of the Texas State Auditor's Office, or any successor agency (collectively "Auditor") to conduct an audit or investigation in connection with those funds pursuant to Sections 51.9335(c), 73.115(c) and 74.008(c), *Texas Education Code*. Contractor agrees to cooperate with the Auditor in the conduct of the audit or investigation, including without limitation providing all records requested. Contractor will include this provision in all contracts with permitted subcontractors.

Waivers. No delay or omission by either party in exercising any right or power arising from non compliance or failure of performance by the other party with any of the provisions of this Agreement shall impair or constitute a waiver of any such right or power. A waiver by either party of any covenant or condition of this Agreement shall not be construed as a waiver of any subsequent breach of that or of any other covenant or condition of the Agreement.

Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties and their respective permitted assigns and successors.

Appointment. Owner hereby expressly reserves the right from time to time to designate by notice to Contractor a representative(s) to act partially or wholly for Owner in connection with the performance of Owner's obligations. Contractor shall act only upon instructions from the designated representative(s) unless otherwise specifically notified to the contrary.

Records. Records of Contractor's costs, reimbursable expenses pertaining to the Project and payments shall be available to Owner or its authorized representative during business hours and shall be retained for four (4) years after final Payment or abandonment of the Project, unless Owner otherwise instructs Contractor in writing.

Notices. All notices, consents, approvals, demands, requests or other communications relied on by the parties shall be in writing. Written notice shall be deemed to have been given when delivered

in person to the designated representative of the Contractor or Owner for whom it is intended; or sent by U. S. Mail to the last known business address of the designated representative; or transmitted by fax machine to the last known business fax number of the designated representative. Mail notices are deemed effective upon receipt or on the third business day after the date of mailing, whichever is sooner. Fax notices are deemed effective the next business day after faxing.

Severability. Should any term or provision of this Agreement be held invalid or unenforceable in any respect, the remaining terms and provisions shall not be affected and this Agreement shall be construed as if the invalid or unenforceable term or provision had never been included.

Illegal Dumping. The Contractor shall ensure that it and all of its Subcontractors and assigns prevent illegal dumping of litter in accordance with Title 5, *Texas Health and Safety Code*, Chapter 365.

Ethics Matters; No Financial Interest. Contractor and its employees, agents, representatives and subcontractors have read and understand: (1) the Ethics Policy for the Board of Regents of Midwestern State University contained in Section 2.25 of the Midwestern State University Policies and Procedures Manual; the Ethics Policy for Employees of Midwestern State University contained in Section 3.314 of the Midwestern State University Policies and Procedures Manual; and (3) applicable state ethics laws and rules. Neither Contractor nor its employees, agents, representatives or subcontractors will assist or cause Owner's (University) employees to violate Owner's (University's) Ethics Policies or applicable state ethics laws or rules. Contractor represents and warrants that no member of the Board has a direct or indirect financial interest in the transaction that is the subject of this Agreement.

By signature hereon, Contractor certifies that no member of the Board of Regents of Midwestern State University, or Executive Officers, has a financial interest, directly or indirectly, in the transaction that is the subject of this contract.

BY SIGNING BELOW, the Parties have executed and bound themselves to this Agreement as of the day and year first above written.

MIDWESTERN STATE UNIVERSITY

VENDOR

By: _____
Signature

By: _____
Signature

Print name

Print name

Date: _____

Date: _____

SHEET NUMBERSHEET TITLECIVIL

C101	Topographic Survey
C102	Demolition Plan
C103	Site Layout & Grading Plan
C104	Grading Details
C105	Dimensional Control Plan

SITE ARCHITECTURAL

SPD101	Site Demolition Plan
SP101	Overall Site Plan
SP102	Enlarged Site Plans
SP201	Site Details
SP202	Site Details

STRUCTURAL

S101	Foundation Plan and General Notes
S201	Foundation Sections & Details
S301	2 nd Floor Framing Plan
S302	Roof Framing Plan
S303	Detail Plans
S401	Elevator Sections and Details
S402	Elevator Sections and Details
S403	Stair A Sections and Details
S404	Stair A Sections and Details
S405	Stair B Sections and Details
S406	Stair C Sections and Details
S407	Stair D Sections and Details
S408	Stair D Sections and Details
S409	Stair D Sections and Details
S501	Typical Sections & Details

ARCHITECTURAL

AD101	First Floor Plan - Demolition
AD102	Second Floor Plan - Demolition
A100	Life Safety & Code Plan
A101	First Floor Plan - Dimensional
A102	First Floor Plan - Notes
A103	Second Floor Plan - Notes
A104	Enlarged Floor Plans
A105	Signage Plans
A106	Reflected Ceiling Plan - 1 st Floor
A107	Reflected Ceiling Plan - 2 nd Floor
A108	Roof Plan
A201	Door & Window Schedule
A202	Door & Window Schedule

SHEET NUMBERSHEET TITLE

A301	Exterior Elevations
A401	Building Sections
A402	Wall Sections
A403	Wall Sections
A404	Partition Sections
A405	Partition Sections
A406	Wall Sections
A501	Exterior Details
A502	Exterior Details
A503	Details
A504	Roof Details
A505	Door & Window Details
A601	Interior Elevations
A602	Interior Elevations
A603	Interior Elevations
A701	Millwork Sections & Details
A801	Stair Sections (<i>Issued by Addendum</i>)
A802	Stair Sections (<i>Issued by Addendum</i>)
A803	Stair & Elevator Sections (<i>Issued by Addendum</i>)

MECHANICAL

M001	Mechanical General Notes & Legends
M002	Mechanical Schedules
M101	First Floor Demolition Mechanical Plan
M102	Enlarged Second Floor Mechanical Room Demolition Plan
M201	First Floor Mechanical Plan
M202	Second Floor Mechanical Plan
M203	Mechanical Roof Plan
M204	First Floor Mechanical Plan - Add ALT #2
M301	First Floor Mechanical Hydronic Plan
M302	Second Floor Mechanical Hydronic Plan
M303	Enlarged Second Floor Mechanical Room Hydronic Plan
M401	Mechanical Section
M501	Mechanical Controls
M502	Mechanical Controls
M601	Mechanical Details
M602	Mechanical Details
M603	Mechanical Details

PLUMBING

P001	Plumbing General Notes & Legends
P002	Plumbing Schedules
P100	First Floor Under Floor Demolition Plumbing Plan
P101	First Floor Demolition Plumbing Plan
P102	Second Floor Demolition Plumbing Plan
P200	First Floor Under Floor Plumbing Plan
P201	First Floor Plumbing Plan
P202	Second Floor Plumbing Plan
P203	First Floor Plumbing Plan - Add ALT #2

P301	Enlarged Plumbing Plans
P401	Plumbing Isometric Riser Diagrams
P402	Plumbing Isometric Riser Diagrams
P501	Plumbing Details

FIRE SUPPRESSION

FP001	Fire Suppression General Notes & Legends
FP201	First Floor Fire Suppression Plan
FP202	Second Floor Fire Suppression Plan
FP203	First Floor Fire Suppression Plan - Add ALT #2

ELECTRICAL

E001	Electrical Abbreviations & Symbols
E101	First Floor Electrical Demolition Plan
E102	Second Floor Electrical Demolition Plan
E201	First Floor Power Plan
E202	Second Floor Power Plan
E300	Lighting Details & Schedules
E301	First Floor Lighting Plan
E302	Second Floor Lighting Plan
E303	First Floor Lighting Plan
E401	Electrical Panelboard Schedules
E402	Electrical Panelboard Schedules

TECHNOLOGY

T001	Technology General Notes and Legends
T201	First Floor Technology Plan
T203	First Floor Technology Plan Alternate #2
T301	Enlarged MDF
T601	Technology Camera Details
T602	Technology WIFI Details

END OF SECTION

1. The proposal bid date for the project Building Construction is scheduled for **Thursday October 1, 2020**. A Board of Regents meeting to determine the award of the construction contract will be scheduled, contracts are scheduled to be signed on or before **November 1, 2020**. Ten days are allowed for the successful contractor to obtain the required Performance and Payment Bonds with Insurance Certificates. Layout of on-site General Construction will start on or before **November 1, 2020**.
2. The work under this Contract shall be completed by **August 15, 2021**.
3. A Mandatory Contractor Pre-Proposal Meeting at the (See Legal Notice for location) will be held at **10:00 a.m. on September 17, 2020**.

All interested Contractors will have the opportunity to visit the existing site and ask questions.

4. General Contractor shall make all arrangements within his organization in order to complete the project in the specified time allotted and present to the Architect and Owner his schedule of critical materials and times for approval that must be kept. All design submittals, and shop drawings not in the Architect's possession within 45 days after contract signing will not be considered, and item causing unnecessary delay and will require the Contractor to use double shift jobsite crews to make up time, at his expense, until the project is back on schedule.

END OF SECTION

1. GENERAL

- a. Work included: To provide adequate budget and bonding to cover items not precisely determined by the Owner prior to bidding, allow within the proposed Contract Sum the amounts described below.
- b. Related Work:
 - (1) Documents affecting work of this Section included, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - (2) Other provisions concerning Cash Allowances also may be stated in other Sections of these Specifications.

2. SPECIFIC CASH ALLOWANCES

- a. Contingency: Provide **two hundred thousand and 00/100's (\$200,000.00)** in the contract for the "DANIEL BUILDING RENOVATION" for items to be considered during construction.
- b. Exterior Building Signage: Provide **ten thousand and 00/100's (\$10,000)** as an allowance for permanent exterior building identification signage.

END OF SECTION

1. GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide and pay for field engineering services required for Project.
 - 1. Civil, structural, or other professional engineering services specified or required to execute Contractor's construction methods.
- B. Owner's Representative will identify existing control points and property line corner stakes if required.

1.02 QUALIFICATIONS OF SURVEYOR OR ENGINEER

Registered professional engineer of the discipline required for the specific service on the Project, licensed in the state in which the Project is located.

1.03 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the Project are those designated on drawings.
- B. Locate and protect control points prior to starting site work and preserve all permanent reference points during construction.
 - 1. Make no changes or relocations without prior written notice to Architect.
 - 2. Report to Architect when any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.
 - 3. Require surveyor to replace Project control points which may be lost or destroyed. Establish replacements based on original survey control.

1.04 PROJECT SURVEY REQUIREMENTS

- A. Establish lines and levels, locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements.
 - a. Stakes for grading, fill, and topsoil placement.
 - b. Utility slopes and invert elevations.
 - 2. Batter boards for structures.
 - 3. Building foundation, column locations, and floor levels.
 - 4. Controlling lines and levels required for mechanical and electrical trades.
- B. From time to time, verify layouts by same methods.

1.05 RECORDS

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

1.06 SUBMITTALS

- A. Submit name and address of Surveyor and Professional Engineer to Owner.
- B. On request of Owner, submit documentation to verify accuracy of field engineering work.
- C. Submit certificate signed by registered engineer or surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.

END OF SECTION

1. GENERAL

1.01 REQUIREMENTS INCLUDED

Abbreviations and acronyms used in Contract Documents to identify reference standards.

1.02 QUALITY ASSURANCE

- A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents or applicable codes establish stricter standards.
- B. Publication Date: The publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.

1.03 ABBREVIATIONS, NAMES AND ADDRESSES OF ORGANIZATIONS

Obtain copies of referenced standards direct from publication source when needed for proper performance of Work, or when required for submittal by Contract Documents.

END OF SECTION

1. GENERAL:

- a. Contractor: state on Proposal Form amount to be deducted and/or added to Base Contract Price, unless noted otherwise, for performing following Alternates to Contract, subject to following conditions:
- b. Deductions/Additions: include any additive or deductive modifications of work or additional work that may be required by reason of acceptance of any alternate.
- c. Owner reserves right to reject acceptance of any alternate and accept following alternate so long as there is not overlap in intent of following alternate.
- d. Where entire specification sections are part of work to be bid as an Alternate, that section is noted in Table of Contents. Specification Sections in which only parts of work of that section are part of work to be bid as Alternate are not identified in Table of Contents but that fact is noted in section itself, except that no listing or other identification of work in specifications which is part of work to be bid as Alternate : in any way limit Contractor's obligation to bid and furnish credits, materials and work reasonably and generally understood to be part of work described.

2. ALTERNATES:

Alternate No. 1 - Provide and install five (5) Fenced Exterior Courtyards on the west side of the building as shown on the drawings and specified therein.

Alternate No. 2 – Provide all materials and installation to finish out the Northeast interior quadrant of the Building (approximately 4,000sf) as shown on drawings and specified therein.

END OF SECTION

1. REQUIREMENTS INCLUDED:

Submit Applications for Payment to Owner in accord with the schedule established by Conditions of the Contract and Agreement Between Owner and Contractor.

2. RELATED REQUIREMENTS:

- a. Agreement Between Owner and Contractor
- b. Conditions of the Contract: Progress Payments, Retainages, and Final Payment.

3. FORMAT AND DATA REQUIRED:

Submit itemized applications typed on AIA Document G702 - 1992, Application and Certificate for Payment and continuation sheets G703 - 1992.

4. PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT:

- a. Application Form:
 - (1) Fill in required information, including that for Change Orders executed prior to date of submittal of application.
 - (2) Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
 - (3) Execute certification with signature of a responsible officer of Contract firm, properly notarized.
- b. Continuation Sheets:
 - (1) Fill in total list of all scheduled component items of work with item number and scheduled dollar value for each item.
 - (2) Fill in dollar value in each column for each scheduled line item when work had been performed or products stored. Round off values to nearest dollar.
 - (3) List each Change Order executed prior to date of submission, at the end of the continuation sheets List by Change Order Number and description, as for an original component item of work.
 - (4) Provide continuation sheets separately for each addition. Coordinate the civil site work with Architect to include appropriate amount for each addition.

5. SUBSTANTIATING DATA FOR PROGRESS PAYMENTS:

- a. When the Owner requires substantiating data, Contractor shall submit suitable information with a cover letter identifying:
 - (1) Project.
 - (2) Application number and date.
 - (3) Detailed list of enclosures.
 - (4) For stored products:
 - (a) Item number and identification as shown on application.
 - (b) Description of specific material.

- b. Submit one copy of data and cover letter for each copy of application.
6. PREPARATION OF APPLICATION FOR FINAL PAYMENT:
- a. Fill in Application form as specified for progress payments.
7. SUBMITTAL PROCEDURE:
- a. Submit Applications for Payment monthly to Owner based on 95% (ninety-five percent) of the value of material delivered and 95% (ninety-five percent) of the value of completed work. Time of payment will be determined in the Agreement between Owner and Contractor.
 - b. Materials must be delivered 15 days prior to date of billing.

END OF SECTION

1. GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Promptly after award of the Contract, prepare and submit to Owner estimated construction progress schedules for the Work with sub-schedules of related activities which are essential to its progress.
- B. Submit revised progress schedules periodically.

1.02 FORM OF SCHEDULES

- A. Prepare schedules in the form of a horizontal bar chart.
 - 1. Provide separate horizontal bar for each trade or operation.
 - 2. Horizontal time scale: Identify the first workday of each week.
 - 3. Scale and spacing: To allow space for notations and future revisions.
- B. Format of listings: The chronological order of the start of each item of work.
- C. Identification of listings: By major work activities.

1.03 CONTENT OF SCHEDULES

- A. Construction Progress Schedule:
 - 1. Show the complete sequence of construction by activity.
 - 2. Show the dates for the beginning and completion of each major element of construction.
 - 3. Show projected percentage of completion for each item as of the first day of each month.
- B. Submittals Schedule for Shop Drawings, Product Data and Samples.
Show: The dates for Contractor's submittals.

1.04 PROGRESS REVISIONS

- A. Indicate progress of each activity to date of submission.
- B. Show changes occurring since previous submission of schedule:
 - 1. Major changes in scope.
 - 2. Activities modified since previous submission.
 - 3. Revised projections of progress and completion.
 - 4. Other identifiable changes.
- C. Provide a narrative report as needed to define:
 - 1. Problem areas, anticipated delays and the impact on the schedule.
 - 2. Corrective action recommended, and its effect.
 - 3. The effect of changes on schedules of other prime contractors.

1.05 SUBMISSIONS

- A. Submit initial schedules within 15 days after award of Contract.
 - 1. Owner will review schedules and return review copy within 10 days after receipt.
 - 2. If required, resubmit within 7 days after return of review copy.
- B. Submit revised progress schedules with each application for payment.
- C. Submit the number of opaque reproductions which the Contractor requires, plus four (4) copies which will be retained by the Owner and Architect.

1.06 DISTRIBUTION

- A. Distribute copies of the reviewed schedules to:
 - 1. Job site file.
 - 2. Subcontractors
 - 3. Owner
- B. Instruct recipients to report promptly to the Contractor in writing, any problems anticipated by the projections shown in the schedules.

END OF SECTION

1. GENERAL:

- a. Submit to the Architect Shop Drawings, Product Data and Samples required by Specification sections.
- b. Prepare and submit a list of required submittals of Shop Drawings, Product Data and Samples. Include dates for submission and need dates for each item. Attached list is to be used as guide and is not to be considered as complete.

2. RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

- a. General Conditions
- b. Substitutions and Product Options - Section 01630.

3. SHOP DRAWINGS:

- a. Original Drawings, prepared by Contractor, subcontractor, supplier or distributor, which illustrate some portion of the work, showing fabrication, layout, setting or erection details, prepared by a qualified detailer.
- b. Reproduction for submittals: Black line prints or electronic submittals.

4. PRODUCT DATA:

- a. Manufacturer's standard schematic drawings:
 - (1) Modify drawings to delete information which is not applicable to the project.
 - (2) Supplement standard information to provide additional information applicable to project.
- b. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data:
 - (1) Clearly mark each copy to identify pertinent materials, products or models.
 - (2) Show dimensions and clearances required.
 - (3) Show performance characteristics and capacities.
 - (4) Show wiring diagrams and controls.
 - (5) See Divisions 220000, 230000, and 230000 for additional requirements.

5. SAMPLES:

Physical examples to illustrate materials, equipment and workmanship, and to establish standards by which completed work is judged.

6. CONTRACTOR RESPONSIBILITIES:

- a. Review Shop Drawings, Product Data and Samples prior to submission. Initial, sign or stamp, certifying to review of submittal.
- b. Verify:
 - (1) Field measurements.
 - (2) Field construction criteria.
 - (3) Catalog numbers and similar data.
- c. Coordinate each submittal with requirements of work and of Contract Documents.
- d. Contractor's responsibility for errors and omissions in submittals is not relieved by Architect's review of submittals.

- e. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Architect's review of submittals, unless Architect/Engineer gives written acceptance of specific deviations.
- f. Notify Architect, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- g. Begin no work which describes submittals until return of submittals with Architect's stamp and initials or signature indicating review.
- h. After Architect's and Owner's review, distribute copies.

7. SUBMISSION REQUIREMENTS:

- a. Schedule submissions to Architect at least 30 days before date reviewed submittals will be needed, in accordance with approved submittal schedule.
- b. Submit 6 prints or electronic copy of Shop Drawings.
- c. Submit 6 copies or electronic copy of Product Datum.
- d. Submit number of Samples specified in each of specification sections.
- e. Accompany submittals with transmittal letter, containing:
 - (1) Date
 - (2) Project title and number
 - (3) Contractor's name and address
 - (4) The number of each Shop Drawing, Product Datum and Sample submitted.
 - (5) Notification of deviations from Contract Documents.

8. RE-SUBMISSION REQUIREMENTS:

- a. Shop Drawings:
 - (1) Revise initial drawings as required and re-submit as specified for initial submittal.
 - (2) Indicate on drawings any changes which have been made, other than those requested by Architect.
- b. Product Data and Samples: Submit new datum and samples as required for initial submittal.

9. DISTRIBUTION OF SUBMITTALS AFTER REVIEW:

- a. Architect will retain two copies of approved or corrected Shop Drawings and Product Datum. On mechanical and electrical submittals the consulting engineer will retain one additional copy of related data.
- b. Architect will forward 1 copy of approved or corrected Shop Drawings and Product Datum to Owner.
- c. Architect will return remaining copies to Contractor for Distribution.
- d. Contractor: distribute remaining copies of Shop Drawings and Product Datum which carry Architect's stamp, as required for construction, including Contractor's file, job site file, subcontractors, suppliers and fabricators.

END OF SECTION

1. **TEMPORARY HEAT:**
Provide without extra cost to Owner, temporary heating as required for performance of work and as required for proper protection of work until completion and acceptance of project.
2. **TEMPORARY LIGHT, POWER:**
 - a. Furnish temporary light, complete with wiring, lamps, and similar equipment as required for completion of work. Work done without adequate lighting and found to be unsatisfactory will be removed.
 - b. Owner will furnish current, for temporary lighting, and electrical power for trades.
 - c. Contractor shall make necessary arrangement with Power Company and Owner for temporary electric service connections therewith and pay costs connected therewith. Do not remove temporary electric service connections until new building service is completed and tested.
3. **TEMPORARY HOISTS:**
 - a. Contractor only: install, operate, adequate number of hoists, lifts, personal elevators as required for structural and roof work, for his own use and for sub-rental to subcontractors and other contractors. Notice is brought to OSHA requirements concerning this item.
 - b. Do not construct hoists at such locations as will interfere with or affect work of other contractors; locate them a sufficient distance from exterior walls; provide protection to prevent damage, staining, marring of permanent work.
4. **TEMPORARY OFFICES:**
Provide and maintain a 20' x 12' wide watertight office at the job site for use by Architect, Contractor, and Sub-contractors. Maintain office; heat during cold weather and cool during hot weather; maintain doors, locks on doors, tables, benches, drawing racks. Keep complete set of construction documents up-to-date with addenda, change orders, etc., for use of Architect on jobsite. Separate rack from Contractor's work desk required for use of storage of shop drawings and separate contract documents.
5. **TEMPORARY TELEPHONE:**
 - a. Install without extra cost to Owner, job telephone for duration of contract. Pay for local calls. Party making long distance and toll calls: pay for same.
6. **SANITARY FACILITIES FOR WORKMEN:**
 - a. Contractor: provide and maintain suitable, weathertight, painted, sanitary toilet facilities for workmen for entire construction period. Comply with requirements of applicable health authorities and Department of Labor Occupational Safety and Health Standards. When toilet facilities are no longer required, promptly remove from site, disinfect and clean or treat area as required. Existing sewer line may be tapped outside of existing slab area.
 - b. Contractor: keep toilet facility swept clean and supplied with toilet tissue at all times.
 - c. Owner's facilities within near completed structure: not be used at any time without his written permission.

- d. If any new construction surfaces in project other than toilet facilities provided for herein, are soiled at any time, entire area so soiled: completely removed from project and rebuilt.
7. **TEMPORARY WATER SERVICE:**
 - a. Water line is available at high school campus. Connect and provide temporary supply from connection point as directed by Owner and maintain and protect it, until completion of project and acceptance by Owner. General Contractor: provide, protect, and maintain an adequate water supply for Construction use on project for construction purposes.
 - b. Owner: pay cost of temporary water used on project.
 - c. When temporary water lines and meter are no longer required, they: removed by Contractor responsible for their installation and any part, or parts, of grounds or buildings disturbed or damaged by their removal: restored to original condition.
 8. **TEMPORARY STAIRS, LADDERS, RAMPS, RUNWAYS AND ENCLOSURES:**
Furnish, maintain, equipment such as temporary stairs, ladders, ramps, scaffolds, runways, derricks, chutes, and like, as required for proper execution of work by trades. Such apparatus equipment, construction: as per labor laws, other state and local laws applicable thereto.
 9. **REMOVAL OF TEMPORARY WORK:**
Remove temporary work from premises, on or before completion of work.
 10. **TEMPORARY OR TRIAL USAGE:**
 - a. Temporary or trial usage by Owner or any mechanical device, machinery, apparatus, equipment, or any work or materials supplied under contract before final completion and written acceptance of same by Architect: not be construed as evidence of Architect's acceptance of same.
 - b. If Contractor so elects, he may, without extra cost to Owner, place approved persons to make trial usage. Make such trial under Architect's supervision.
 11. **PERMANENT UTILITY CONNECTIONS AND SERVICE:**
 - a. Application to appropriate utility company for permanent gas, water, telephone and electrical service will be accomplished by Owner. Written notification through Architect will be made by one week prior to needed connections.
 - b. Street crossing costs, taps, permits, meters, etc., to be paid for by Contractor.
 - c. Charges to Utilities in form of consumed service prior to acceptance and/or occupancy: paid by Owner.
 - d. Utilities connections: made by this Contractor to existing mains.
 12. **PROTECTION OF THE WORK:**
 - a. Contractor: at all times, provide protection against weather, so as to maintain work, materials, apparatus, and fixtures free from injury or damages. At end of day's work, new work likely to be damaged: covered or otherwise protected as required.
 - b. Wet work : not be performed when temperature is below 40 F. or is likely to go below 40 F., within ensuing 48 hours, except when sufficient protective heat is provided and Architect's approval in writing is obtained.

- c. Construct and maintain necessary temporary drainage and do pumping necessary to keep excavations and floors, pits, and trenches free of water from whatever source.
 - d. If low temperatures make it impossible to continue operations safely in spite of cold weather precautions, contractor: cease work and: so notify Architect. Open fires are not permitted within the building enclosure.
 - e. Climatic Conditions: When so ordered by Architect, Contractor: suspend any work that may be subject to damage by climatic conditions.
 - f. Snow, ice: Remove snow, ice as necessary for safe and proper execution of work.
13. TEMPORARY JOB-SITE PROTECTION:
- a. Provide temporary fences at or near limits of construction limit lines as indicated to prevent unauthorized or accidental access to job site. Immediate building site as indicated: enclosed with a 6'- 0" "Hog Wire" fence. Fence post: 4 x 4 at 6'- 0" o.c. Access to site: by gates of same height as fence. Each gate: closed and LOCKED at all times when construction operations are not in progress. 6'- 0" chain link wire fence with 1-5/8" O.D. pipe at 6'- 0" o.c. with posts at corners and gates set in concrete: considered equal to "Hog Wire" fence.
 - b. Provide other enclosures, barricades or other security and safety measures as may be required by laws and regulations or as necessary to protect work and prevent unauthorized access to work by any person. When building is fully enclosed, provide construction locks at doors, doors: locked at close of each day's work.
14. MISCELLANEOUS SAFETY REQUIREMENTS:
- a. Comply with applicable laws and regulations concerning safety requirements.
 - b. Guard Lights. Provide, maintain guard lights at barricades, obstructions in streets, roads or sidewalks, at trenches or pits adjacent to public or roads.
 - c. Fire. Obtain inspection of premises by local protection authority. Provide and maintain equipment, signs; enforce regulations recommended and/or required by regulating authority.

END OF SECTION

1. GENERAL:

See referenced note in SECTION: SPECIAL CONDITIONS, paragraph 1.

2. SCOPE:

- a. This section covers project sign completely.
- b. Immediately upon beginning of work under this contract, Contractor: accomplish work covered under this section of specifications. Locations of project sign: as determined by Architect.

3. PROJECT SIGN:

- a. Contractor shall erect one painted job sign, 4'- 0" high x 8'- 0" wide and mounted on 4 x 4's with top at least 8'- 0" above grade.
- b. Owner: approve sign color, lettering, and location of one 8'- 0" wide by 4'- 0" high job sign.
- c. Separate signs or advertisements: not permitted.
- d. Bulletin Board for required government notices: attached to side of office and glass covered as required.

END OF SECTION

1. GENERAL

1.01 REQUIREMENTS INCLUDED

Provide secure storage and protection for products to be incorporated into the work and maintenance and protection for products after installation and until completion of the Work.

1.02 STORAGE

- A. Store Products immediately on delivery and protect until installed in the Work. Store in accord with manufacturer's instructions with seals and labels intact and legible.
- B. Store products subject to damage by elements in substantial weathertight enclosures.
 - 1. Maintain temperatures within ranges required by manufacturer's instructions.
 - 2. Provide humidity control for sensitive products as required by manufacturer's instructions.
 - 3. Store unpacked products on shelves, in bins, or in neat piles accessible for inspection.
- C. Exterior Storage:
 - 1. Provide substantial platforms, blocking, or skids to support fabricated products above ground; prevent soiling or staining. Cover products subject to discoloration or deterioration from exposure to the elements with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
 - 2. Store loose granular materials on solid surfaces such as paved areas, or provide plywood or sheet materials to prevent mixing with foreign matter.
 - a. Provide surface drainage to prevent flow or ponding of rainwater.
 - b. Prevent mixing of refuse or chemically injurious materials or liquids.
- D. Arrange storage in a manner to provide easy access for inspection.

1.03 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
 - 1. State of storage facilities is adequate to provide required conditions.
 - 2. Required environmental conditions are maintained on continuing basis.
 - 3. Surfaces of products exposed to elements are not adversely affected.Any weathering of products, coatings, and finishes is acceptable under requirements of Contract Documents.
- B. Mechanical and electrical equipment, which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item with notice of enclosed instructions shown on exterior of package.
 - 1. Comply with manufacturer's instructions on scheduled basis.
 - 2. Space heaters, which are part of electrical equipment, shall be connected and operated continuously until equipment is placed in service.

1.04 PROTECTION AFTER INSTALLATION

- A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed prior to completion of Work.
- B. Control traffic to prevent damage to equipment and surfaces.
- C. Provide coverings to protect finished surfaces from damage.
 - 1. Cover projections, wall corners, and jambs, sills, and soffits of openings in areas used for traffic and for passage of products in subsequent work.
 - 2. Protect finished floors and stairs from dirt and damage:
 - a. In areas subject to foot traffic, secure heavy paper, sheet goods, or other materials in place.
 - b. For movement of heavy products, lay planking or similar materials in place.
 - c. For storage of products, lay tight wood sheathing in place.
 - d. Cover walls and floor of elevator doors, used by construction personnel.
- D. Waterproofed and roofing surfaces.
 - 1. Prohibit use of surfaces for traffic of any kind and for storage of any products.
 - 2. When some activity must take place in order to carry out the Contract, obtain recommendations of installer for protection of surface.
 - a. Install recommended protection; remove on completion of that activity.
 - b. Restrict use of adjacent unprotected areas.

1.05 OFF-SITE STORAGE

Any off-site storage by the Contractor of material for which payment is requested shall be as follows:

- 1. Located in a bonded warehouse.
- 2. Be insured for the full value of the material and approved by Bonding Company.
- 3. Have a listing of inventory, itemized and listing all quantities and descriptions, checked and certified by the Contractor requesting the payment.
- 4. No payment for off-site storage will be allowed unless the above is complied with.

1.06 CONTRACTOR RESPONSIBILITY

Each Contractor shall be held responsible (even after payment has been made by the Owner to the Contractor) for all materials stored on the site or incorporated in the structure against theft, acts of vandalism, or any other act that is not protected or covered by any insurance that is in force. It shall be the responsibility of the Contractor to deliver to the Owner a completely new and finished piece of construction work upon final payment.

The Owner assumes no responsibility for stored material.

END OF SECTION

1. GENERAL:
See General Conditions.
2. RELATED REQUIREMENTS SPECIFIED ELSEWHERE:
See Shop Drawings, Product Data & Samples.
3. PRODUCT LIST:
 - a. Within 30 days after date of each subcontract, submit to Architect 5 copies of complete list of products and materials which are proposed for installation.
 - b. Prepare list on basis of each specification section.
 - c. For products specified under reference standards, include with listing of each product:
 - (1) Name and address of manufacturer.
 - (2) Trade name.
 - (3) Model or catalog designation.
 - (4) Manufacturer's data, including performance and test data, reference standards.
4. CONTRACTOR'S OPTIONS:
 - a. For products specified only by reference standards, select any product meeting standards, by any manufacturer.
 - b. For products specified by naming several products or manufacturers, Architect may select any product and manufacturer named.
 - c. For substitution of products specified by naming only one product and manufacturer or to establish a quality standard, the Contractor : submit request for substitution as specified below.
5. STANDARDS FOR SUBSTITUTIONS:
 - a. During Bidding, Architect will consider written requests from Proposers and manufacturers for substitutions. Such requests must be received at least 7 days prior to Proposal Date. Requests received after that time will not be considered. Approval of proposed substitutions will be set forth in an Addendum or letter of approval. Requests for substitutions : include data listed below.
 - b. Within 30 days after date of Contract, Architect will consider formal requests from Contractor for substitutions of products in place of those specified.
 - c. Submit 2 copies of request for substitution. Include in substitution:
 - (1) Complete data substantiating compliance of proposed substitution with Contract Documents.
 - (2) For products:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature, including product description, performance and test data and reference standards.
 - c. Samples, if applicable.
 - d. Name and address of similar projects on which product was used and date of installation.
 - (3) For construction methods:
 - a. Detailed written descriptions of proposed method.
 - b. Complete drawings illustrating methods or revisions.
 - (4) Itemized comparison of proposed substitution with product or method specified.
 - (5) Data relating to changes in construction schedule.
 - d. In making request for substitution, Bidder/Contractor represents:
 - (1) He has personally investigated proposed product or method and determined that it is

- equal or superior in all respects to that specified.
- (2) He will provide same guarantee for substitution as for product or method specified.
 - (3) He will coordinate installation of accepted substitution into work making such changes as may be required for work to be complete in all respects.
 - (4) He waives all claims for additional costs related to substitution which subsequently become apparent.
- e. Substitutions will not be considered if:
- (1) They are indicated or implied on Shop Drawings or Product Data submittals without formal request submitted in accordance with Article 5 of this Section.
 - (2) Acceptance will require substantial revision of Contract Documents.
- f. If substitution is not approved or accepted, Contractor : furnish specified product.

END OF SECTION

1. GENERAL

See referenced note in SECTION: SPECIAL CONDITIONS, paragraph 1.

2. RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any) apply to the work specified in this section.

3. DESCRIPTION OF WORK:

- a. The extent of demolition work is shown on the drawings.
- b. Demolition includes removal and reuse of some items and the removal and disposal of demolished materials, as shown on the drawings and herein specified.

4. EXECUTION:

The General Contractor : responsible for all demolition work and the coordination thereof.

The General Contractor : coordinate with the other contractors for their own demolition as shown on the demolition plans. Any items damaged or removed and not required : replaced or returned at no additional cost to Owner.

5. SUBMITTALS:

- a. Schedule; Demolition: Submit 2 copies of proposed methods and operations of demolition to the Architect for review prior to the start of work in each phase of construction as shown in the scheduling sections. Include in the schedule the coordination for shut-off, capping and continuation of utility services as required.
- b. Provide a detailed sequence of demolition and removal work to ensure the uninterrupted progress of the Owner's operations.

6. JOB CONDITIONS:

- a. Occupancy: Buildings to have items removed will not be vacated or discontinued in use prior to the start of the work.
- b. Condition of Structures: The Owner assumes no responsibility for the actual condition of structures to be demolished.
- c. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner in so far as practicable.
- d. Partial Removal: Items of salvageable value to the Contractor may be removed from the structure as the work progresses. Salvaged items must be transported from the site as they are removed.
- e. Storage or sale of removed items on the site will not be permitted.
- f. Explosives: The use of explosives will not be permitted.
- g. Traffic: Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways

if required by governing regulations.

- h. Protection: Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.
 - (1) Erect temporary covered passageways as required by authorities having jurisdiction.
 - (2) Provide interior and exterior shoring, bracing, or support to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain.
- i. Damages: Promptly repair damages caused to adjacent facilities by demolition operations at no cost to the Owner.
- j. Utility Services: Maintain existing utilities, indicated to remain, keep in service, and protect against damage during demolition operations.
 - (1) Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities.
 - (2) The Owner will shut-off utilities serving each structure and contractor : verify before starting work. Disconnecting and sealing indicated utilities before starting demolition operations is part of this work.
- k. Removal and Reuse: Items noted on plans : removed and reused in the same manner.
- l. Removal of items noted to remove and turn over to Owner : removed in a workmanlike manner to prevent damage to these items.

7. DEMOLITION:

- a. Pollution Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.
 - (1) Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
 - (2) Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations, as directed by the Architect or governing authorities. Return adjacent areas to condition existing prior to the start of the work.
- b. Demolition: Demolish areas indicated completely and remove from the site. Use such methods as required to complete the work within the limitations of governing regulations.
 - (1) Proceed with demolition in a systematic manner, as scheduled in phasing.
 - (2) Remove framing members and lower to ground by means of hoists, derricks, or other suitable methods.

8. DISPOSAL OF DEMOLISHED MATERIALS:

- a. General: Remove from the site debris, rubbish, and other materials resulting from demolition operations. Burning of removed materials from demolished structures will not be permitted on the site.
- b. Removal: Transport materials removed from demolished structures and dispose of off the site. Any debris not removed from site promptly: removed by direction of Architect at Contractor's expense.

END OF SECTION

1. GENERAL:

See referenced note in SECTION: SPECIAL CONDITIONS, paragraph 1.

2. WORK INCLUDED:

Work to be performed under this section of Specifications: include poisoning of soil within building designated on Plans where slab is being cut out and concrete filled, beneath slab, prior to final pouring, and treatment of building perimeter as specified herein, and treatment outside of building for a distance not to exceed 1'-0".

3. RELATED WORK SPECIFIED ELSEWHERE:

- A. Placement of fill and backfill: SECTION: EXCAVATING, FILLING AND BACKFILL
- B. Concrete work: SECTION: CONCRETE.

4. QUALITY ASSURANCE:

- A. Qualifications: Applicator for soil poisoning work : have equipment, experience, facilities, and personnel of sufficient quantity and quality to assure performance of work in timely fashion and in manner that will produce specified results and : registered and licensed in accordance with regulations of State of Texas.
- B. Testing:
 - (1) Samples: taken by Architects/Engineer's representative and analyzed by independent testing laboratory approved by Architect and paid for by Contract or in accordance with GENERAL AND SPECIAL CONDITIONS.
 - (2) Test on sample of one quart of working solution for each 10,000 square feet of treated area.
 - (3) Areas : retreated if test results average is less than 90% of listed minimum concentration.
- C. Submittals: Submit to the Architect 1 label of material (soil poisoning chemical) that will be used.

5. MATERIALS:

Termidor by BASF or approved equal.

6. TIME OF APPLICATION:

- A. Do not begin soil poisoning work until preparations for slab placement have been completed and prior to placement of vapor barrier.
- B. Do not apply soil poison when surface water is present or soil is excessively wet.

7. LOCATION:

Apply soil treatment to areas beneath building concrete floor slabs on grade or fill, and along interior sides of foundation walls and grade beams. Where exterior is abutted by concrete slabs, asphalt paving or other permanent surfacing, treat exterior sides of foundation walls and grade beams as specified for interior sides of walls. After vapor barrier installation, inspect and retreat any disturbed subgrades.

8. RATE OF APPLICATION:

Follow specifically the Manufacturer's requirements on the label.

9. GUARANTEE:

- A. Upon completion of soil treatment, and as condition of final acceptance, furnish Owner written 5-year guarantee against defects from termites.
- B. Guarantee: state that application was made at concentration, rates and methods, which comply with these Specifications.
- C. At end of five-year period Owner : offered renewable guarantee on year-to-year basis, at Owner's option, at agreed upon annual fee.
- D. If subterranean termite activity exists at any portion of new construction treated during one year guarantee period, Contractor : promptly, and without expense to Owner, re-treat soil at building perimeters by drilling 1/2" holes, 2'- 0" deep at 16" on center and forcibly inject holes with 1/4 of quantity of material originally treated with, using same means as originally specified herein.
- E. If termite activity is found to exist at any portion of new construction treated after one year guarantee period, Contractor: re-treat soil at location where activity exists with same quantity of material originally treated, using same means as originally specified herein, as part of 5 year original guarantee.
- F. Guarantee : non-cancelable by parties to contract except by Owner .
- G. Draw guarantee in favor of Owner and submit sample form of guarantee to Architect for approval before beginning work.

10. RE-TREATMENT:

Chemicals used in re-treatment must be previously certified as to type of chemical and rate of concentration.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

A. Furnish all labor, materials, services and equipment required to install the Cast in Place Concrete, including:

1. Cast-in-place concrete complete, including concrete and reinforcing in drilled piers and bases for mechanical equipment.
2. Expansion joint filler strips and sealers
3. Forms, ties and shoring
4. Reinforcement, complete
5. Finishing, curing and protecting concrete.
6. Shop drawings

1.2 CODES AND STANDARDS

A. Comply with the provisions of the following codes, specifications and standards, except as otherwise specified or shown:

1. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete."
2. ACI 305 "Hot Weather Concreting."
3. ACI 306 "Cold Weather Concreting."
4. ACI 315 "Details and Detailing of Concrete Reinforcement."
5. ACI 318 "Building Code Requirements for Reinforced Concrete."
6. ACI 347 "Recommended Practice for Concrete Formwork."
7. CRSI "Manual of Standard Practice."
8. CRSI "Placing Reinforcing Bars."

1.3 SUBMITTALS

A. General: Approval of drawings will only cover the general scheme, design and character of details, but not checking of dimensions or quantities. Contractor shall be responsible for omissions and errors and conformity with the contract documents and specifications. Submit four copies of submittals for review by the engineer, unless otherwise noted in the general conditions.

B. Shop Drawings – Submit the following shop drawings to the Owner.

1. Reinforcement placement – including all dowels, corner bars and other miscellaneous rebar. Include clear indication of reinforcement splice lengths and splice locations.
2. Curing compound, evaporative reducer, floor hardener, leveling compound and waterstops.
3. Void boxes and backfill retainers.

4. Construction joint locations.
 5. Pan joists formwork.
- C. Concrete Mix Designs - The concrete plant shall submit mix designs for approval. Provide sieve analysis of each type of aggregate used in the concrete mix. Each design submittal shall include data sheets on all admixtures proposed for the mix.

Any statements or letters from the concrete plant which state that they will not guarantee strengths according to the ACI 318 code will not be allowed or accepted. The cement contents are a minimum. If the concrete plant must increase the cement or otherwise modify the mix to achieve a mix which they will warranty, they shall coordinate this with the engineer and obtain his approval prior to submitting the mix design.

PART 2 - PRODUCTS

2.1 MATERIALS

A. CONCRETE MATERIALS

1. Portland cement - ASTM C-150, Type 1
2. Aggregates - ASTM C-33. Coarse aggregate, crushed limestone or equal, maximum size 1 1/2" for grade beam and piers; 1" for slabs. No sieve percentage shall vary more than 20% from an adjacent sieve.
 - a. Provide an optimized aggregate combination for all exposed concrete floors.
3. Admixtures - no admixtures will be allowed unless approved by the Engineer. Refer to the plans for specific requirements for admixtures for each classification of use.
 - a. Air entraining admixture - ASTM C-260
 - b. Mid Range Water Reducer – ASTM C-494, Type A or F
 - 1) Do not use air entrainment over 3% with lignin type water reducing admixtures in any slab to receive a hard troweled finish.
4. Water - clean, fresh and drinkable, free from oil and injurious amounts of vegetable matter, alkalis or other impurities.

B. REINFORCEMENT MATERIALS

1. Reinforcing Steel Bars - newly rolled, domestic billet steel conforming to ASTM A615, Grade 60.
2. Reinforcing Wire – ASTM A-82
3. Deformed Bar Anchors – ASTM A-496
4. Headed Concrete Anchors – ASTM A-108
5. Fiber Reinforcement - 100% virgin polypropylene, MD Graded, fibers containing no reprocessed olefin materials and specifically manufactured for use as concrete secondary reinforcement.
6. Concrete bar supports, chairs, spacers, etc. required for support of reinforcing, shall be equal to the Dayton/Richmond types listed below. Maximum spacing shall be 48 inches on center, each way.

- a. Under Footings: Bottom Reinforcement: R21 – 3” high with round base.
- b. Under Slab over Fill: R20 – With round base and height to have 1 ¼” cover on top.

C. CURING MATERIALS:

1. Polyethylene Sheeting - Commercial Standard CS 238, white, not less than 6 mil nominal thickness, meeting water retention requirements of ASTM C171. This may be not be used in exposed concrete areas.
2. Membrane Curing Compound - ASTM C-309, Type 1, compatible with resilient floor coverings.

D. FORMS:

1. Wood forms for unexposed concrete surfaces-No. 2 common Southern Yellow Pine lumber or other materials of equal qualifications of sufficient thickness to be capable of sustaining the loads to be imposed thereon, dressed to uniformly smooth contact surfaces.
2. Forms for exposed concrete surfaces -- Commercial Standard Douglas fir, moisture resistant, concrete form plywood, with one smooth face, or steel. a. Concrete Columns – steel or fiberglass
3. Form ties for exposed surfaces - Manufactured to allow a positive breakback of not less than one inch inside the concrete surface. Ties shall be equipped with a plastic cone of not less than 5/8" diameter and one inch long which will completely cover the hole and prevent the leakage of any mortar.
4. Form Release Agents - Form release agents shall not stain or cause imperfections on concrete surfaces. All form release agents shall be paint compatible.
5. Void Boxes (Fiber-board forms) – Void boxes shall be equal to those manufactured by Surevoid Products, inc. of Fort Worth, Texas. The boxes shall be capable of sustaining a load of 1000 pounds per square foot, shall have an interior uniform cellular configuration, shall be rectangular in shape, and shall be coated, not impregnated, with moisture resistant compound. Refer to the plans for the depth of the boxes. Archvoid pier void pieces or pier voids shall be installed at the piers under the grade beams. Trapezoidal void boxes are prohibited.
6. Soil Retainer Boards
 - a. Foam Board Panels: Styrofoam Brand Square Edge Rigid Insulation as manufactured by Dow Chemical Co. and distributed locally by Cain's Builders Supply (817 581-1344). Retainer boards shall have a flexural strength of 50 psi (ASTM C 203), shear strength of 35 psi (ASTM D 393), compressive strength of 25 psi (ASTM D 1621) and a tensile strength of 50 psi (ASTM D 1623), supplied in 1" = 4"-6" void forms, 1½" = 8" forms, or 2" = 10"-12" forms thickness.
 - b. Plastic Boards: Motzblock, as manufactured by M&M Construction Specialties (800.937.9493). Retainer boards shall be a cambered, ribbed and made of high density polyethylene. Retainer boards shall have superior strength to resist lateral loads applied by compacted soil, be impact resistant and capable of being exposed to moisture without deterioration.

- c. Fluted Polypropylene Board – white, 13mm thick, high density polypropylene board with a cellular profile as distributed by SureVoid Products, Inc. of Fort Worth, Texas.

E. ACCESSORY MATERIALS

1. Non-shrink Grout – ASTM C1107, Grades B or C
 - a. Masterflow 713 Plus, Non-Shrink Grout, or approved equal.
2. Vapor Retarder –
 - a. Typical floor slab: 10 mil, ASTM E-1745, Class A or better.
 - 1) Stego Wrap by Stego Industries, LLC.
 - 2) Vapor Block by Raven Industries.
 - 3) Perminator by W.R. Meadows.
 - b. Wood Flooring: 15 mil, ASTM E-1745, Class A or better.
 - 1) Stego Wrap by Stego Industries, LLC.
 - 2) Vapor Block by Raven Industries.
 - 3) Perminator by W.R. Meadows.
 - c. Specialty Flooring: Remolded Membrane Vapor Seal by W.R. Meadows, or approved equal conforming to ASTM E-1993.
3. Waterstops - Greenstreak Style 732, or approved equal.
4. Expansion joint fillers -- Sponge rubber conforming to ASTM D-1752.
5. Evaporation Reducer: - Confilm by Degussa Admixtures, or approved equal.
6. Concrete Sealers, Hardeners and Coatings:
 - a. Exposed concrete floors with light traffic:
 - 1) Lapidolith by Sonneborn
 - 2) Super Rez-Seal by Euclid
7. Bonding Agent – SikaDur 32 by Sika Corporation, or approved equal, two-part, 100% solids epoxy conforming to ASTM C-881.
8. Leveling Compound:
 - a. At sloped surfaces up to 3 inches deep, and exposed surfaces: Ardex SDT, or approved equal.
 - b. To level uneven floor surfaces that receive a floor covering: Ardex K-15, or approved equal

PART 3 - EXECUTION

3.1 GRADE CONTROL

- A. Establish and maintain lines and grades for concrete items. Construct concrete items to the shapes, dimensions and elevations indicated.

3.2 SUBGRADE PREPARATION

- A. Rough grading will have been completed. Complete any fine grading operations to prepare subgrades.

3.3 VAPOR RETARDER MEMBRANE

- A. General - Start membrane under perimeter grade beam and over subgrade. All joints and seams, lateral and butt, shall be overlapped 6 inches and taped using the manufacturer's recommended tape system. All penetrations must be sealed using specified membrane and tape. Any area damaged after installation shall be repaired using manufacturer's product and tape. Cover any damage by a minimum overlap of 6 inches in all directions and tape carefully around entire perimeter of repair.
- B. Provide a 10 mil vapor retarder under all interior slabs-on-grade except as noted below.
 - 1. Wood Floors: Provide a 15 mil vapor retarder under all wood flooring.
 - 2. Specialty Flooring: Provide a Premoulded Membrane Vapor Seal under specialty flooring where noted on the drawings.

3.4 FORMWORK

- A. General - Do not use earth cuts as forms for vertical surfaces. Design and engineering of formwork is the responsibility of the Contractor. Design formwork for loads and lateral pressures outlined in Part 3, Section 102 of ACI 347 "Recommended Practice for Concrete Formwork." Camber formwork to compensate for anticipated deflections due to weight and pressure of fresh concrete. Provide positive means of adjustment of shores and struts. Take up settlement during concrete placing operations. Provide temporary openings at base of column forms and wall forms and at other points where necessary to facilitate cleaning and observation immediately before depositing concrete. Build into forms the required inserts, pipe sleeves, bolts and other equipment as approved by the structural engineer.
- B. Preparation of form surfaces - Forms must be tight to prevent leakage of grout or cement paste. Board forms having joints opened by shrinkage shall be swelled until closed by wetting before concrete is placed. Seal plywood and other wood surfaces not subject to shrinkage against absorption of moisture by field-applied non-absorptive liner. Steel forms shall be coated to prevent bond with concrete, apply coating prior to placing of reinforcing steel.
- C. Construct formwork so that concrete surfaces will conform to the following tolerances:
 - 1. Variations from plumb in lines and surfaces and walls: $\frac{1}{4}$ " in per 10 foot of distance, but not more than 1".
 - 2. Variations of distance between columns and beams: $\frac{1}{4}$ " per 10 foot of distance, but not more than $\frac{1}{2}$ " in any one bay, and not more than 1" total variation.
 - 3. Variation from position of linear building lines from established position in plans, but not more than 1".
 - 4. Variation in sizes and locations of sleeves and floor openings: (-) $\frac{1}{4}$ " and (+) $\frac{1}{2}$ ".
 - 5. Variation in cross-sectional dimensions of columns and beams and the thickness of slabs: (-) $\frac{1}{4}$ " and (+) $\frac{1}{2}$ ".
- D. All grade beams shall be formed using form ties and wales. Wire may not be substituted for ties and 2x12's are not acceptable to form grade beams.

- E. No piping or conduits shall be installed in any concrete without the prior written approval of the engineer. If approved, piping or conduits shall be located in the middle of the slab and shall not exceed one inch in outer diameter.
- F. Void Boxes - Void boxes shall be installed to minimize all locations which concrete could penetrate the void space during placement. Tape all ends of boxes and all joints between boxes shall be snug or covered with masonite or taped as required to prevent concrete from entering the void space. Any boxes damaged by moisture shall be replaced prior to placing concrete. Any gaps between void boxes shall be covered with cardboard bridging. Any gaps between piers and archvoids shall be filled with a material to be approved by the Engineer. Do not use poly on top or bottom of boxes or wrap the boxes in poly. Cover all boxes under the slab with 1/4" masonite.

3.5 PLACING REINFORCEMENT

- A. General - Metal reinforcement shall be free from loose flaky rust, mud, oil or other coatings that will reduce bond. Thickness of concrete cover shall be in accordance with Chapter 7, ACI 318 "Building Code Requirements for Reinforced Concrete." Welding of reinforcement shall not be permitted.
- B. Bar placing - Support and wire bars together to prevent displacement beyond the following tolerances:
 - 1. Concrete cover to formed surfaces: +/- 1/4".
 - 2. Minimum spacing between bars: +/- 1/4".
 - 3. Top bars in slabs and beams:
 - a. Members 8" deep or less: +/- 1/4".
 - b. Members more than 8" but not over 2 feet deep: +/- 1/2".
 - 4. Crosswise of members space evenly within 2".
 - 5. Lengthwise of members: +/- 2".
 - 6. Move bars as necessary to avoid interference with other reinforcing steel, conduits or embedded items. If bars are moved to exceed above tolerances, resulting arrangements of bars must be approved by the Engineer.

3.6 CONSTRUCTION JOINTS

- A. General - Locate construction joints in concrete as indicated. Construction joints not shown on the construction documents shall be made and located to least impair the strength of the structure. Joint locations shall be approved by the engineer. The surface of all joints shall be thoroughly cleaned and all laitance removed prior to placing the adjoining concrete. Reinforcing steel and wire mesh shall be continued across all joints, unless detailed otherwise. Provide longitudinal keys at least 1 1/2" deep in wall joints.
- B. Waterstops – Install Waterstops in joints where shown on drawings, and at all other joints located below grade. Make joints at the ends and intersections of pieces as recommended by the manufacturer to develop water tightness.
- C. Fill all saw cuts in concrete slabs with approved Sawcut Joint Filler.

3.7 CONCRETE PLACEMENT

- A. Proportioning and Design of Concrete Mixes – Refer to the drawings for the required 28 day concrete compressive strength, minimum cement content, required air content and required slump.
1. Measuring ingredients for concrete - Measure ingredients for concrete separately for each batch, by weight, except that water may be by weight or volume. Mix and transport ready-mix concrete in accordance with ASTM C94 "Specifications for Ready-Mixed Concrete" (Alternate No. 1).
- B. Fibrous Reinforcement – Add fibrous concrete reinforcement to concrete materials at the time the concrete is batched in amounts conforming to the approved submittals, and ASTM C-116. Mix concrete for the uniform distribution of the fibers.
- C. Preparation before placing concrete -- Remove hardened concrete and foreign material from conveying equipment. Formwork must be complete, installed with ice and excess water removed. Reinforcement must be secured in place. Expansion joint material, anchors and other embedded items in position. Sprinkle subgrades sufficiently to eliminate suction. Seal extremely porous subgrades in an approved manner. Completely clean forms of foreign matter immediately prior to placing concrete.
- D. Weather Conditions:
1. Protection - Do not place concrete during rain, sleet or snow unless adequate protection is provided and approval by the engineer is obtained.
 2. Cold Weather - In cold weather, concrete placement shall conform to the provisions ACI 306 "Cold Weather Concreting." Do not place concrete when the temperature is forecast to be 32 degrees or below for the next 72 hours.
 3. Hot Weather - If the air temperature is greater than 90 degrees or the concrete temperature greater than 85 degrees, use hot weather concreting procedures in conformance to ACI 305 "Hot Weather Concreting," and as approved by the engineer. The contractor may submit his preferred procedure, but all procedures must be approved by the engineer. These procedures may include but the following:
 - a. Placing the concrete in the early morning hours.
 - b. The use of evaporation reducer (see below).
 - c. The use of misting as a curing method.
 - d. The use of wet blankets as a curing method.
 - e. The modification of the concrete mix to add a retarder (not the preferred method and will be approved only under special conditions).
- E. Concrete slump - Do not place concrete when its plasticity, as measured by slump tests, is different from those listed in the drawings. Any concrete which comes to the jobsite other than these slumps will be rejected. Do not add water to the concrete on the jobsite without the approval of the engineer or the testing laboratory.

- F. Deposit concrete as close as practical to its final destination to avoid segregation due to rehandling or flowing. Do not subject the concrete to any procedure that will cause segregation. Vibrators shall not be used to transport concrete.
- G. Deposit concrete continuously, or in layers of such thickness that no concrete will be deposited on concrete that has hardened sufficiently to cause the formation of seams or cold joints. Placement shall be at a rate such that the concrete being intergraded with the fresh concrete is still plastic.
- H. Consolidate all concrete by mechanical vibration supplemented by spading, tamping and rodding to secure a dense, homogeneous mass, thoroughly worked around reinforcement, embedded items and into the corners of the formwork. Where concrete is placed in layers, vibrators shall be extended into the layer below.

3.8 FINISHING CONCRETE SLAB SURFACES

- A. General - For all horizontal slab surfaces, all bull floating shall be done before bleeding occurs. Use wooden floats and trowels on non-air entrained concrete. Use magnesium floats and trowels on air entrained concrete. Use a darby at all edges of slabs. No troweling is to be done until after bleeding is complete. Do not use a fresno before bleeding is complete. Use mechanical trowel from left to right only. No jitterbugging will be allowed. Level the surface to a tolerance of 1/8" in ten feet when tested with a ten foot long straight edge.
- B. Brush Finish:
 - 1. Location:
 - a. all exterior concrete
 - b. all interior slabs that will receive ceramic tile or brick pavers
 - 2. Method of finishing - Steel trowel smooth. Brush the surface immediately after troweling with a soft bristle broom to create a uniformly textured, non-skid surface. Brush lines shall be parallel to the direction of the slope.
- C. Trowel finish:
 - 1. Location - all interior slabs and interior face of precast panels.
 - 2. Method of finishing - Steel trowel smooth with mechanical trowel.
- D. Evaporation Reducer - Use an approved evaporation reducer after each finishing operation on the cast in place concrete floor slab unless the conditions do not require its use. Prior approval from the engineer must be obtained to omit the use of this product.
- E. Concrete Hardener - Provide a hardener on all interior exposed concrete surfaces. Apply in accordance with manufacturers recommendations.
- F. Special Coating Areas – Refer to the drawings for the exposed concrete slab areas that shall receive the Special Coating. Slabs shall be sealed by first etching the surface with an acid etcher, and then applying two coats of clear epoxy. The contractor shall submit to the Engineer for approval the manufacturer of the sealer and the method of application. If

there is any doubt that the method the contractor wishes to use, then it must be submitted prior to bidding.

3.9 CURING AND PROTECTION

- A. General - Protect freshly deposited concrete from premature drying and excessively hot or cold temperatures, and maintain without drying at a relatively constant temperature for the required period of time. Curing shall immediately follow finishing operations.
- B. Membrane Curing Compound - Cure all concrete slabs with a one coat application of membrane curing compound. Minimum coverage rate of 400 square feet to the gallon. Apply strictly in conformity with manufacturer's recommendations. Curing compound shall be compatible with the sealer used on the concrete.
- C. Temperature:
 - 1. Cold Weather - When mean daily temperature of atmosphere is less than 40 degrees F., maintain temperature of concrete between 50 and 70 degrees F. for the required curing period. When necessary, make arrangements for heating, covering, insulating, or housing in advance of placement. Arrangements shall be adequate to maintain required temperature and moisture conditions. Do not place concrete when the temperature is forecast to be 32 degrees or below for the next 72 hours.
 - 2. Hot Weather - If the air temperature is greater than 90 degrees or the concrete temperature greater than 85 degrees, hot weather concreting procedures shall be used as approved by the engineer. The contractor shall submit a procedure to the engineer for approval. Refer to section 3.7.E.3 of this specification section for acceptable procedures.

3.10 REMOVAL OF FORMS

- A. Formwork for columns, walls sides of beams and other parts not supporting weight of concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal operations.
- B. Repair all surface defects immediately after form removal including, but not limited to the following:
 - 1. Cut form ties back at least $\frac{3}{4}$ ". Clean and thoroughly dampen the holes and fill solid with patching mortar.
 - 2. Remove all honeycombed and other defects down to sound concrete. Clean and thoroughly dampen the honeycomb holes and fill solid with patching mortar.
 - 3. If the repaired surface is exposed to view, the patching mortar shall be blended to produce a color matching the color of the surrounding concrete.

3.12 QUALITY ASSURANCE

- A. General – Verification inspection and testing of all cast-in-place concrete Work shall be performed by a Testing Agency. The Testing Agency will conduct and interpret tests and state in a report whether the Work complies with or deviates from requirements. Copies of the inspection and tests reports shall be submitted to the Architect/Engineer and Contractor in a timely manner.

1. Contractor shall provide access to work as required to accomplish testing. Contractor shall correct deficiencies in or remove and replace structural steel that inspections and tests reports indicate do not comply with the specification requirements.
 2. Additional testing of deficient Work will be performed at Contractor's expense to determine the compliance of the corrected Work with the specification requirements.
- B. Inspection and Testing – The testing laboratory shall be responsible for the quality assurance of the concrete. The laboratory shall perform all required concrete tests, and shall observe the placement of the concrete to enforce the requirements of this specification. Any discrepancies shall be immediately reported to the General Contractor for correction, and prominently noted in the laboratory reports. Reporting shall include the location of the discrepancy.
- C. Compression Tests - The Contractor shall notify the testing laboratory to take test cylinders in accordance with the provisions of ASTM C172 and ASTM C31, and according to the schedule below. One cylinder shall be tested at 7 days, two at 28 days and the last one held.
1. Three cylinders every 75 cubic yards of concrete, or
 2. Three cylinders for each days work for quantities under 75 cubic yards.
- D. Slump Test - The testing laboratory shall perform a slump test in accordance with the provisions of ASTM C143 with each set of cylinders.
- E. Air Content Test - The testing laboratory shall perform an air content test in accordance with the provisions of ASTM C143 with each set of cylinders.
- F. Concrete Temperature - The testing laboratory shall record the temperature of the concrete in accordance with the provisions of ASTM C23 with each set of cylinders.

3.13 NONCOMPLIANCE

- A. Any concrete which does not meet the American Concrete Institute standards for compliance with the design strengths shall be field tested by a testing laboratory at the Contractor's expense if required by the Engineer. Field tests shall be by coring or non-destructive testing approved by the Engineer.
- B. Any concrete which fails to meet specifications by field testing shall be replaced at the Contractor's expense.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Decorative concrete masonry units.
3. Pre-faced concrete masonry units.
4. Mortar and grout.
5. Steel reinforcing bars.
6. Masonry joint reinforcement.
7. Ties and anchors.
8. Embedded flashing.
9. Miscellaneous masonry accessories.
10. Masonry-cell insulation.

B. Related Sections:

1. Section 033000 "Cast-in-Place Concrete" for installing dovetail slots for masonry anchors.
2. Section 047200 "Cast Stone Masonry" for furnishing cast stone trim.
3. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural-steel frame.
4. Section 071900 "Water Repellents" for water repellents applied to concrete unit masonry.
5. Section 076200 "Sheet Metal Flashing and Trim" for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
6. Section 097523 "Stone Window Stools" for stone window stools.
7. Section 321400 "Unit Paving" for exterior concrete unit masonry paving.
8. Section 323223 "Segmental Retaining Walls" for dry-laid, concrete unit retaining walls.

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide **structural** unit masonry that develops indicated net-area compressive strengths at 28 days.
 - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
 - 2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
 - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
 - 1. Decorative CMUs, in the form of small-scale units.
 - 2. Pre-faced CMUs.
 - 3. Weep holes/vents.
- D. Samples for Verification: For each type and color of the following:
 - 1. Exposed Decorative CMUs.
 - 2. Pre-faced CMUs.
 - 3. Accessories embedded in masonry.

1.7 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
 - B. Qualification Data: For testing agency.
 - C. Material Certificates: For each type and size of the following:
 1. Masonry units.
 - a. Include data on material properties and material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 2. Cementitious materials. Include brand, type, and name of manufacturer.
 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 4. Grout mixes. Include description of type and proportions of ingredients.
 5. Reinforcing bars.
 6. Joint reinforcement.
 7. Anchors, ties, and metal accessories.
 - D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
 - E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
 - F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.
- 1.8 QUALITY ASSURANCE
- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.
 - B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
 - C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

- D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- E. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.
 - 1. Build sample panels for **typical exterior wall** in sizes approximately **48 inches** long by **48 inches** high.
 - 2. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
 - 3. Protect approved sample panels from the elements with weather-resistant membrane.
 - 4. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Protect accepted mockups from the elements with weather-resistant membrane.
 - 2. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.10 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of **24 inches (600 mm)** down both sides of walls and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is **40 deg F** and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide **square-edged or bullnose (see plan details)** units for outside corners unless otherwise indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed split face CMU.
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
 - a. **Products:** Subject to compliance with requirements, provide the following:
 - 1) Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.
- C. CMUs: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of **2150 psi**.
 2. Density Classification: **Medium weight**.
 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 4. Size (Width): Manufactured to the following dimensions:
 - a. 100 mm nominal; **[90]** **[92]** mm actual.
 - b. 150 mm nominal; **[140]** **[143]** mm actual.
 - c. 200 mm nominal; **[190]** **[194]** mm actual.
 - d. 250 mm nominal; **[240]** **[244]** mm actual.
 - e. 300 mm nominal; **[290]** **[295]** mm actual.
 - f. 400 mm nominal; **[390]** **[396]** mm actual.
 5. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
 6. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.
- D. Concrete Building Brick: ASTM C 55.
1. Density Classification: **Medium weight**.
 2. Size (Actual Dimensions): As per plans.

E. Decorative CMUs: ASTM C 90.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Featherlite Building Products Corp.
2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of **1900 psi min.**
3. Density Classification: **Lightweight or Medium weight.**
4. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph.
5. Pattern and Texture:
 - a. Standard pattern, ground-face finish. **Match Architect's samples.**
 - b. Standard pattern, split-face finish. **Match Architect's samples.**
 - c. Standard pattern, split-ribbed finish. **Match Architect's samples.**
 - d. Scored vertically so units laid in running bond appear as square units laid in stacked bond, standard finish. **Match Architect's samples.**
 - e. Triple scored vertically so units laid in running bond appear as vertical units laid in stacked bond (soldier courses), standard finish. **Match Architect's samples.**
6. Colors: **As selected by Architect from manufacturer's full range.**
7. Special Aggregate: Provide units made with aggregate matching aggregate in Architect's sample.

F. Pre-faced CMUs: Lightweight **hollow** concrete units complying with ASTM C 90, with manufacturer's standard smooth resinous facing complying with ASTM C 744.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Featherlite Building Products Corp.
2. Size: Manufactured to dimensions specified in "CMUs" Paragraph, but with pre-faced surfaces having **1/16-inch- (1.5-mm-)** wide returns of facing to create **1/4-inch- (6.5-mm-)** wide mortar joints with modular coursing.
3. Colors and Patterns: **As selected by Architect from manufacturer's full range.**

2.3 CONCRETE AND MASONRY LINTELS

A. General: Provide the following:

- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated. **Verify color to be used with Architect.**
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than **1/4 inch (6 mm)** thick, use aggregate graded with 100 percent passing the **No. 16 (1.18-mm)** sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Aggregate for Grout: ASTM C 404.
- F. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs, containing integral water repellent by same manufacturer.
 - 1. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **ACM Chemistries, Inc.;** RainBloc for Mortar.
 - b. **BASF Aktiengesellschaft;** Rheopel Mortar Admixture.
 - c. **Grace Construction Products, W. R. Grace & Co. - Conn.;** Dry-Block Mortar Admixture.
- G. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, **Grade 60 (Grade 420)**.
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
 - 1. Interior Walls: **Mill- 9 gage galvanized**, carbon steel.
 - 2. Exterior Walls: **Hot-dip galvanized** steel.
 - 3. Wire Size for Side Rods: **0.148-inch** diameter.
 - 4. Wire Size for Cross Rods: **0.148-inch** diameter.
 - 5. Wire Size for Veneer Ties: **0.148-inch** diameter.
 - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than **16 inches (407 mm)** o.c.
 - 7. Provide in lengths of not less than **10 feet (3 m)**.

- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either **ladder or truss type** with single pair of side rods.

2.6 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. **Mill-Galvanized**, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 641/A 641M, Class 1 coating – **Interior only**.
2. **Hot-Dip Galvanized**, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating – **Exterior**.

- B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped **1/4-inch- (6.35-mm-)** diameter, **hot-dip galvanized steel wire**. **Mill-galvanized wire may be used at interior walls unless otherwise indicated.**
2. Tie Section: Triangular-shaped wire tie, sized to extend within **1 inch (25 mm)** of masonry face, made from **0.187-inch** diameter, wire. **Mill-galvanized wire may be used at interior walls, unless otherwise indicated.**

- C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from **0.105-inch- (2.66-mm-)** thick, steel sheet, **galvanized after fabrication**.
 - a. **0.108-inch** thick, galvanized sheet may be used at interior walls unless otherwise indicated.
2. Tie Section: Triangular-shaped wire tie, sized to extend within **1 inch (25 mm)** of masonry face, made from **0.187-inch** diameter, **hot-dip galvanized steel wire**. **Mill-galvanized wire may be used at interior walls unless otherwise indicated.**
3. Corrugated Metal Ties: **Metal strips not less than 7/8 inch (22 mm)** wide with corrugations having a wavelength of **0.3 to 0.5 inch (7.6 to 12.7 mm)** and an amplitude of **0.06 to 0.10 inch (1.5 to 2.5 mm)** made from **0.105-inch- (2.66-mm-)** thick, steel sheet, **galvanized after fabrication** with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within **1 inch (25 mm)** of masonry face.
 - a. **01.08-inch- (2.74-mm-)** thick, galvanized sheet may be used at interior walls unless otherwise indicated.

2.7 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: **Headed or L-shaped** steel bolts complying with **ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6)**; with **ASTM A 563 (ASTM A 563M)** hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with **SMACNA's "Architectural Sheet Metal Manual"** and as follows:
 - B. Application: Unless otherwise indicated, use the following:
 - 1. Where flashing is fully concealed, use **metal flashing or flexible flashing**.
 - C. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
 - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 - 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
 - 3. Elastomeric Sealant: ASTM C 920, chemically curing **urethane** sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
 - D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Preformed Control-Joint Gaskets: Made from **styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805** and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

2.10 MASONRY-CELL INSULATION

- A. Loose-Granular Fill Insulation: **Perlite** complying with ASTM C 549, **Type II** (surface treated for water repellency and limited moisture absorption) or **Type IV** (surface treated for water repellency and to limit dust generation).

2.11 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
 2. Use **portland cement-lime** mortar unless otherwise indicated.
 3. For exterior masonry, use **portland cement-lime** mortar or Type S masonry.
 4. For reinforced masonry, use **portland cement-lime** mortar or Type S masonry.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is **indicated or needed to provide required compressive strength of masonry**.
1. For masonry below grade or in contact with earth, use **Type S**.
 2. For reinforced masonry, use **Type S**.
 3. For mortar parge coats, use **Type S**.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than **2000 psi (14 MPa)**.
 3. Provide grout with a slump of **8 to 11 inches (203 to 279 mm)** as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that reinforcing dowels are properly placed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TOLERANCES

- A. Dimensions and Locations of Elements:
 1. For dimensions in cross section or elevation do not vary by more than plus **1/2 inch (12 mm)** or minus **1/4 inch (6 mm)**.
 2. For location of elements in plan do not vary from that indicated by more than plus or minus **1/2 inch (12 mm)**.
 3. For location of elements in elevation do not vary from that indicated by more than plus or minus **1/4 inch (6 mm)** in a story height or **1/2 inch (12 mm)** total.
- B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than **1/4 inch in 10 feet (6 mm in 3 m)** maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than **1/8 inch in 10 feet (3 mm in 3 m)**.
3. For vertical lines and surfaces do not vary from plumb by more than **1/4 inch in 10 feet (6 mm in 3 m)** maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than **1/8 inch in 10 feet (3 mm in 3 m)** maximum.
5. For lines and surfaces do not vary from straight by more than **1/4 inch in 10 feet (6 mm in 3 m)** maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than **1/4 inch in 10 feet (6 mm in 3 m)** maximum.

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in **running bond**; do not use units with less than nominal **4-inch (100-mm)** horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than **4-inches (100-mm)**. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal **4-inch (100-mm)** horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout **24 inches (600 mm)** under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078446 "Fire-Resistive Joint Systems."

3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 - 2. Allow cleaned surfaces to dry before setting.
 - 3. Wet joint surfaces thoroughly before applying mortar.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY-CELL INSULATION

- A. Pour granular insulation into cavities to fill void spaces. Limit the fall of insulation to one story high, but not more than **20 feet (6 m)**.

3.6 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of **5/8 inch (16 mm)** on exterior side of walls, **1/2 inch (13 mm)** elsewhere. Lap reinforcement a minimum of **6 inches (150 mm)**.
 - 1. Space reinforcement not more than **16 inches (406 mm)** o.c.
 - 2. Provide reinforcement not more than **8 inches (203 mm)** above and below wall openings and extending **12 inches (305 mm)** beyond openings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

- E. Cut and bend reinforcing units as directed by manufacturer for continuity at [**corners,**] returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
 - 1. Provide an open space not less than **1/2 inch (13 mm)** wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than **24 inches (610 mm)** o.c. vertically and **36 inches (915 mm)** o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
 - 1. Provide sash block with preformed gaskets.

3.9 LINTELS

- A. Provide **concrete or masonry** lintels where shown and where openings of more than **12 inches (305 mm)** for brick-size units and **24 inches (610 mm)** for block-size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of **8 inches (200 mm)** at each jamb unless otherwise indicated.

3.10 FLASHING

- A. General: Install embedded flashing in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch (13 mm)** back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 - 2. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch (13 mm)** back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
 - 3. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.11 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than **12.67 ft. (3.86 m)**.

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.13 MASONRY WASTE DISPOSAL

- A. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Face brick.
2. Mortar and grout.
3. Ties and anchors.
4. Embedded flashing.
5. Miscellaneous masonry accessories.

B. Related Sections:

1. Section 03300 "Cast-in-Place Concrete" for installing dovetail slots for masonry anchors.
2. Section 05120 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
3. Section 05500 "Metal Fabrications" for furnishing steel lintels and shelf angles for brick masonry.
4. Section 07620 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:

1. Face brick.
2. Weep holes/vents.

D. Samples for Verification: For each type and color of the following:

1. Face brick.
2. Weep holes and vents.
3. Accessories embedded in masonry.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of the following:

1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
 2. Cementitious materials. Include brand, type, and name of manufacturer.
 3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 4. Grout mixes. Include description of type and proportions of ingredients.
 5. Anchors, ties, and metal accessories.
- B. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Clean exposed faces of mockups with masonry cleaner as indicated.
 2. Protect accepted mockups from the elements with weather-resistant membrane.
 3. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls and hold cover securely in place.

- B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.2 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units.
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 - 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 - 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

- B. Face Brick: Facing brick complying with ASTM C 216.

Brick: 5-brick blend as manufactured by Acme Brick Company, all brick with velour texture, to include the following brick blended by percentages shown below. Blend mortar color: natural gray with raked joints to make existing.

Brick Blend

DTP449 Caramel Ironspot	25%
DTP162 Dark Baja Blend	23%
DTP405 Golden Sunset Flash	21%
DTP456 Cranberry Flash	17%
ELP276 Navajo Red	14%

2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color mortar color.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91.
- E. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than **1/4 inch (6 mm)** thick, use aggregate graded with 100 percent passing the **No. 16 (1.18-mm)** sieve.
- F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 - 1. **Products:** Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. **Euclid Chemical Company (The)**; Accelguard 80.
 - b. **Grace Construction Products; W.R. Grace & Co. -- Conn**; Morset.
 - c. **Sonneborn Products**; Trimix-NCA.

2.4 REINFORCEMENT

- A. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

2.5 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 641/A 641M, Class 1 coating.
 - 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
 - 3. Stainless-Steel Wire: ASTM A 580/A 580M, **Type 304**.
 - 4. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, **G60 (Z180)** zinc coating.

5. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 6. Stainless-Steel Sheet: ASTM A 666, **Type 304**.
 7. Stainless-Steel Bars: ASTM A 276 or ASTM A 666, Type 304.
- B. Corrugated Metal Ties: Metal strips not less than **7/8 inch (22 mm)** wide with corrugations having a wavelength of **0.3 to 0.5 inch (7.6 to 12.7 mm)** and an amplitude of **0.06 to 0.10 inch (1.5 to 2.5 mm)** made from **16 ga. 0.060-inch- (1.52-mm-) thick, steel sheet, galvanized after fabrication 22 ga. 0.031-inch- (0.79-mm-) thick, stainless-steel sheet.**
- C. Wire Ties, General: Unless otherwise indicated, **size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face.** Outer ends of wires are bent 90 degrees and extend **2 inches (50 mm)** parallel to face of veneer.
- D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped **1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.**
 2. Tie Section: Triangular-shaped wire tie, sized to extend within **1 inch (25 mm)** of masonry face, made from **0.187-inch-** diameter, **hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.**
- E. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from **0.105-inch- (2.66-mm-) thick, steel sheet, galvanized after fabrication.**
 - a. **0.108-inch- (2.74-mm-) thick, galvanized sheet may be used at interior walls unless otherwise indicated.**
 2. Tie Section: Triangular-shaped wire tie, sized to extend within **1 inch (25 mm)** of masonry face, made from **0.187-inch-** diameter, **hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.**
 3. Corrugated Metal Ties: Metal strips not less than **7/8 inch (22 mm)** wide with corrugations having a wavelength of **0.3 to 0.5 inch (7.6 to 12.7 mm)** and an amplitude of **0.06 to 0.10 inch (1.5 to 2.5 mm)** made from **0.060-inch- (1.52- mm-) thick, steel sheet, galvanized after fabrication** with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within **1 inch (25 mm)** of masonry face.
- F. Adjustable Masonry-Veneer Anchors:
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 2. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
 3. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
 - a. **Products:** Subject to compliance with requirements, **provide the following or approved equal:**

- 1) [Dayton Superior Corporation, Dur-O-Wal Division.](#)
 - 2) [Hohmann & Barnard, Inc;](#) **DW-10-X.** Stud walls without insulation.
 - 3) For stud walls with insulated use Hohmann & Bernard 2/3 anchors with triangle wire ties.
4. With block and insulation boards HB-270-2X cadder eye-wire hot dipped galvanize.

2.6 MISCELLANEOUS ANCHORS

- A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.

2.7 EMBEDDED FLASHING MATERIALS

- A. Flexible Flashing:

1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than **0.040 inch (1.02 mm)**.

- a. **Products:** Subject to compliance with requirements, provide one of the following:

- 1) [Carlisle Coatings & Waterproofing Inc;](#) CCW-705-TWF Thru-Wall Flashing.
- 2) [Grace Construction Products; W.R. Grace & Co. -- Conn;](#) Perm-A-Barrier Wall Flashing.
- 3) [Hohmann & Barnard, Inc;](#) Textroflash or Flexflash.
- 4) [Meadows, W.R.,Inc;](#) Air-Shield Thru-Wall Flashing.

- b. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

2. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy.

- a. **Products:** Subject to compliance with requirements, provide one of the following:

- 1) [Du Pont;](#) Thru-Wall Flashing.
- 2) [Hohmann & Barnard, Inc;](#) Flex-Flash.
- 3) [Hyload, Inc;](#) Hyload Cloaked Flashing System.
- 4) [Mortar Net USA, Ltd;](#) Total Flash.

- b. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, **0.025 inch (0.64 mm)** thick, with a **0.015-inch- (0.38-mm-)** thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately **1-1/2 inches (38 mm)** from edge. Provide drip edge above all window and door openings.

- 1) Color: As selected by Architect.

- c. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

- B. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
 2. Where flashing is indicated to be turned down at or beyond the wall face, **use metal flashing.**
 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing **with a drip edge, with a sealant stop, or flexible flashing with a metal drip edge or as detailed on Drawings.**
 4. Where flashing is fully concealed, use **flexible flashing.**
- C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. Wicking Material: Absorbent rope, made from **cotton or UV-resistant synthetic fiber**, 1/4 to 3/8 inch (6 to 10 mm) in diameter, in length required to produce 2-inch (50-mm) exposure on exterior and 18 inches (450 mm) in cavity. Use only for weeps.
- B. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. **Products:** Subject to compliance with requirements, provide one of the following:
 - a. [Dayton Superior Corporation, Dur-O-Wal Division](#); Polytite MortarStop.
 - b. [Mortar Net USA, Ltd](#); Mortar Net.
 2. Provide one of the following configurations:
 - a. Strips, full-depth of cavity and **10 inches (250 mm)** high, with dovetail shaped notches **7 inches (175 mm)** deep that prevent clogging with mortar droppings.
 - b. Strips, not less than **1-1/2 inches (38 mm)** thick and **10 inches (250 mm)** high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
 - c. Sheets or strips full depth of cavity and installed to full height of cavity.
 - d. Sheets or strips not less than **1 inch (25 mm)** thick and installed to full height of cavity with additional strips **4 inches (100 mm)** high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.

2.9 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
1. **Manufacturers:** Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
 - a. [Diedrich Technologies, Inc.](#)
 - b. [EaCo Chem, Inc.](#)
 - c. [PROSOCO, Inc.](#)

2.10 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar.
 - 2. Use **portland cement-lime, masonry cement, or Type S mortar cement** mortar unless otherwise indicated.
 - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide **Type S** unless another type is indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation do not vary by more than plus **1/2 inch (12 mm)** or minus **1/4 inch (6 mm)**.
 - 2. For location of elements in plan do not vary from that indicated by more than plus or minus **1/2 inch (12 mm)**.
 - 3. For location of elements in elevation do not vary from that indicated by more than plus or minus **1/4 inch (6 mm)** in a story height or **1/2 inch (12 mm)** total.
- B. Lines and Levels:
 - 1. For bed joints and top surfaces of bearing walls do not vary from level by more than **1/4 inch in 10 feet (6 mm in 3 m)**, or **1/2 inch (12 mm)** maximum.
 - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or **1/2 inch (12 mm)** maximum.
 - 3. For vertical lines and surfaces do not vary from plumb by more than **1/4 inch in 10 feet (6 mm in 3 m)**, **3/8 inch in 20 feet (9 mm in 6 m)**, or **1/2 inch (12 mm)** maximum.
 - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or **1/2 inch (12 mm)** maximum.
 - 5. For lines and surfaces do not vary from straight by more than **1/4 inch in 10 feet (6 mm in 3 m)**, **3/8 inch in 20 feet (9 mm in 6 m)**, or **1/2 inch (12 mm)** maximum.

6. For vertical alignment of exposed head joints, do not vary from plumb by more than **1/4 inch in 10 feet (6 mm in 3 m)**, or **1/2 inch (12 mm)** maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than **1/16 inch (1.5 mm)** except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**, with a maximum thickness limited to **1/2 inch (12 mm)**; do not vary from bed-joint thickness of adjacent courses by more than **1/8 inch (3 mm)**.
2. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**. [**Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).**]
3. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than **1/16 inch (1.5 mm)** from one masonry unit to the next.

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in **bond pattern indicated on Drawings**; do not use units with less than nominal **4-inch (100-mm)** horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick as follows:
 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 2. With entire units, including areas under cells, fully bedded in mortar at starting course on footings.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set **burnished CMU** trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 2. Allow cleaned surfaces to dry before setting.
 3. Wet joint surfaces thoroughly before applying mortar.

- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.5 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
 - 1. Provide an open space not less than **1 inch (25 mm)** wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than **24 inches (610 mm)** o.c. vertically and **36 inches (915 mm)** o.c. horizontally.

3.6 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to **wall framing and concrete backup** with masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten **screw-attached and seismic** anchors **through sheathing to wall framing and to concrete backup** with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 - 2. Insert slip-in anchors in metal studs as sheathing is installed. Provide one anchor at each stud in each horizontal joint between sheathing boards.
 - 3. Embed **tie sections connector sections and continuous wire** in masonry joints. Provide not less than **2 inches (50 mm)** of air space between back of masonry veneer and face of sheathing.
 - 4. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 5. Space anchors as indicated, but not more than **18 inches (458 mm)** o.c. vertically and **24 inches (610 mm)** o.c. horizontally, with not less than 1 anchor for each **2 sq. ft. (0.2 sq. m)** of wall area. Install additional anchors within **12 inches (305 mm)** of openings and at intervals, not exceeding **8 inches (203 mm)**, around perimeter.
 - 6. Space anchors as indicated, but not more than **16 inches (406 mm)** o.c. vertically and **inches (610 mm)** o.c. horizontally with not less than 1 anchor for each **2.67 sq. ft. (0.25 sq. m)** of wall area. Install additional anchors within **12 inches (305 mm)** of openings and at intervals, not exceeding **36 inches (914 mm)**, around perimeter.

3.7 EXPANSION JOINTS

- A. General: Install expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form expansion joints in brick as follows:
 - 1. Build flanges of metal expansion strips into masonry. Lap each joint **4 inches (100 mm)** in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
 - 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
 - 3. Build in compressible joint fillers where indicated.
 - 4. Form open joint full depth of brick wythe and of width indicated, but not less than **1/2 inch (13 mm)** for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."
 - 5. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.8 VERTICAL REINFORCING, BOND BEAM, AND LINTEL REINFORCING

A. Vertical Reinforcing:

1. All **8" CMU walls** : have **#5 reinforcing bar** and cell filled with grout to top of bond beam **4'-0" o.c.** maximum.
2. Two cells each side of jambs have #4 reinforcing bar in each cell and cells filled with grout to top of bond beam.
3. Where filling entire void between wythes with grout, **#4 reinforcing bars** : places at **1'-0" o.c. max. each direction.**

B. Install steel lintels where indicated.

C. Provide minimum bearing of **8 inches (200 mm)** at each jamb unless otherwise indicated.

3.9 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least **8 inches (200 mm)**; with upper edge tucked under building paper or building wrap, lapping at least **4 inches (100 mm)**.
3. At lintels and shelf angles, extend flashing a minimum of **6 inches (150 mm)** into masonry at each end. At heads and sills, extend flashing **6 inches (150 mm)** at ends and turn up not less than **2 inches (50 mm)** to form end dams.
4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than **1-1/2 inches (38 mm)** or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
5. Install metal **drip edges and sealant stops** with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch (13 mm)** back from outside face of wall and adhere flexible flashing to top of metal drip edge.
7. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch (13 mm)** back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
8. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Trim wicking material flush with outside face of wall after mortar has set.

- E. Install vents in head joints in exterior wythes at spacing indicated. Use **specified weep/vent products or open head joints** to form vents.
 - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.10 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.11 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION

PART 1- GENERAL

1.1 SCOPE

- A. Furnish all labor, materials, services and equipment required to install the

Structural Steel. 1.2 CODES AND STANDARDS

- A. Comply with the provisions of the following codes, specifications and standards, except as otherwise specified or shown:
1. "Standard Specifications for the Design and Fabrication of Structural Steel for Buildings," of the American Institute of Steel Construction.
 2. "Code of Standard Practice for Steel Buildings and Bridges," of A.I.S.C.
 3. "Code of Welding in Building Construction, D1.0" of the American Welding Society.
 4. "Specification for Structural Joints Using ASTM A325 and A490 Bolts," of the Research Council on Structural Connections.
 5. "Painting Manual," of the Steel Structural Painting Council (SSPC).
- B. Comply with all applicable Federal, State, and City codes and regulations for performance of the work of this section including erection safety regulations.

1.2 SUBMITTALS

- A. General - Approval of drawings will only cover the general scheme, design and character of details, but not checking of dimensions or quantities. Contractor shall be responsible for omissions and errors and conformity with the contract documents and specifications. Submit four copies of submittals for review by the engineer, unless otherwise noted in the general conditions.
- B. Shop Drawings - Submit shop and erection drawings based on Contract Documents clearly showing each piece required for fabrication and erection. Include details of cuts, connections, cambers, holes, and other pertinent data. Indicate welds by standard AWS symbols. Indicate type size and length of bolts distinguishing between shop and field bolts. Indicate high- strength bolted slip-critical, direct-tension, and tensioned shear/bearing connections.
- C. Product Data:
1. Mil Test Reports - Mill test reports signed by the manufacturer certifying comply with the requirements of this specification. Each piece of steel shall be identified when submitting the Mill test reports for non-domestic steel.
 2. Bolts, nuts and washers including mechanical properties and chemical analysis..
 3. Shop Primer.
- D. Welder Certification — Provide copies of the AWS Certified Welders documents for each welder demonstrating they are qualified to perform all procedures required by the Contract Documents.

1.3 QUALITY CONTROL

- A. Structural Steel Fabricator — Not less than 5 years experience in the fabrication of structural steel buildings.
- B. Structural Steel Erector - Not less than 5 years experience in the erection of structural steel buildings.
- C. Welders - Make welds only by operators who have recently been qualified by tests, as prescribed in the "Standard Qualification Procedure" (AWA Designation B3.0) of American Welding Society. This provision need not apply to tack welds not later incorporated into finished welds carrying calculated stress.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver structural steel to the Project site in such quantities and at such times to ensure continuity of installation.
- B. Bolts and other anchorage devices to be embedded in concrete and masonry shall be delivered to the site before the start of concrete or masonry work.
- C. Fasteners shall be protected from dirt and moisture. Clean and relubricate bolts and nuts that become dry or rusty before use.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Steel W and C shapes - ASTM A-992 OR ASTM A-572 (Fy=50 Ksi).
- B. Structural Steel Angles, Plates, and Bars - ASTM A-36.
- C. Hollow Steel Shapes — ASTM A-500, Grade B (46 ksi).
- D. Steel Pipe — ASTM A-53, Type E or S, Grade B.
- E. Anchor Bolts, Nuts and Washers:
 - 1. Anchor Rods – F1554 (Fy=36KSI) or ASTM A-36, or equivalent.
 - 2. Nuts — ASTM A-563, heavy hex Grades C, C3, D, DH or DH3.
 - 3. Washers — ASTM F-436.
- F. High Strength Bolts, nuts and Washers:
 - 1. Heavy Hex Steel Structural Bolts - ASTM A-325, Type 1, uncoated.
 - 2. Heavy Hex Carbon-Steel Nuts — ASTM A-563, Grade C, C3, D, DH, or DH3.
 - 3. Hardened carbon-steel washers with finish being plain, uncoated.
- G. Tension Control Bolts — ASTM F-1852.
- H. Shear Connectors — ASTM A-108, Grade 1015 through 1020, headed studs, cold finished carbon steel, AWS D1.1, Type B.

- I. Welding Electrodes - All arc-welding electrodes shall conform to ASTM A-233 for Steel Arc-Welding Electrodes. Electrodes shall be as recommended by their manufacturers for the positions and other conditions of actual use
- J. Shop Primer Paint SSPC — Paint 25, Type 1, red oxide type equivalent to Sherwin-Williams Kemfast-Dri Primer E 61 Al.
- K. Non-Shrink Grout — ASTM C-1107, Grade C.
 - 1. Duragrout by L&M Construction Chemicals.
 - 2. NS Grout by Euclid Chemical Company.
 - 3. Five-Star Grout by Five Star Products, Inc.

2.2 FABRICATION

- A. General - Fabricate and assemble structural steel according to AISC specifications referenced in this section.
- B. Splices — Splice members only where shown on the Contract Documents. Other splices are not allowed without the prior written approval of the engineer.
- C. Templates — Furnish templates, together with instructions, for setting of anchors, anchor bolts and bearing plates.
- D. Misfits and Errors - Any material found missing, or material rejected because of misfits or faults of material or workmanship, shall be supplied forthwith by the Contractor from local sources, if possible. Misfits or errors discovered during sorting or erection shall be corrected, or new fabricated material shall be furnished by the Contractor. Defective work and fasteners shall be replaced at the expense of the Contractor

2.3 WELDING

- A. Weld Connections - Perform shop and field welding in every detail in accordance with all applicable provisions of above referenced A.I.S.C. Specifications and with "Code for Welding in Building Construction" of the American Welding Society.
- B. Weld Details - Comply with all of the requirements for joints which are accepted without qualification tests under the "Code for Welding in Building Construction" (AWA Designation D1.0) of the American Welding Society, and in addition, to specific requirements of the drawings.

2.4 SHOP PAINTING

- A. Shop prime paint all structural steel surfaces, except the following:
 - 1. Work to be embedded in concrete or mortar.

2. Contact surfaces to be field welded shall not be coated within three inches of the weld, prior to welding.
 3. Top flange of beams that receive shear connectors.
 4. Contact surfaces for high strength bolts to be torqued to proof load.
 5. Zinc-coated surfaces.
 6. Surfaces to receive sprayed-on fireproofing.
- B. Surface Preparation - Thoroughly dry and clean surfaces when paint is applied. Remove all mill scale, rust, dirt, grease and other harmful materials prior to coating. Prepare surfaces according to the specification SSPC-SP 2 "Hand Tool Cleaning."
- C. Priming - Soon as possible after cleaning, apply primer to all exposed surfaces according to manufacturer's recommendations. Coat all joints and crevices thoroughly. Paint any surfaces concealed or inaccessible after assembly, prior to assembly. Apply to uniform dried film thickness of not less than 1.5 mil. Promptly repair any damaged coating with primer.

PART 3 - EXECUTION

3.1 ERECTION

- A. Fabrication Errors - Report any errors in shop fabrication or deformation resulting from handling and transportation that prevent proper assembly and fitting of parts immediately to Owner, and obtain approval of method of correction. Approved corrections shall be made at no additional cost to the Owner.
1. The use of a cutting torch for field correction of fabricating/erection errors shall not be permitted without the prior written approval of the Engineer. For each fabrication/erection error the Contractor shall submit a drawing of the existing condition and proposed correction for the Engineer's review.
- B. Anchor Bolts and Bearing Plates:
1. Surface Preparation — Clean concrete and masonry bearing surfaces of bond reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surfaces of base and bearing plates.
 2. Anchor Bolts - Accurately locate the anchor bolts by use of templates or other methods as required. Set column base plates to correct elevations; support temporarily on wedges, shims or setting nuts until the columns have been plumbed and grouted.
 3. Base/Bearing Plate Grout — Pack non-shrink grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow curing. Comply with manufacturer's recommendations.
- C. Temporary Shoring - Provide any temporary shoring and additional bracing of steel framing necessary to adequately and safely support any or all loads imposed on structure during construction. Before proceeding with work submit drawings for review of any proposed temporary shoring and bracing. Review of drawings shall not relieve Contractor of sole responsibility for safe execution of work.

3.2 QUALITY ASSURANCE

A. General — Verification inspection and testing of all structural steel Work shall be performed by a Testing Agency. The Testing Agency will conduct and interpret tests and state in a report whether the Work complies with or deviates from requirements. Copies of the inspection and tests reports shall be submitted to the Architect/Engineer and Contractor in a timely manner.

1. Contractor shall provide access to work as required to accomplish testing. Contractor shall correct deficiencies in or remove and replace structural steel that inspections and tests reports indicate do not comply with the specification requirements.
2. Additional testing of deficient Work will be performed at Contractor's expense to determine the compliance of the corrected Work with the specification requirements.

B. Field Bolted Connections — All bolted connections shall be visually inspected in accordance with the Research Council on Structural Connections, "Specification for Structural Joints Using ASTM A325 and A490 Bolts."

1. The Testing Laboratory shall randomly visually inspect ten percent of all bolted connections to verify bolt installation compliance.

C. Field Welded Connections:

1. Fillet Welds - All field fillet welds shall be visually inspected in accordance with the applicable parts of the American Welding Society's AWS D1.1, Section 6, Inspection.
2. Full Penetration Welds - In addition to visual inspection, the engineer of record may request that any or all of the full penetration welds be tested in accordance with AWS D1.1 inspection procedures. One of the inspection procedures listed below shall be chosen at the testing agency's option:
 - a. Liquid Penetration Inspection — ASTM E-165.
 - b. Magnetic Particle Inspection — ASTM E-709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Radiographic Inspection — ASTM E-94 and ASTM E-142; minimum quality level "2-2T."
 - d. Ultrasonic Inspection — ASTM E-164.

D. Shear Connectors — Visual inspection and bend tests shall be performed in accordance with the applicable parts of American Welding Society's AWS D1.1, Section 4, Techniques and Section 7, Stud Welding.

1. In addition to the AWS testing requirements, the Testing Laboratory shall randomly test one shear stud on each beam and purlin. The stud shall be bent to a 15 degree angle and left in the bent condition.

3.3 CLEAN-UP

A. Touch Up Painting - After erection of steel, clean all exposed surfaces of bolts, nuts, and

welds required for field assembly of shop painted steel. Apply paint to exposed areas using the same material as used for shop painting. Repair abraded and damaged coating to approved condition.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

- A. Furnish all labor, materials, services and equipment required to install the Steel Roof Deck.

1.2 CODES AND STANDARDS

- A. Comply with the provisions of the latest edition of the following codes, specifications and standards, except as otherwise specified or shown:
 - 1. "Specifications for the Design of Cold-Formed Steel Structural Members," of the American Iron and Steel Institute.
 - 2. "Manual of Construction with Steel Deck," of Steel Deck Institute.
 - 3. "Structural Welding Code – Sheet Metal, D1.3" of the American Welding Society.
- B. Comply with all applicable Federal, State, and City codes and regulations for performance of the work of this section including erection safety regulations.

1.3 SUBMITTALS

- A. General - Approval of drawings will only cover the general scheme, design and character of details, but not checking of dimensions or quantities. Contractor shall be responsible for omissions and errors and conformity with the contract documents and specifications. Submit four copies of submittals for review by the engineer, unless otherwise noted in the general conditions.
- B. Shop Drawings - Submit shop and erection drawings based on Contract Documents clearly showing each piece required for fabrication and erection. Include the layout for each type of deck, size and location of supports, anchorage, details, sump pans, cut openings and accessories. Provide the profile of each type of deck, and the corresponding section properties and finishes.
 - 1. Mechanical Fasteners – Tests reports from a qualified independent testing agency evidencing compliance with project requirements based on comprehensive testing.
- C. Welder Certification – Provide copies of the AWS Certified Welders documents for each welder demonstrating they are qualified to perform all procedures required by the Contract Documents.

1.4 QUALITY CONTROL

- A. Manufacturer – Member of the Steel Deck Institute.
- B. Welders - Make welds only by operators who have recently been qualified by tests, as prescribed in the "Standard Qualification Procedure" (AWA Designation B3.0) of American Welding Society.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deck bundles must be stored off the ground with one end elevated to provide drainage. Protect bundles from condensation with a ventilated, waterproof covering. Check bundles periodically for tightness, and retighten so wind cannot loosen sheets.
- B. Place deck bundles on the building frame near a main supporting beam at a column or wall. Do not place bundles on unattached or unbolted frames or joists. The structural frame must be properly braced to receive the bundles.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Sheet Steel for Painted Roof Deck and Accessories- ASTM A-611 (33 ksi).
- B. Sheet Steel for Galvanized Roof Deck and Accessories - ASTM A-653 (33 ksi).
- C. Structural Steel Angles, Plates, and Bars - ASTM A-36.
- D. Primer Paint – Manufacturer’s standard shop primer paint.
- E. Galvanizing – ASTM A-924, Class G60.
- F. Acoustical Batts – Inert, non-organic mineral or glass fiber sound absorbing batts that will produce a Noise Reduction Coefficient (NCR) of 0.70.

2.2 ACCESSORIES

- A. General – Furnish with decking all necessary accessories such as ridge and valley plates, flat plates at a change of deck direction, cant strips, saddle plates, insulation cleats, anchor clips, closure pieces and sump pans to provide a finished surface for the application of roof insulation and roof covering. Accessories shall have the same finish as the decking, and shall be fabricated of material not lighter than 18 gauge.
- B. Weld Washers – Mild steel, uncoated ¾” outside diameter, 1/8” thick.
- C. Screws – self-drilling TEK screws manufactured from galvanized heat treated carbon steel.

2.3 SHOP PAINTING

- A. Shop primer paint/galvanize all steel deck and accessory surfaces.
- B. Primer Paint Surface Preparation - Thoroughly dry and clean surfaces, provide chemical cleaning and phosphate treatment prior to the application of the primer paint.

2.4 FABRICATION

- A. Steel Roof Deck – Provide the following type of deck with thickness as noted on the drawings:

1. Wide Rib, Type B.
 2. Deep Rib, Type N.
- B. Acoustical Roof Deck – Type B/N with fluted deck with perforated vertical webs.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Do not start installation of steel deck until corresponding steel framework has been plumbed, aligned and completed, and until temporary shoring, where required, has been installed.
- B. Steel surfaces to which the deck is to be welded shall be free of paint, ice, water, oil, dirt, rust and other materials detrimental to welding.
- C. All O.S.H.A., State and Local rules for erection shall be followed.

3.2 INSTALLATION

- A. Install deck panels and accessories in accordance with Steel Deck Institute (SDI) specifications, SDI Manual of Construction with Steel Deck, and in accordance with the Contract Documents.
- B. Decking shall safely support a uniformly distributed live load of 25 pounds per square foot plus dead loads of construction loads. Deflection shall not exceed 1/240 of maximum span shown for live loads specified. Do not support ceilings from deck units. Unit design strength shall not exceed minimum yield strength of steel divided by 1.65. Maximum working stress shall not exceed 20,000 psi.
- C. Place deck units on supporting steel framework and adjust to final position with ends lapped over structural supporting members with a minimum end bearing of 1 ½ inches. Attach the deck panels firmly to the supports immediately after placement to provide a safe working platform. Place flutes in straight and true alignment through entire length of run before being permanently fastened.
- D. Each unit shall extend over three or more spans, wherever possible, with joints staggered. Provide nested two inch (2”) laps at the ends and nested side laps. Do not stretch or contract side lap interlocks.
- E. Cut and neatly fit deck and accessories at skew conditions, around openings and at other work projecting through or adjacent to the decking.
- F. Openings: Trades that cut openings subsequent to the installation of the deck are responsible to reinforce those openings in accordance to the requirements of the Engineer of Record. Openings wider than 6 inches shall have 3x3x1/4 inch angles added between the joist and all

around the opening for deck support.

- G. Provide closure fittings of metal, composition, neoprene or rubber to fit the underside of steel deck to seal the ribs or corrugations in decking that will be left exposed at outside walls, over interior partitions and any similar points. Seal underside of decking at overhang eaves or outriggers with corresponding metal.
- H. Acoustical Batts – Install sound absorbing batts neatly in the voids between perforated webs off acoustical deck. Keep sound absorbing material dry before, during and after installation.

3.3 ATTACHMENT

- A. Anchor deck units to steel supporting members per the following:
 - 1. Arc spot puddle welds per the visible minimum diameter and attachment pattern noted on the contract documents.
 - 2. Mechanical fasteners, either power actuated, pneumatically driven or self drilling screws may be used in lieu of welding, provided the product data has been submitted and approved.
- B. Side Lap Attachments – Fasten side laps of deck units with spans greater than five feet (5 ft) at mid span or at 36 inch intervals, whichever distance is smaller, or as noted on the contract documents using #10 self drilling screws.
- C. Perimeter Edge Attachments – Fasten perimeter edges of deck units at minimum 24 inches intervals with 5/8” arc spot puddle welds or as shown in the Contract Documents.
- D. Accessories – Anchor accessories to supporting members by arc welding or self drilling screws at 12 inch maximum intervals or as noted on the contract documents.

3.4.1 TOUCH UP PAINTING

- A. Touch Up Painting - After erection, all scarred areas on both top and bottom sides of decking, including cuts, drill holes, rust spots, welds and weld scars, shall be touched up with an air drying paint similar to that used in shop coat.

3.5 QUALITY ASSURANCE

- A. General – Verification inspection and testing of all structural steel Work shall be performed by a Testing Agency. The Testing Agency will conduct and interpret tests and state in a report whether the Work complies with or deviates from requirements. Copies of the inspection and tests reports shall be submitted to the Architect/Engineer and Contractor in a timely manner.
 - 1. Contractor shall provide access to work as required to accomplish testing. Contractor shall correct deficiencies in or remove and replace structural steel that inspections and tests reports indicate do not comply with the specification requirements.
 - 2. Additional testing of deficient Work will be performed at Contractor’s expense to determine the compliance of the corrected Work with the specification requirements.
- B. Inspection and Testing – Visually inspect the deck surface for tears, dents, or other damage

that may prevent the deck from acting as a structural roof base. Visually inspect all deck welds. Welding shall be done such that no weld shall have more than thirty percent (30%) burn through of the deck, and with a maximum of ten percent (10%) failing. The need for repair of the damaged deck or supporting member shall be determined by the Architect/Engineer.

3.5 CLEAN-UP

- A. Clean Up - At completion of operations, remove all dunnage, debris, excess materials resultant from work on this section. Leave entire installation in condition satisfactory to receive other trades work.

END OF SECTION

SECTION 053100 – STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Features:

- 1. Steel Roof Deck
- 2. Steel Form Deck
- 3. Support Framing
- 4. Connections
- 5. Accessories

B. Related Sections:

- 1. 013300 – Submittal Procedures
- 2. 014500 – Structural Testing, Inspection, and Quality Assurance
- 3. 033000 – Cast-in-Place Concrete
- 4. 051200 – Structural Steel Framing
- 5. 078100 – Applied Fireproofing

1.3 REFERENCE STANDARDS

- A. General: Comply with the provisions of the latest versions of the publications listed below except as otherwise shown or specified.

B. American Iron and Steel Institute (AISI):

- 1. AISI Specification for the Design of Cold-Formed Steel Structural Members

C. American Society for Testing and Materials (ASTM):

- 1. ASTM A36 Structural Steel
- 2. ASTM A108 Steel Bars, Carbon, Cold-Finished, Standard Quality
- 3. ASTM A611 Standard Specification for Structural Steel (SS) Sheet, Carbon, Cold Rolled
- 4. ASTM A653 Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process
- 5. ASTM A924 General Requirements for Steel Sheet, Metallic Coated by the Hot-Dip Process

- D. American Welding Society (AWS):
 - 1. AWS D1.1 Structural Welding Code - Steel
 - 2. AWS D1.3 Structural Welding Code - Sheet Steel
- E. Steel Deck Institute (SDI):
 - 1. SDI Design Manual for Composite Decks, Floor Decks, and Roof Decks
- F. Underwriters' Laboratories (UL) Fire Resistance Manual

1.4 QUALITY ASSURANCE

- A. Qualification of Erector/Installer: Must have a minimum of 5 years' experience in the installation and/or erection of steel decking and accessories.
- B. All deck material and connections are to have current ICC-ES Reports.
- C. Each welder performing work on this project shall be qualified in accordance with the American Welding Society before commencement of welding on this project.
- D. Unless otherwise noted, the materials of this Section are used as part of an assembly in which fire-resistive construction ratings are required. Demonstrate rated approval by Underwriter's Laboratories, Inc., and the governmental agencies having jurisdiction.
- E. See Section 014500, "Structural Testing, Inspection, and Quality Assurance," for testing and inspection.
- F. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- G. Pre-Construction Conference: Schedule a job conference to review the Structural Documents prior to development of shop drawings. The conference shall be attended by all pertinent parties, which at a minimum is to include the Fabricator, Erector, Contractor, Owner's Testing Agency, and Structural Engineer.

1.5 SUBMITTALS

- A. Submit the following in accordance with Section 013300, "Submittal Procedures."
- B. Shop Drawings: Clearly indicate the following:
 - 1. Deck layout and orientation, type and gage, framing and supports, and unit dimensions and sections
 - 2. Size and location of holes and openings through deck
 - 3. Edge condition details and locations, including type and locations of all closures
 - 4. Additional deck support framing where required
 - 5. Types of welds and weld patterns, including weld washer requirements
 - 6. Types of connection fasteners and locations
 - 7. Location and patterns for button punching

8. Layout of steel shear connector studs
 9. Shoring locations, if required
- C. Manufacturer's Product Data: Clearly indicate all technical information that specifies full compliance with requirements of this Section and contract documents, including manufacturer's published installation recommendations.
- D. Copies of each welder's qualification records shall be made available to the Architect for inspection.
- E. Mill Test Reports: Submit mill test reports.
- F. Submit ICC-ES Report confirming compliance of steel deck with regulatory fire-resistance requirements.

1.6 HANDLING AND STORAGE

- A. Handling: Handle and stack all materials carefully in order to prevent deformation or damage. During unloading and hoisting, extra care shall be given to prevent damage to the ends and sides. Decking shall not be placed in direct contact with the ground. Store deck at a slope to prevent water from ponding. Where the underside of deck is architecturally exposed, it shall be free from visual defects such as scratches, dents, flame cut edges, holes, etc. All damaged deck shall be replaced.
- B. Damaged Units: The Contractor shall replace damaged deck units that are rejected by the Owner's Testing Agency. All rejected deck shall be immediately removed from the job site.

1.7 JOB CONDITIONS

- A. General: Conform to all local, state and federal safety regulations, especially where decking is used as planking prior to welding in place. Exercise extreme care so as to prevent decking from blowing off in wind.

1.8 CONDITION OF STEEL

- A. Pre-Fireproofing Inspection: The Contractor, steel decking erector, sprayed-on fireproofing applicator, and the Owner's Testing Agency shall conduct a visual inspection of all steel decking prior to receiving fireproofing. The purpose of this inspection is to check for foreign substances on the surfaces that could impair adhesion. Any cleaning that may be necessary as a result of this inspection shall be done at no additional cost to the Owner.
1. All steel decking shall be free of oil, dirt, or other materials that will impair bond of concrete or fireproofing.
 2. Application of the sprayed-on fireproofing will not commence until all steel surfaces have been accepted by sprayed-on fireproofing subcontractor and material manufacturer. No additional compensation shall be granted to the Contractor, steel decking erector, or fireproofing applicator should it be determined at a later date that foreign substances that were allowed to remain on the steel surfaces will have a detrimental effect in obtaining total adhesion in accordance with the fireproofing Specification Section.

1.9 REQUIREMENTS AT EDGE CONDITIONS

- A. The Contractor shall make specific provisions to provide the necessary framing materials at slab and roof edge conditions. The Contractor shall provide and install all gage metal edge closures where required by the plans and specification and shall coordinate shoring requirements at composite slab edges. The Contractor shall provide and install all structural steel bent plate edge closures or structural steel edge materials and any corresponding bracing or shoring where required by the plans and specifications.
- B. At edge closures, provide necessary modifications to the edge closure to ensure that shear connector studs can be properly connected to the structural framing. Where possible, weld through the edge closure. Where this is not possible or where an inadequate weld occurs, cut the edge plate at each stud and connect the stud directly to the framing.

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

- A. Galvanized Steel Form Deck:
 - 1. Material: Composite floor deck shall be galvanized steel conforming to ASTM A653 Grade 33 F_y (min) = 33,000 psi with a G60 coating of zinc prior to being formed. Furnish decking of depth and profile as indicated on the drawings.
 - 2. Gage of deck and minimum connections shall be determined by the Contractor based on the span conditions, unshored condition, and the superimposed loads shown on the drawings, load diagrams, and notes. Minimum gage is 24, unless noted otherwise on the drawings. The capacities of the deck shall be based on current ICC-ES Reports.
 - 3. For floor deck indicated as part of a fire rated system, furnish decking listed in the UL "Fire Resistance Directory" and bearing the UL label for the system detailed.
 - 4. Fabricate composite deck units with integral embossing or raised patterns to provide mechanical bond with concrete slabs.
 - 5. Furnish deck panels of lengths required to span continuously over four or more supports (three spans) unless framing does not allow for such layout.
 - 6. Furnish deck panels with butted end conditions and interlocking side laps, unless otherwise noted.
 - 7. Furnish deck with UL approved tabs or clips for hanging loads:
 - a. Hanger clips designed to clip over male side lap joints of floor deck units may be used instead of hanger slots.
 - b. Provide manufacturer's standard hanger attachment devices.
 - 8. Furnish deck panels with provisions for venting through the deck ("vent deck") for slabs that are to receive impervious coatings such as roofing materials or waterproof membranes.
- B. Roof Deck:
 - 1. Material: Steel roof deck shall be galvanized steel conforming to ASTM A653 Grade 33 F_y (min) = 33,000 psi with a minimum G60 coating of zinc prior to being formed or ASTM A611 Grade C or D with F_y (min) = 33,000 psi with primed and painted surfaces where specified as being painted per the Architect. Furnish decking of depth, gage, and

- profile as indicated in drawings with all connections as indicated in the drawings and notes.
2. Where the deck and connections are not sized on the drawings, they shall be designed by the Contractor to satisfy the requirements of the plan superimposed vertical gravity and uplift loads in conjunction with the required diaphragm capacity as indicated in the load maps and notes. The minimum deck gage is 22. Total load deflections shall be limited to $L/360$. The capacities of the deck and its connections shall be based on current ICC-ES Reports.
 3. Uplift Loading: Steel roof deck and its connections to the supporting steel members shall be capable of resisting uplift loads of 25 pounds per square foot or the loads indicated on the load maps, whichever is greater.
 4. For deck indicated as part of a fire rated system, furnish decking listed in the UL "Fire Resistance Directory" and bearing the UL label for the system detailed.
- C. Connections: Connections shall be determined by the Contractor based on the more stringent of the manufacturer's minimum recommendations for the plan configurations and loading or as specified in the contract documents. Connections may be made by any method recommended by the manufacturer, except that button punching of side laps shall not be allowed at roof decks unless indicated specifically as being required per the Structural Plans. Connection materials shall be as follows:
1. Welded Shear Connectors: Shall be Type B in accordance with AWS D1.1 and comply with ASTM A108, Grade 1015 or 1020; of dimensions complying with AISC specifications and the contract drawings; through deck stud welded shear connectors. Install in such a manner as to provide complete fusion between the end of the stud and structural steel base material.
 2. Mechanical Fasteners: Corrosion-resistant, low-velocity, powder-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
 3. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
 4. Welding Materials: Applicable AWS D1.1 and D1.3 type required for materials being welded.
 5. Weld Washers: Provide as required per manufacturer's recommendations.
- D. Support Framing: Where necessary to provide support of the deck at edges of openings and at columns, additional support framing shall be provided by the Contractor per the typical details so that the deck flutes are supported with a minimum 2 inches of bearing. Where no details are provided or are not applicable, the Contractor shall design and provide secondary structural steel framing consisting of ASTM A36 steel to support the deck. The secondary framing shall satisfy the requirements of Section 051200, "Structural Steel Framing."
- E. Accessories: At roof and floor slab conditions, the Contractor is to design and provide all accessories of types required to complete the installation of steel decking in the system shown, including edge forms, end closures, sump pans, closure strips, cover plates, etc. Finish sheet steel items to match deck. Include the following items:
1. Metal cover plates to close gaps at changes in deck direction, columns, walls, and openings; 20 gage minimum.
 2. Continuous sheet metal edging at openings and concrete slab edges, 20 gage minimum or as required per plan.
 3. Sealed closures for ends of cells on single-unit decking, 20 gage minimum.

4. Fabricate metal closure strips of 20-gage sheet steel for openings between decking and other construction. Form to provide tight fitting closures at open ends of cells or flutes, sides of decking, and between decking.
- F. Shear Connectors: Where the deck capacity is determined based on the installation of shear studs, the shear studs required on the framing plans for composite beams or other connections to structural framing shall not be considered to be effective in determining the deck capacity. Shear studs, which are in addition to those required per plan, shall be provided as required by the deck manufacturer to achieve the required deck capacity, provided these additional studs can be placed on the beam without adversely affecting the shear value of the studs that are required per plan.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 TOLERANCES

- A. Unless otherwise noted, edge materials shall be field installed to the minimum tolerances of this Section or as required for the installation of the cladding system, whichever is more stringent.
 1. Edge Location: $\pm 1/2$ inch from established building working lines.
 2. Edge Height: $\pm 1/8$ inch from established slab thickness

3.3 INSTALLATION

- A. General: Install decking in accordance with approved shop drawings and manufacturer's recommendations. Where steel deck is to be welded to steel framing with puddle welds or shear studs, the steel framing shall be free of dirt and debris prior to laying the steel deck. Any water in the deck's valley shall be released so it does not become entrapped between the deck and the beam. The deck shall be installed so that the bottom rib is in continuous contact with the steel framing.
- B. Accurately align and adjust steel panel units in place before permanently fastening. Provide butt end spliced, do not overlap ends of deck. Inaccuracies in alignment or level shall be brought to the attention of the Architect and corrected by the Contractor before steel panels are finally placed.
- C. Provide proper bearing on support framing of 2-inch minimum to steel and 4-inch minimum to CMU or concrete. Where shear connector studs are used, place deck so that the stud can be placed on top of the framing. If the stud falls within the top of the flute, cut a slot through the deck and provide closure so that fresh concrete will not leak.
- D. Reinforce openings in accordance with structural framing details and manufacturer's recommended details.

- E. Install strip closures at slab edges of the thickness of slab, as required to contain poured concrete. Ensure closures are of sufficient strength to remain in place without distortion.
- F. Install closure strips and angle flashings as required to close openings between deck and walls, columns, and openings and gaps between deck, to prevent concrete leakage.
- G. Connections: After deck has been aligned, provide permanent connections to the support framing with welds, shear connector studs, screw fasteners, or powder driven fasteners as required by the manufacturer or per plan. All closures, edge forms, plates, etc. shall be securely connected to the support framing per the manufacturers recommendations and per plan.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting work. Use welding washers where recommended by deck manufacturer.
- I. Furnish shoring as required to maintain position of structures and prevent deflection beyond allowable limits. Ensure construction loads do not exceed deck carrying capacity per manufacturer.
- J. Shear Connectors: Weld shear connectors to supports through decking units in accordance with manufacturer's instructions.
 - 1. General: Shear studs may be used in lieu of 3/4-inch puddle welds. The studs shall be installed only by certified operators approved by the manufacturer and who are thoroughly familiar with the installation equipment. A copy of the operating instructions for the equipment shall be at the job site at all times. Interchanging of studs and welding equipment of different manufacturers is not permitted.
 - a. Installation, inspection, and qualification of weld base metal shall conform to the requirements of AWS D1.1.
 - b. The first two studs, at the start of each production period (the interval between start-up and shut-down of equipment) and at the start of each new welding procedure, shall be tested by bending to an angle of 30° by striking the stud with a hammer (in lieu of the first sentence in Paragraph a of the AWS code). If failure occurs in the weld, the procedure shall be corrected and the next two studs shall be welded and tested prior to welding of any more studs.
 - c. If after welding, visual inspection reveals that a sound weld or a full 360° flash has not been obtained for a particular stud, the stud shall be replaced. At Contractor's option, the weld may be repaired by AWS D1.1.
 - d. Studs that show no signs of failure shall be accepted as shear connectors provided they meet the dimensional limitations of the drawings, provided no portion is less than 1 inch from a proposed concrete surface, and provided any bends or out-of-plumbness does not exceed 15°. In addition, all studs shall extend not less than 1-1/2 inches above the top of the decking. If thru-deck stud welding is not practical, provide pre-punched holes in deck.
 - e. The studs shall have complete fusion to the steel beams underlying the decking. Where repairs are made by fillet welding, such welding shall be between stud and beam with removal of portions of the decking as required.
 - f. Ferrules shall be removed after completion.
 - 2. Do not weld shear connectors through two layers (lapped ends) of decking units.
 - 3. Weld only on clean, dry deck surfaces.

4. Space and align shear connectors as shown or, if not shown, as recommended by manufacturer.
 5. On steel beam supporting steel deck with concrete or cast-in-place concrete, shear studs shall be placed at a maximum spacing of at 2'-0" on center.
- K. Hanging Loads: Do not hang concentrated loads exceeding 50 pounds from steel roof deck. Loads shall be located no closer than 5'-0" from any adjacent hanging load.
- L. Cleaning: Prior to placement of concrete or other finish materials, the deck shall be cleaned to be free of debris and water.

3.4 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Repair galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780 and manufacturer's written instructions at cut edges or locations where coating has been damaged.
- B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.
- C. Provide protection against concrete splatter or spillage for all materials that would be adversely affected by this occurrence.

3.5 CONSTRUCTION LOADING

- A. The Contractor shall assume complete responsibility for the loading of composite floor deck due to construction loads. The Contractor shall verify when it is acceptable to place loads on the composite floor deck with the deck supplier, who shall substantiate that the slab deck will not be damaged or have a reduced capacity as a result of the proposed construction loads.
- B. The Contractor shall be responsible to repair any damage that occurs to the deck due to construction loads.

END OF SECTION 053100

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed steel framing product and accessory.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

C. Shop Drawings:

1. Include layout, spacing, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product test reports.

D. Research reports.

1.4 QUALITY ASSURANCE

A. Product Tests: Mill certificates or data from a qualified independent testing agency.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

- C. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
 - 1. ClarkWestern Building Systems, Inc.
 - 2. Dietrich Metal Framing; a Worthington Industries company.
 - 3. MarinoWARE.
 - 4. Nuconsteel; a Nucor Company.
 - 5. Steel Network, Inc. (The).

2.2 PERFORMANCE REQUIREMENTS

- A. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 - 1. Grade: **ST33H, ST50H** .
 - 2. Coating: **G60**.
- B. Steel Sheet for **Vertical Deflection and Drift** Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: **33 or 50, Class 1**.
 - 2. Coating: **G60**

2.4 LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness **0.0428 inch** .
 - 2. Flange Width: Minimum **1-5/8 inches** .

- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and matching minimum base-metal thickness of steel studs.
- C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: **0.0428 inch**
 - 2. Flange Width **1-5/8 inches** .

2.5 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: **0.0428 inch**
 - 2. Flange Width: **1-5/8 inches**
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and matching minimum base-metal thickness of steel studs.
- C. Vertical Deflection Clips: Manufacturer's standard **bypass and head** clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
 - 1. Manufacturers: Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
 - a. ClarkWestern Building Systems, Inc.
 - b. Dietrich Metal Framing; a Worthington Industries company.
 - c. MarinoWARE.
 - d. Steel Network, Inc. (The).
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.6 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration.

2.7 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- B. Anchor Bolts: ASTM F 1554, **Grade 36**, threaded carbon-steel **hex-headed bolts** and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by **hot-dip process according to ASTM A 153/A 153M, Class C**.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.8 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: **SSPC-Paint 20**.
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, **1/4 inch (6.4 mm)** thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than **1/4 inch (6 mm)** to ensure a uniform bearing surface on supporting concrete or masonry construction.
- B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
- D. Install framing members in one-piece lengths.
- E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- F. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- G. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of **1/8 inch in 10 feet (1:960)** and as follows:
 - 1. Space individual framing members no more than plus or minus **1/8 inch (3 mm)** from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 LOAD-BEARING WALL INSTALLATION

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
 - 1. Anchor Spacing: as specified in structural drawings.
- B. Squarely seat studs against top and bottom tracks with gap not exceeding of **1/8 inch (3 mm)** between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
 - 1. Stud Spacing: **12 inches or 16 inches as indicated.**
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.
- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
- G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
 - 1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
 - 2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
 - 1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- I. Install horizontal bridging in stud system, spaced vertically **48 inches**. Fasten at each stud intersection.
 - 1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to **6 inches (150 mm)** deep.

2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
 - K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to **top and** bottom track unless otherwise indicated. Space studs as follows:
 1. Stud Spacing: **12 inches or 16 inches as indicated.**
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 1. Install single deep-leg deflection tracks and anchor to building structure.
 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 3. Connect vertical deflection clips to **bypassing or infill** studs and anchor to building structure.
 4. Connect drift clips to cold-formed metal framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than **48 inches (1220 mm)** apart. Fasten at each stud intersection.
 1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within **12 inches** of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - a. Install solid blocking at **96-inch.**
 2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

1. GENERAL:

See referenced note in SECTION: SPECIAL CONDITIONS, paragraph 1.

2. DESCRIPTION OF WORK:

Provide labor and materials to complete miscellaneous metals as indicated and specified.

3. RELATED WORK SPECIFIED ELSEWHERE:

A. Masonry Accessories: SECTION: MASONRY ACCESSORIES.

B. Painting: SECTION: PAINTING AND FINISHING.

4. QUALITY ASSURANCE:

A. Requirements of Regulatory Agencies and Reference Standards:

1. Conform to: Standard Specifications for Design, Fabrication and Erection of Structural Steel for Buildings. A.I.S.C. and "Code for Welding in Building Construction," American Welding Society, Inc. , latest edition, where not sight exposed.
2. Conform to "Specification for Architecturally Exposed Structural Steel, A.I.S.C. where sight exposed.

B. Fabrication:

1. Qualifications: Work: executed in shop whose products are limited to highest quality work.
2. Welding as required:
 - a Welding: in accordance with American Welding Society Publications D 1.0-63, "Welding in Building Construction"; and D2.0-63, "Welding Highway and Railway Bridges", latest edition.
 - b Cleaning of Welds: Welding slag, weld spatter, rust and burnt paint: removed with slag hammer and metal scraper and then wire brushed until completely cleaned. Temporary erection bracing, clips, etc.: removed and any burrs left after their removal: ground flush with parent metal on structural members. Undercuts and pulled places in parent metal on exposed members made during erection: filled by welding and ground flush. One coat of primer paint (or "Galv-Weld" for galvanized items) : applied immediately after cleaning.
 - c Removal or unsatisfactory welding: by chipping or arc-air method.
 - d Weld lengths and sizes: as indicated.

C. Workmanship:

1. Connections:
 - a. Connections not otherwise detailed: support full load capacity of members joined.
 - b. Connections not otherwise detailed : selected to support one half of total uniform load capacity of member as tabulated by A.I.S.C. Code for given shape, span, and steel specification of member.

- c. Design of members and connections for any portion of structure not indicated on contract drawings : completed by fabricator and indicated on shop drawings. Connections not indicated : made to conform to AISC Specifications for Design, Fabrication and Erection of Structural Steel for Buildings or in case of connections using high strength bolts, specifications for structural joints using ASTM A-325 bolts.
 - d. Items detailed on plans to be anchored with screws or bolts, or to receive blocking or other bolted items : provided with holes at spacing indicated.
2. Intermittent and continuous welding, and straightening of built-up sections : done in manner to minimize internal stresses.
 3. Where exposed welding is required, welds : executed neatly and ground smooth without pits or blemishes.
 4. Exposed items : cleaned of weld spatter and slag prior to painting.
 5. Modification of details of fabrication for economy or feasibility : made only on written approval of Architect. Exposed members: selected, and : free from bend, warp, or other defects, conform to AISC "Specification for Exposed Structural Steel".
 6. Work : fitted together at shop as far as possible, and delivered complete and ready for erection. Use of gas cutting torch in field for correcting fabricating errors will be permitted only after approval of Architect.
 7. Remove and grind smooth markings (heat numbers manufacturer's name, etc.) from sight exposed steel, except in storage and mechanical room areas. Pits, gouges, and imperfections of any nature will not be permitted on sight exposed steel.

5. MATERIALS:

- A. Steel : conform to requirements of ASTM A36. Steel : clean and free from mill scale, pitting and warps.
 1. Mill test showing heat number of structural steel : furnished to Architect prior to delivery of steel to job site.
 2. Steel of domestic manufacturer only will be accepted.
- B. Galvanizing:
 1. Items indicated to be galvanized : hot dip galvanized after fabrication in accordance with ASTM A123, A385, or A386, as applicable.
 2. Field welds on galvanized items : touched-up as approved using "Galv-Weld" as manufactured by Galv-Weld Products Co., P.O. Box 1303, Bradenton, Fla.
- C. Anchors and Fasteners:
 1. Required for items included under this section of specifications.
 2. Structural Connections:
 - a. Steel to concrete and masonry: A36 threaded rod or equal unless otherwise detailed. Minimum 3/8" diameter bolts where not otherwise indicated. Installed in approved epoxy grout only at top of horizontal surface. Set in concrete when poured, masonry laid, minimum 6" imbedment for 1/2" bolts.
 - b. Contractor : furnish and install A36 threaded rod or equal.
 - c. Provide necessary holes of proper size and spacing to receive screws and bolts.
 3. Toggle bolts-two wing spring type. Size indicated or of proportionate strength for

- members secured. Length as required
4. Molly screw anchors, Molly Corp. or equal.
- In walls, 1/16" to 5/8" thick, use "S" length.
 - In walls, 5/8" to 1-1/2" thick, use "S" length.
 - In walls, 1-1/2 to 1-3/4" thick, use "XL" length.
 - If wall material has tendency to crumble, use Molly safety wrench or equal.
5. Paint for shop coat and field touch-up TNEMEC Corp. Co. 99D (dark red) Metal primer, or approved equal.

D. Aluminum, extrusions for architectural and special shapes : extruded in alloy 6063-T5. Alloy 6061-T6 : used to impart high strength characteristics to structural shapes. See "Aluminum Construction Manual", published by the Aluminum Association, 420 Lexington Avenue, New York, N.Y. Use Brushed Anodized finish on aluminum.

E. Pipe : conform to requirements of ASTM A53, Grade "B", with not more than .05 PCT. sulfur content; use at pipe handrails only.

F. Miscellaneous items specified by manufacturer at end of section.

G. Shop Painting:

- Provide steel not galvanized or not encased in concrete with one shop coat of specified paint. Completely cover surfaces.
- Steel : thoroughly cleaned prior to application of shop coat.
- Mix and apply paint in strict conformance with paint manufacturer's instructions.
- Shop coat : have dry film thickness of not less than 3 mils.
- Fabricator : certify on shop drawings to effect that shop coat of paint used is as specified.
- Shop coat of paint will be checked and tested by Architect prior to steel erection.
- Immediately after erection, touch up scratches, welds, and other paint blemishes with same type paint used for shop coat. Provide sufficient quantity of paint specified above for touch-up required at project site.

6. DELIVERY AND STORAGE:

Handling and storage of steel : with care to avoid bending, twisting, or other damage. Unloading : under supervision of General Contractor. Steel : stored to allow drainage of water from parts. Blocking : placed to keep steel off ground.

7. INSTALLATION:

- Use experienced personnel and proper equipment.
- Set steel accurately to line and level.
- Field connections not sight exposed may be bolted or welded at contractor's option, exceptions as noted.
- Steel items that are to be in contact with aluminum, concrete, masonry, or mortar : given heavy coat of Pratt and Lambert asphaltic varnish or equal on contact surfaces. Do not coat sight exposed surfaces or surfaces to receive caulking.

8. SHOP DRAWINGS:

- A. Required for items.
- B. Show size and length of members, welds, details of connections, locations of bolt holes for blocking and erections, and necessary details and information.
- C. Indicate name of mill from which steel or aluminum : supplied.
- D. Begin fabrication only after receiving approved shop drawings.

9. MISCELLANEOUS METAL ITEMS:

Items : include but not necessarily be limited to following lists which are guide to type of work which : provided by this section.

- A. Galvanized Steel Items: Hot-dip galvanized fabrication : miscellaneous clip angles at exterior locations at roof.
- B. Shop Coated Steel Items:
 - 1. Angles and plates for lintels and miscellaneous framing and bracing.
 - 2. Miscellaneous clip angles not otherwise noted.
 - 3. Angles and clip angles for partition bracing.
- C. Toilet partition anchors as required to rigidly attach partitions.
- D. Miscellaneous channels, angles, plates and shapes as indicated and required for installation of Owner furnished equipment where not furnished by equipment manufacturer.
- E. Installation of manufacturer furnished anchorage items.
- F. Back-up plates, angles, bolts and other reinforcement and fasteners for wall or ceiling mounted items not otherwise indicated or specified
- G. Stair nosings at exterior steps : 3" wide, Type T-305, single component abrasive of epoxy and grit, color to C10, black with standard Type 1 Anchor as manufactured by Balco Safety Tread of Wichita, Kansas.
- H. Steel Pipe Handrails:
 - 1. Handrails at exterior (**to meet ADA Guidelines**) : 1-1/2" outside diameter steel pipe as specified in 5. e. above. All joints : welded and ground smooth.
 - 2. Number of horizontal and vertical rails as indicated on drawings: If not indicated: Verticals shall be 1/2" x 1/2" bar @ 4" o.c. with vertical pipe @ 4'- 0" o.c.
- I. Renovation Projects w/Additions:
 - 1. Quality Standard: This portion of the specifications are based on products of BALCO INC. for expansion joint covers. Products of other acceptable manufacturers : meet or exceed product and performance standards of BALCO INC. for expansion joint covers. This portion of the specifications, whichever is more stringent.

2. Materials:
 - a. Extruded aluminum 6063-T5
 - b. Extruded filler strips of flexible PVC.
3. Finishes:
 - a. Floor : Mill Finish
 - b. Wall Ceiling : 204R-1 clear anodized finish.
4. Types:
 - a. Floor to Floor (NEW) : 6FTP-1.
 - b. Floor to Floor (NEW to EXISTING) : 6FVTP-1E
 - c. Floor to Walls : 6FVTP-1
 - d. Wall to Wall : (PARALLEL) : 6TW-1
 - e. Wall to Wall : (PERPENDICULAR) : 6TWC-1
 - f. Suspended Ceiling to wall: CICI-1 3/4
 - g. Suspended Ceiling to suspended ceiling: Type CIWI-2 1/2".

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pre-engineered mechanically fastened stainless steel Railing System.

B. Related Requirements:

1. Section 055112 "Metal Pan Stairs" for steel tube railings associated with metal pan stairs.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Stainless Steel Mechanically Fastened Railing Systems:

1. Manufacturers: Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
2. Basis-of-Design Product: Subject to compliance with requirements, provide **product indicated on Drawings** or comparable product by one of the following:
 - a. HDI Railing Systems as manufactured by Handrail Design Inc., 1200 Corporate Blvd., Lancaster, Pa 17601.

- b. System: Inox Balustrade Straight Horizontal SS top rail with stainless steel elbow supports and connectors attached to two 1/4" thick post rails, 8 – 15mm intermediate in-fill rods and side mount fasteners on post. Posts max spacing: 51 3/16" not to exceed 43 5/16" above finished floor.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of **50 lbf/ ft.** applied in any direction.
 - b. Concentrated load of **200 lbf** applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of **50 lbf** applied horizontally on an area of **1 sq. ft.**
 - b. Infill load and other loads need not be assumed to act concurrently.

2.3 MATERIALS: Guardrails and Handrail Systems

- A. All rails and other tubular components shall be constructed using the following:
 - 1. Stainless Steel grade UNS 1.4301 & 1.4305, type 303 & 304 respectively; surface to be #6 finish (240 grain/grit); tubes 1 9/16" (40mm) by 5/64" (2mm).
 - 2. Nylon insets to be nylon 6, ref polyamide type B3S manufactured by BASF.
- B. All Posts and other components shall be constructed using the following:
 - 1. Stainless steel grade UNS 1.4301 & 1.4305, type 303 & 304 respectively, surface to be #6 finish (240 grain/grit); bars 2" (50mm) by 1/4" (6mm) fastened vertically by sliding clamps.
 - 2. Stainless steel grade UNS 1.4301 & 1.4305, type 303 & 304 respectively, surface to be #6 finish (240 grain/grit); clamps and end block to be supplied for top of post, for handrail attachment to match finish of post bars.
 - 3. Stainless steel grade UNS 1.4301 & 1.4305, type 303 & 304 respectively, surface to be #6 finish (240 grain/grit); stainless steel clamp and end block for connecting posts to fastening base.
- C. Fastening Bolts
 - 1. Stainless steel to match base clamping plate.

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Shop Primers: Provide primers that comply with **Section 099113 "Exterior Painting" and Section 099123 "Interior Painting," Section 099113 "Exterior Painting"**
- F. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- G. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- H. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION

- A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- B. Form work true to line and level with accurate angles and surfaces.
- C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 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 flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- D. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

- E. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- F. Form changes in direction by bending
- G. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- H. Close exposed ends of railing members with prefabricated end fittings.
- I. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
- J. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of **1/16 inch in 3 feet**.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet**.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

3.2 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Form or core-drill holes not less than **5 inches** deep and **3/4 inch** larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space

between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

- C. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members.

3.3 ATTACHING RAILINGS

- A. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- B. Secure wall brackets and railing end flanges to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.
 - 3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
 - 4. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.
 - 5. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.
 - 6. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055213

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Rooftop equipment bases and support curbs.
3. Wood blocking, and nailers.
4. Wood furring.
5. Wood sleepers.
6. Utility shelving.
7. Plywood backing panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S, unless otherwise indicated.

- B. Maximum Moisture Content of Lumber: **15 percent.**

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet** beyond the centerline of the burners at any time during the test.
 - 1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - 3. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841. For enclosed roof framing, framing in attic spaces, and where high temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 15 percent.

- C. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Framing for raised platforms.
 - 2. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: **Construction or No. 2 grade of any species.**
- B. Load Bearing Studs Construction, Stud, or **No. 3 grade and any of the following:**
 - 1. Douglas fir-south; WWPA.
 - 2. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
- C. Other Framing: **No. 2 grade and the following species:**
 - 1. Southern pine; SPIB.
 - 2. Douglas fir-south; WWPA.
 - 3. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases and support curbs.
 - 4. Cants.
 - 5. Furring.
 - 6. Grounds.
 - 7. Utility shelving.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.
- C. For utility shelving, provide lumber with **15** percent maximum moisture content of eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium grade; NeLMA, NLGA, WCLIB, or WWPA.
- D. For concealed boards, provide lumber with **15** percent maximum moisture content and any of the following species and grades:
 - 1. Mixed southern pine, No. 3 grade; SPIB.
 - 2. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: NES NER-272.
- C. Screws for Fastening to Metal Framing: **ASTM C 1002**, length as recommended by screw manufacturer for material being fastened.

2.7 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Self-adhesive butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than **0.025 inch**.

PART 3 - EXECUTION

INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit.
- B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- C. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Comply with AWWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- G. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior trim.
2. Interior plywood, hardboard, and board paneling.

B. Related Requirements:

1. Section 061053 "Rough Carpentry"
2. Section 064023 "Interior Architectural Woodwork"
3. Section 099100 "Painting"

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
- B. Samples: For each type of paneling.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20.

1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
 - a. For exposed lumber, mark grade stamp on end or back of each piece.

B. Softwood Plywood: DOC PS 1.

C. Hardboard: AHA A135.4.

D. **MDF: ANSI A208.2, Moisture Resistant- 1 1/8", standard Sierra Pine Medite II, 48 lb. density with exterior glue, made with binder containing no added urea-formaldehyde resin. Provide fire-rated where indicated. For wet areas – Medex Moisture Resistant MDF – 49 lb. density. Medex shall extend 24" either side of a sink or lavatory.**E. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade **M-2**, finished on both faces with thermally fused, **melamine-impregnated decorative paper** and

complying with requirements of NEMA LD3, **Grade VGL**, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

1. Color: **Off-white, unless noted otherwise.**

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent respectively.
- B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
 1. For exposed lumber and plywood indicated to receive a stained or natural finish, mark back of each piece.
- C. Application: **Where indicated, or required by code.**

2.3 INTERIOR TRIM

- A. Hardwood Lumber Trim:
 1. Species and Grade: **Select white maple, Clear**; NHLA.
 2. Maximum Moisture Content: **10 percent.**
- B. Hardwood Moldings for Transparent Finish (Stain or Clear Finish): WMMPA HWM 2, N-grade wood moldings made to patterns included in WMMPA HWM 1.
 1. Species: **Select white maple.**
 2. Maximum Moisture Content: **9 percent.**
- C. Moldings for Opaque Finish (Painted Finish): Made to patterns included in WMMPA WM 12.
 1. Hardwood Moldings: WMMPA HWM 2, P-grade.
 - a. Species: **Select white maple.**
 - b. Maximum Moisture Content: **9 percent.**
 2. Optional Material: Primed MDF.

2.4 PANELING

- A. Hardwood Veneer Plywood Paneling: Manufacturer's stock hardwood plywood panels complying with HPVA HP-1, **made without added urea-formaldehyde adhesive.**
1. Manufacturers: Subject to compliance with requirements, products by one of the following:
 - a. Chesapeake Hardwood Products, Inc.
 - b. Georgia-Pacific Corp.
 - c. Holland Southwest International.
 2. Face Veneer Species and Cut: **Select white maple, plain sliced.**
 3. Veneer Matching: **Selected for similar color and grain.**
 4. Thickness: **½ inch.**
 5. Face Pattern: **Selected by Architect from manufacturer's standard patterns.**
 6. Finish: **As selected by Architect from manufacturer's full range.**
- B. Hardboard Paneling: Interior factory-finished hardboard paneling complying with AHA 135.5.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 2. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. Chesapeake Hardwood Products, Inc.
 - b. Georgia-Pacific Corp.
 - c. Marlite.
 3. Thickness: **1/4 inch (6.4 mm).**
 4. Finish: **Class I.**
 5. Surface-Burning Characteristics: As follows, tested according to ASTM E 84:
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

2.5 MISCELLANEOUS MATERIALS

- A. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
- B. Paneling Adhesive: Comply with paneling manufacturer's written recommendations for adhesives.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of **24 hours unless longer conditioning is recommended by manufacturer.**

3.2 INSTALLATION, GENERAL

- A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 2. Countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 - 3. Install to tolerance of **1/8 inch** in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and **1/16-inch** (1.5-mm) maximum offset for reveal installation.
 - 4. Install stairs with no more than **3/16-inch** (4.7-mm) variation between adjacent treads and risers and with no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.

3.3 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with **minimum number of joints practical**, using full-length pieces from maximum lengths of lumber available. **Miter** at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.

3.4 PANELING INSTALLATION

- A. Plywood Paneling: Select and arrange panels on each wall **to minimize noticeable variations in grain character and color between adjacent panels.** Leave **1/4-inch (6-mm)** gap to be covered with trim at top, bottom, and openings. Install with uniform tight joints between panels.
 - 1. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners. Space fasteners and adhesive as recommended by panel manufacturer.
 - 2. Conceal fasteners to greatest practical extent.
- B. Hardboard Paneling: Install according to manufacturer's written recommendations. Leave **1/4-inch (6-mm)** gap to be covered with trim at top, bottom, and openings. Butt adjacent panels with moderate contact. Use fasteners with prefinished heads matching paneling color.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

B. Related Requirements:

1. Section 123623.13 "Plastic-Laminate-Clad Countertops."

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, **including panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, fire-retardant-treated materials, and cabinet hardware and accessories.**

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples:

1. Plastic laminates, for each color, pattern, and surface finish.
2. Thermoset decorative panels, for each color, pattern, and surface finish.

1.3 INFORMATIONAL SUBMITTALS

A. Woodwork Quality Standard Compliance Certificates: **AWI Quality Certification Program certificates.**

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: **Certified participant in AWI's Quality Certification Program.**B. Installer Qualifications: **Certified participant in AWI's Quality Certification Program.**

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CABINET FABRICATORS

- A. Fabricators: Subject to compliance with requirements, provide products by one of the following:
 - 1.

2.2 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
- B. Grade: **Custom.**
- C. Type of Construction: **Face frame.**
- D. Cabinet, Door, and Drawer Front Interface Style: **Flush overlay.**
- E. Reveal Dimension: **3/4** inch.
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Abet Laminati, Inc.
 - b. Formica Corporation.
 - c. Lamin-Art, Inc.
 - d. Panolam Industries International, Inc.
 - e. Wilsonart International; Div. of Premark International, Inc.
- G. Laminate Cladding for Exposed Surfaces:
 1. Horizontal Surfaces: **Grade HGL.**
 2. Postformed Surfaces: **Grade HGP.**
 3. Vertical Surfaces: **Grade VGS.**
 4. Pattern Direction: **Vertically for drawer fronts, doors, and fixed panels.**
- H. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: **High-pressure decorative laminate, NEMA LD 3, Grade VGS.**
 2. Drawer Sides and Backs: **Thermoset decorative panels with PVC or polyester edge banding.**
 3. Drawer Bottoms: **Thermoset decorative panels.**
- I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As indicated by laminate manufacturer's designations.
 2. Match Architect's sample.
 3. As selected by Architect from laminate manufacturer's full range in the following categories:
 - a. Solid colors, **matte** finish.
 - b. Solid colors with core same color as surface, **matte** finish.
 - c. Wood grains, **matte** finish.
 - d. Patterns, **matte** finish.

2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Wood Moisture Content: **5 to 10** percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Recycled Content of Medium-Density Fiberboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **10** percent.
 2. Composite Wood and Products: Products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 3. Medium-Density Fiberboard: ANSI A208.2, **moisture resistant 49 lb. density, made with binder containing no urea formaldehyde.**
 4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, **moisture resistant 49 lb. density made with adhesive containing no urea formaldehyde.**
 5. Thermoset Decorative Panels: Medium-density fiberboard, moisture resistant 49 lb. density, finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.4 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities

having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 feet (3.2 m)** beyond the centerline of the burners at any time during the test.
1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.

2.5 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087111 "Door Hardware (Descriptive Specification)."
- B. Frameless Concealed Hinges: **(European Type): BHMA A156.9, B01602, 170** degrees of opening, **self-closing**.
- C. Back-Mounted Pulls: BHMA A156.9, B02011.
- D. Wire Pulls: Back mounted, solid **metal, 5 inches (127 mm) long, and 5/16 inch (8 mm) in diameter**.
- E. Adjustable Shelf Standards and Supports: **BHMA A156.9, B04071; with shelf rests, B04081**.
- F. Shelf Rests: **BHMA A156.9, B04013; metal**.
- G. Drawer Slides: BHMA A156.9.
1. Grade 1 and Grade 2: Side mounted **full-extension** type; **zinc-plated steel** with polymer rollers.
 2. Grade 1HD-100 and Grade 1HD-200: Side mounted; **full-extension** type; zinc-plated-steel ball-bearing slides.
 3. For drawers not more than 3 inches (75 mm) high and not more than 24 inches (600 mm) wide, provide **Grade 1**.
 4. For drawers more than 3 inches (75 mm) high but not more than 6 inches (150 mm) high and not more than 24 inches (600 mm) wide, provide **Grade 1HD-100**.
 5. For drawers more than 6 inches (150 mm) high or more than 24 inches (600 mm) wide, provide **Grade 1HD-100**.
 6. For computer keyboard shelves, provide **Grade 1HD-100**.
 7. For trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide, provide **Grade 1HD-100**.
- H. Aluminum Slides for Sliding Glass Doors: **BHMA A156.9, B07063**.

- I. Door Locks: **BHMA A156.11, E07121.**
- J. Drawer Locks: **BHMA A156.11, E07041.**
- K. Door and Drawer Silencers: **BHMA A156.16, L03011.**
- L. Float Glass for Cabinet Doors: ASTM C 1036, Type I, **Class 1 (clear)**, Quality-Q3, **1/8 inch** thick.
- M. Tempered Float Glass for Cabinet Doors: ASTM C 1048, **Kind FT, Condition A, Type I, Class 1 (clear)**, Quality-Q3, **with exposed edges seamed before tempering**, 6 mm thick unless otherwise indicated.
- N. Tempered Float Glass for Cabinet Shelves: ASTM C 1048, **Kind FT, Condition A, Type I, Class 1 (clear)**, Quality-Q3; with exposed edges seamed before tempering, **6 mm** thick.
- O. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with **BHMA A156.18** for BHMA finish number indicated.
 - 1. Satin Stainless Steel: BHMA 630.

2.6 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: **Hardwood lumber**, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Do not use adhesives that contain urea formaldehyde.
- D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Adhesive for Bonding Plastic Laminate: **Contact cement.**
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive.

2.7 FABRICATION

- A. Complete fabrication, including assembly and hardware application, 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.
- B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

- C. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

3.2 INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)**.
- C. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- D. Anchor cabinets 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: Install without distortion so 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 installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than **1/8 inch in 96-inch (3 mm in 2400-mm)** sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c.

END OF SECTION 064116

PART 1 — GENERAL

1.01 RELATED DOCUMENTS

- A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

1.02 SUMMARY

- A. The work of this section includes, but is not limited to, the following:
 - 1. Rubberized asphalt sheet membrane waterproofing
 - 2. Prefabricated drainage composite
 - 3. Protection board
- B. Related Sections: Other specification sections which directly relate to the work of this section include, but are not limited to, the following:
 - 1. Section 033000 – Cast-In-Place Concrete
 - 2. Section 042000 – Unit Masonry
 - 3. Section 071100 – Dampproofing
 - 4. Section 076000 – Flashing and Sheet Metal
 - 5. Section 079200 – Joint Sealants
 - 6. Section 079500 – Expansion Control
 - 7. Section 334600 – Subdrainage

1.03 REFERENCE STANDARDS

- A. The following standards and publications are applicable to the extent referenced in the text.
- B. American Society for Testing and Materials (ASTM)
 - C 836 Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
 - D 412 Standard Test Methods for Rubber Properties in Tension
 - D 570 Standard Test Method for Water Absorption of Plastics
 - D 882 Standard Test Methods for Tensile Properties of Thin Plastic Sheeting
 - D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
 - D 1876 Standard Test Method for Peel Release of Adhesives (T-Peel)

- D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
- D 3767 Standard Practice for Rubber - Measurements of Dimensions
- D 5385 Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
- E 96 Standard Test Methods for Water Vapor Transmission of Materials
- E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

1.04 SUBMITTALS

- A. Samples: Submit representative samples of the following for approval:
 - 1. Sheet membrane
 - 2. Protection board
 - 3. Prefabricated drainage composite

1.05 QUALITY ASSURANCE

- A. Manufacturer: Sheet membrane waterproofing shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of self-adhesive sheet membrane waterproofing. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past 5 years.
- B. Installer: A firm which has at least 3 years experience in work of the type required by this section.
- C. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.
- D. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.

1. Do not double-stack pallets of membrane on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
 2. Protect mastic and adhesive from moisture and potential sources of ignition.
 3. Store drainage composite or protection board flat and off the ground. Provide cover on top and all sides.
- B. Sequence deliveries to avoid delays, but minimize on-site storage.

1.07 PROJECT CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.
- B. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

1.08 WARRANTY

- A. Sheet Membrane Waterproofing: Provide written 5 year material warranty issued by the membrane manufacturer upon completion of the work.

PART 2 — PRODUCTS

2.01 MATERIALS

- A. Sheet Membrane Waterproofing: **Bituthene® 3000/Low Temperature Membrane by Grace Construction Products; a self-adhesive, cold-applied composite sheet consisting of a thickness of 1.4 mm (0.056 in.) of rubberized asphalt and 0.1 mm (0.004 in.) of cross-laminated, high density polyethylene film. Provide rubberized asphalt membrane covered with a release sheet, which is removed during installation. No special adhesive or heat shall be required to form laps.**
- B. Sheet Membrane Waterproofing

PHYSICAL PROPERTIES FOR BITUTHENE 3000/LOW TEMPERATURE MEMBRANE:

Property	Test Method	Typical Value
Color		Dark gray-black
Thickness	ASTM D 3767 Method A	1.5 mm (0.060 in.) nominal
Flexibility, 180° bend over 25 mm (1 in.) mandrel at -43°C (-45°F)	ASTM D 1970	Unaffected
Tensile Strength, Membrane	ASTM D 412 Modified ¹	2240 kPa (325 lbs/in. ²) minimum

Die C		
Tensile Strength, Film	ASTM D 882 Modified ¹	34.5 MPa (5,000 lbs/in. ²) minimum
Elongation, Ultimate Failure of Rubberized Asphalt	ASTM D 412 Modified ¹	300% minimum
Crack Cycling at -32°C (-25°F), 100 Cycles	ASTM C 836	Unaffected
Lap Adhesion at Minimum Application Temperature	ASTM D 1876 Modified ²	700 N/m (4 lbs/in.) – Bituthene 3000 880 N/m (5 lbs/in.) – Low Temp
Peel Strength	ASTM D 903 Modified ³	1576 N/m (9 lbs/in.)
Puncture Resistance, Membrane	ASTM E 154	222 N (50 lbs) minimum
Resistance to Hydrostatic Head	ASTM D 5385	60 m (200 ft) of water
Permeance	ASTM E 96, Section 12 – Water Method	2.9 ng/m ² sPa (0.05 perms) maximum
Water Absorption	ASTM D 570	0.1% maximum

Footnotes:

1. The test is run at a rate of 50 mm (2 in.) per minute.
2. The test is conducted 15 minutes after the lap is formed and run at a rate of 50 mm (2 in.) per minute at -4°C (25°F).
3. The 180° peel strength is run at a rate of 300 mm (12 in.) per minute.

C. Prefabricated Drainage Composite: (**Hydroduct® 220**) Drainage Composite by Grace Construction Products. Drainage Composite shall be designed to promote positive drainage while serving as a protection course.

D. Protection Board:

1. Expanded Polystyrene Protection Board: **25 mm (1 in.) thick for vertical applications** with the following characteristics. Adhere to waterproofing membrane with Bituthene Protection Board Adhesive.

Normal Density: **16 kg/m³ (1.0 lb/ft³)**

Thermal Conductivity, **K factor: 0.24 at 5°C (40°F), 0.26 at 24°C (75°F)**

Thermal Resistance, **R-Value: 4 per 25 mm (1 in.) of thickness.**

E. Waterstop: **Adcor™ ES hydrophilic non-bentonite waterstop by Grace Construction** Products for non-moving concrete construction joints.

F. Miscellaneous Materials: Surface conditioner, mastic, liquid membrane, tape and accessories specified or acceptable to manufacturer of sheet membrane waterproofing.

PART 3 — EXECUTION

3.01 EXAMINATION

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 PREPARATION OF SUBSTRATES

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods which are acceptable to manufacturer of sheet membrane waterproofing.
- B. Cast-In-Place Concrete Substrates:
 - 1. **Do not proceed with installation until concrete has properly cured and dried (minimum 7 days for normal structural concrete and minimum 14 days for lightweight structural concrete).**
 - 2. Fill form tie rod holes with concrete and finish flush with surrounding surface.
 - 3. Repair bugholes over 13 mm (0.5 in.) in length and 6 mm (0.25 in.) deep and finish flush with surrounding surface.
 - 4. Remove scaling to sound, unaffected concrete and repair exposed area.
 - 5. Grind irregular construction joints to suitable flush surface.
- C. Masonry Substrates: Apply waterproofing over concrete block and brick with smooth trowel-cut mortar joints or parge coat.
- D. Wood Substrates: Apply waterproofing membrane over securely fastened sound surface. All joints and fasteners shall be flush to create a smooth surface.
- E. Related Materials: Treat joints and install flashing as recommended by waterproofing manufacturer.

3.03 INSTALLATION

- A. Refer to manufacturer's literature for recommendations on installation, including but not limited to, the following:
 - 1. Apply primer at rate recommended by manufacturer. Recoat areas not waterproofed if contaminated by dust. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of primer.

2. Delay application of membrane until primer is completely dry. Dry time will vary with weather conditions.
3. Seal daily terminations with troweled bead of mastic.
4. Apply protection board and related materials in accordance with manufacturer's recommendations.

3.04 CLEANING AND PROTECTION

- A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.
- B. Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Foam-plastic board insulation.
 - 2. Glass-fiber board insulation.
 - 3. Glass-fiber blanket insulation.
 - 4. Vapor retarders.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research/evaluation reports.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BOARD INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Celotex Corporation.
 - 2. CertainTeed Corporation.
 - 3. Johns Manville.
 - 4. Knauf Insulation.
 - 5. Owens Corning.

2.2 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CertainTeed Corporation.
 - 2. Johns Manville.
 - 3. Owens Corning.

- B. Sound Control Batts: Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
- C. Thermal Insulation: Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. R-value minimum 11.0 for 3 ½” thickness and 19.0 for 6” thickness when tested in accordance with ASTM C518.

2.3 FOAMED-IN-PLACE INSULATION

- A. Underside of roof deck and exterior walls:
 - 1. Open cell spray applied foam “AirTight OC” by Lapolla Industries, Inc. or approved equal (R-20 at exterior walls & R-30 at underside of deck).
 - 2. Ignition burner meeting the requirements of 2006 IBC Chapter 26.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation 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. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes a fluid-applied, air and water resistive vapor-permeable membrane border.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For air-barrier assemblies.
 - 1. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: Build mockups to set quality standards for materials and execution.
 - 1. Build integrated **mockups of exterior wall assembly 100 SF max**, incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly. Verify components required by Architect.
 - a. Coordinate construction of mockups to permit inspection by Owner's testing of air barrier before external insulation and cladding are installed.
 - b. Include junction with roofing membrane, corner and foundation wall intersection.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL:

2.2 PERFORMANCE REQUIREMENTS

- A. General: Air and water resistive vapor permeable barrier shall be capable of stopping air and water leakage in the cavity wall exterior, incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.3 VAPOR-PERMEABLE MEMBRANE AIR-BARRIER

- A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Elastomeric membrane.

1. Products: Subject to compliance with requirements, provide the following:
 - a. PROSOCO R-GUARD Spray
 - 1) Fluid applied air and water-resistive barrier that stops air and water leakage in cavity wall, masonry veneer construction, as well as in stucco, EIFS and most other building wall assemblies.
 - a) Product: **PROSOCO R-GUARD Spray Wrap MVP**, manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com or approved equal.
2. Physical and Performance Properties:
 - a. ICC-ES AC 212 Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers Over Exterior Sheathing.
 - b. ABAA: Air Barrier Association of America Acceptance Criteria for Liquid Applied Membranes.
 - c. Comply with national, state regulations.
 - d. Water vapor transmission: **34 perms** when tested in accordance with ASTM E96 (Wet Cup).
 - e. Tensile bond: Minimum **15 psi** or exceeds strength of substrate when tested in accordance with ASTM C297.
 - f. Surface burning characteristics: Class A Building Material, when tested in accordance with ASTM E84. Flame Spread: Less than or equal to 25, Smoke Developed: Less than or equal to 450.
 - g. Total solids: **65 to 75-** percent by volume, ASTM-D-2369.
3. Water Based Primer for Raw Gypsum Board Edges
 - a. Primer to **seal the cut edges of gypsum wall boards** where they are exposed in rough openings for windows and doors. The sealed edge makes a compatible surface for easy application of liquid applied fiber-reinforced fill coat and seam treatment for through-wall components.

- 1) Product: PROSOCO R-GUARD PorousPrep, manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
 - b. Subject to compliance with the following physical and performance requirements:
 - 1) Breathable liquid primer.
 - 2) Comply with national, state regulations.
 - 3) Total solids: 16 percent.
4. Liquid Applied Fill Coat and Seam Filler:
- a. High modulus, gun-grade, crack and joint filler, adhesive and detailing compound that combines the best silicone and polyurethane properties. The single-component, Silyl-Terminated-Poly-Ether (STPE) **prepares open joints, seams and cracks before installing primary water and air barrier system** to prevent the movement of water and air through building envelopes.
 - 1) Product: PROSOCO R-GUARD Joint & Seam Filler, manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
5. Liquid-Applied Flashing and Detailing Membrane
- a. Gun-grade waterproofing, adhesive and detailing compound that combines the best of silicone and polyurethane properties. The **single component**, Silyl-Terminated-Poly-Ether (STPE) produces a highly durable, seamless, elastomeric should **treat joints, seams, cracks and provide the flashing membrane in rough openings of structural walls** and to counter-flash waterproofing and air barrier components.
 - 1) Product: PROSOCO R-GUARD FastFlash manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
 - b. Subject to compliance with the following physical and performance requirements:
 - 1) Living Building Challenge 2.0/2.1 Red List.
 - 2) AAMA 714-12 Voluntary Specification for Liquid-Applied Flashing Used to Create a Water-Resistive Seal Around Exterior Wall Openings in Buildings.
 - 3) ICC-ES AC 212 Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers Over Exterior Sheathing.
 - 4) Comply with national state regulations.
 - 5) Water vapor transmission: 21 perms when tested in accordance with ASTM E96.
 - 6) Tensile strength: Greater than 150 psi when tested in accordance with ASTM D412.
 - 7) Elongation at break: Greater than 350 percent when tested in accordance with ASTM D412.
 - 8) Total Solids: 99 percent.
6. Interior Sealant for Windows and Doors
- a. High performance, gun-grade waterproofing sealant that combines the silicone and polyurethane properties. Single component, Silyl-Terminated-Poly-Ether (STPE) that is that is durable, **and stops the movement of moist air through cracks surrounding windows and doors.**
 - 1) Product: PROSOCO R-GUARD AirDam, manufactured by PROSOCO, Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
 - b. Backer rod: In deep joints, control sealant depth by installing closed cell backer rod. Diameter of the soft-backer rod **should be 25 percent greater than the joint width. Do not puncture backer rod.**

7. Preformed Silicone Sealant Extrusion
 - a. Manufacturer's standard system consisting of pre-cured low modulus elastomeric extrusion that provides a continuous transition and bridges **windows and doors frames at curtain wall**, storefront, expansion joints, skylights, and roof to air barrier materials. Provide continuous Preformed Silicone Sealant Extrusion System that is flexible, durable, designed for high dynamic and thermal movement which is resistant to ultraviolet exposure and weathering.
 - 1) Product: PROSOCO SureSpan EX, manufactured by PROSOCO Inc., Lawrence, KS, (800) 255-4255, www.prosoco.com.
 - b. Subject to compliance with the following physical and performance requirements:
 - 1) Elongation: Minimum 400 percent when tested in accordance to ASTM D412.
 - 2) Joint Movement Capacity: Minimum 200 percent elongation and minimum 75% compression per ASTM C1518 (ASTM C1523).
 - 3) Tensile Strength: Minimum 700 psi when tested in accordance with ASTM D412.
 - 4) Tear Strength: Minimum 200 lb/in when tested in accordance with ASTM D624.
 - 5) Tear Propagation: Pass testing requirements of ASTM C1518 (ASTM C1523). Movement Class shall exceed 200 percent Elongation and a Tear Class of PT (Knotty Tear).
 - 6) Shore Hardness A: 50 to 65 when tested in accordance with ASTM D2240.
 - 7) UV Resistance: No degradation of material when exposed to UV.

2.4 ACCESSORY MATERIALS

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.
- B. **Thru Wall Flashing:**
 1. Membrane flashing attached to stud before the sheathing.
 - a. Product: Hohmann & Bernard, Inc., 800-645-0616, **Textro Flashing, 40 mil, white**
 2. Subject to compliance with the following:
 - a. Tensile Strength: **6,242 PSI**
 - b. Elongation: **16%**
 - c. Water Absorption: **.77% max**
 - d. Moisture Vapor Permeation: **.0152 perms**
- C. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

PART 3 - EXECUTION

3.1 EXAMINATION AND SURFACE PREPARATION

- A. Examine conditions for compliance with system manufacturer's requirements for installation, and other specific conditions affecting performance of air barrier system.

- B. All surfaces must be sound, clean and free of grease, dirt, excess mortar or other contaminants. Fill or bridge damaged surfaces, voids or gaps larger than one- inch. **Fill voids and gaps measuring one- inch or less with liquid applied fill coat and seam filler** as necessary to ensure continuity.
 - 1. Surfaces to receive primary fluid applied air and water barrier must be dry or damp, unless approved by air barrier manufacturer. Surfaces to receive (STPE) fluid applied accessories must be dry, damp or wet to the touch. Brush away any standing water present before application. STPE products will tolerate rain immediately after application.
- C. Refer to manufacturer's product data sheets for requirements for condition of and preparation of substrates.
 - 1. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions.
 - 2. Remove contaminants such as grease, oil and wax from exposed surfaces.
 - 3. Remove dust, dirt, loose stone and debris.
 - 4. Use repair materials and methods that are acceptable to manufacturer of the air and water-resistive barrier system.
 - 5. Refer to manufacturer's product data sheets and manufacturer's installation guidelines for additional information on preparing structural walls to receive the primary air and water resistive barrier.
- D. Exterior sheathing:
 - 1. Ensure that sheathing is properly installed with ends, corners and edges properly fastened. Remove and replace damaged sheathing.
 - 2. **Mechanical fasteners** used to secure sheathing boards or penetrate sheathing boards shall be **set flush with sheathing**, and spot overdriven fasteners with liquid applied fill coat and seam filler.
 - 3. Seal the cut edges of gypsum wall boards exposed in rough openings for windows and doors at corners, as recommended by manufacturer.
- E. Masonry and concrete substrates:
 - 1. Masonry head and bed joints should be **fully filled and tooled**.
 - 2. Mechanically remove loose mortar fins, mortar accumulations and protrusions, and debris.
 - 3. **Fill cracks, joints and gaps with liquid applied fill coat and seam** filler as herein specified.

3.2 FIBER REINFORCED FILL COAT AND SEAM FILLER

- A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.
- B. Apply liquid applied fill coat and seam filler for seams, joints, cracks, gaps, primed rough gypsum edges at sheathing, rough openings per manufacturer's written instructions.

3.3 LIQUID APPLIED FLASHING AT WINDOWS, DOORS, OPENINGS AND PENETRATIONS

- A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.
- B. Apply liquid flashing membrane over surfaces to **seal and waterproof rough openings** per manufacturer's written instructions. Spread the wet product to create an opaque, monolithic flashing membrane which surrounds the rough opening and **extends 4 to 6 inches over the face** of the structural wall. Apply additional coats as needed to achieve void- and pinhole-free surface.

3.4 FLUID-APPLIED AIR & WATER-RESISTIVE BARRIER INSTALLATION

- A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.
- B. Apply air and water-resistive barrier to a clean, dry substrate within temperature and weather limitations per manufacturer's written instructions.
 - 1. Apply to recommended thickness.
 - 2. Allow product to cure and dry.
 - 3. Inspect membrane before covering. Repair any punctures or damaged areas by applying additional material.
 - 4. **Back roll as necessary to ensure there are no pinholes, voids or gaps in the membrane.** Apply fluid applied air and water-resistive barrier per manufacturer's recommendations.
 - 5. Apply additional coats per manufacturer's written instructions.

3.5 FLUID-APPLIED FLASHING TRANSITIONS

- A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.
- B. Apply fiber reinforced fill coat and seam filler and liquid flashing membrane as a liquid flashing membrane to **waterproof the transitions in rough opening** and between dissimilar materials per manufacturer's written instructions.
 - 1. Fill any voids between the top of the flashing leg and the vertical wall with fiber reinforced fill coat and seam filler.
 - 2. Spread the wet liquid flashing membrane to create a monolithic "cap-flash" flashing membrane per manufacturer's written instructions.
 - 3. Apply additional coats as needed to achieve void- and pinhole-free surface.
 - 4. Allow treated surfaces to skin before installing other wall assembly, waterproofing or air barrier components.
- C. Apply preformed silicone sealant extrusion to **provide a continuous airtight and water-tight seal** between material frame and substrate per manufacturer's written instructions.
 - 1. Embed material in bead of liquid flashing membrane per manufacturer's written instructions.

3.6 INTERIOR SEALANT FOR WINDOWS AND DOORS INSTALLATION

- A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.
- B. Apply interior waterproofing sealant per manufacturer's written instructions.
 - 1. Install Backer rod: Compressible, closed cell rod stock as recommended by manufacturer for compatibility with sealant. Install Backer Rod as necessary per manufacturer's written instructions.
 - 2. Apply interior waterproofing sealant in **continuous beads without gaps or air pockets**.

3.7 THRU WALL FLASHING

- A. Apply membrane 8" up exterior metal studs above finish floor **before sheathing is applied**. Leave 10" hanging below finish floor. Apply exterior sheathing over flashing thus attaching it to the stud behind the sheathing. Apply liquid membrane over entire sheathing surface.

3.8 FIELD QUALITY CONTROL

- A. Testing: Owner **will require water test by Contractor**.
- B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements.
- C. Air barriers will be considered defective if they do not pass tests and inspections.
 - 1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
 - 2. Remove and replace deficient air-barrier components for retesting as specified above.
- D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- E. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than **45 days**, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
 - 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- F. Remove masking materials after installation.

3.9 Warranty : 5 years.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Concealed-fastener, lap-seam metal wall panels.

1.2 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at **Project site**.

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. Product test reports.
- B. Warranties: Samples of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: **One** year 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: **20** 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 E 1592:
 - 1. Wind Loads: Per code or as indicated on Drawings.
 - 2. Other Design Loads: Per code or as indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than **1/180** of the span.
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: **1.57 lbf/sq. ft. (75 Pa)**.
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: **6.24 lbf/sq. ft. (300 Pa)**.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): **ambient; material surfaces**.
- E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 CONCEALED-FASTENER, LAP-SEAM HORIZONTAL METAL WALL PANELS

- A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting top and bottom edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in laps. Include accessories required for weather tight installation.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide **PAC-Clad Peterson HWP Metal Wall Panels**. Provide basis of design product or comparable product by one of the following:
- a. Dimensional Metals, Inc.
 - b. Englert Inc.
 - c. Flexospan Steek Buildings, Inc.
 - d. Merchant & Evans, Inc.
1. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, **G90 (Z275)** coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, **Class AZ50 (Class AZM150)** coating designation; structural quality. Pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
 2. Face Sheet: **Minimum 20 Ga.** nominal uncoated thickness.
 3. Surface: **Smooth.**
 4. Fluoropolymer Two-Coat Mica System: 0.25-mil primer with 0.8-mil 70 percent PVDF fluoropolymer color coat providing a pearlescent appearance, AAMA 621.
 - a. Basis of Design: **PAC-Clad Peterson HWP Metal Wall**
 - b. Color: **As selected from standard and premium colors.**
 5. Fasteners: **Concealed.**
- C. Panel Coverage: Four-rib profile with recessed flat pan between ribs:
1. Basis of Design Product: **PAC-Clad Peterson HWP Metal Wall Panel**
 2. Panel Width: **16 inches (406 mm) high.**
 3. Panel Depth: **7/8"**.
 4. Panel Lengths: **4' - 30'**.
 5. Provide micro line extrusions to trim and windows.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) 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, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum **1-inch- (25-mm-)** 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. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. 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.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
 - 2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

- A. General: 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.
- 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 621.Two Coat Fluoropolymer** finish containing not less than 70 percent PVDF resin by weight in color coat.
2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install sub-framing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.2 METAL PANEL INSTALLATION

- A. Lap-Seam Metal Panels: Fasten metal panels to supports with **concealed** fasteners at each lapped joint at location and spacing recommended by manufacturer.
 1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
 2. 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.
 3. Flash and seal panels with weather closures at perimeter of all openings.
- 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 (152-mm)** end lap, sealed with sealant and fastened together by interlocking clamping plates.
- 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

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes metal soffit panels.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**.

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. Product test reports.
- B. 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: **One** year 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: **20** 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 E 1592:
 1. Wind Loads: **As indicated on Structural Drawings.**
 2. Other Design Loads: **As indicated on Drawings.**
 3. Deflection Limits: For wind loads, no greater than **1/180** of the span.
- B. Air Infiltration: Air leakage of not more than **0.06 cfm/sq. ft. (0.3 L/s per sq. m)** when tested according to ASTM E 283 at the following test-pressure difference:
 1. Test-Pressure Difference: **1.57 lbf/sq. ft. (75 Pa).**
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
 1. Test-Pressure Difference: **6.24 lbf/sq. ft. (300 Pa).**
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

2.2 METAL SOFFIT PANELS

- A. General: 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 weather tight installation.
- B. Vee Groove Profile Metal Soffit Panels: **Solid** panels formed with vertical panel edges and a **Vee grooved pan** between panel edges; with flush joint between panels.
- C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Basis-of-Design Product: Subject to compliance with requirements, provide product indicated, **PAC-Clad Peterson**, or comparable product by one of the following:

- a. CENTRIA Architectural Systems
- b. Merchant & Evans Inc
- c. PAC-Clad Peterson
- d. Berridge Manufacturing

1. Profile: **PAC-750.**
2. Material: Face Sheet: **Minimum 0.032 inch 22 gage (0.91 mm)** nominal uncoated thickness.
3. Surface: **Vee Groove.**
4. Metallic-Coated Steel Sheet: **G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet** complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
5. Exterior Finish: **Two-coat fluoropolymer.** Fluoropolymer Two-Coat Mica System: **0.25-mil primer** with **0.8-mil** 70 percent PVDF fluoropolymer color coat providing a pearlescent appearance, AAMA 621.
 - a. Color: **As selected from standard and premium colors.**

D. Panel Coverage: **Flush-joint profile with raised flat pan.**

1. **PAC-750 Soffit**
2. Panel Height: **12 inches (305 mm).**
3. Panel Depth: **.50 inches**
4. Fastener: **Concealed.**

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) 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- (25-mm-)** 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 **concealed** fasteners.

- E. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; **1/8 inch (3 mm)** thick.
 - 2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

- A. General: 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.
- 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 621.** Fluoropolymer finish containing not less than 70 percent 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.
 - 2. Concealed Finish: **White** or light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install sub-framing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

1. Soffit Framing: Furring channels to supports **as required to comply with requirements for assemblies indicated.**

3.2 METAL PANEL 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. 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 (152-mm)** end lap, sealed with sealant and fastened together by interlocking clamping plates.
- 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

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Single-ply membrane roofing system and supplementary items necessary for installation.

1.2 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Roof Edge Regions: The following definitions from ANSI/SPRI ES-1 shall be applicable to this project:
 - 1. Roof Corner Region: Based on the following:
 - a. For buildings with mean roof height of 60 ft (18 m) or less, the corner region is a distance from the building corner that is 10 percent of the minimum building width or 40 percent of the building height at the eaves, whichever is smaller, but not less than 4 percent of minimum building width and not less than 3 ft (0.9 m).
 - 2. Roof Perimeter: The section of the roof edge between corner regions as defined above. The edge condition includes the roof edge device (edge flashing or coping) and the nailers or other substrate to edge device is attached.
- C. TPO: Thermoplastic polyolefin.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
 - 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work.
 - 1. Show base flashings and membrane terminations.
 - 2. Show flat and sloped tapered insulation, including slopes.
 - 3. Show crickets and saddles, including slopes.
 - 4. Show roof plan showing orientation of membrane roofing and fastener spacing.
 - 5. Show insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples for Verification Purposes: For the following products:

1. Roofing membrane, 12 in by 12 in (300 mm by 300 mm) square, of color specified, including side and end lap seam.
2. Flashing sheets.
3. Roof insulation.
4. Walkway pads.
5. Termination bars.
6. Insulation fasteners of each type, length, and finish.

D. Product Test Reports: Written reports based on evaluation of comprehensive tests performed by qualified testing agency indicating that each product complies with requirements.

E. Field Quality Control Reports: Written report of testing and inspection required by “Field Quality Control”.

F. Manufacturer’s Project Acceptance Document: Certification by the manufacturer that its product(s) are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that a warranty will be issued.

G. Qualification Data: For installer.

1. For firms and persons specified in "Quality Assurance" to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.

H. Maintenance Data: To include in maintenance manuals.

I. Warranty: Sample of warranty.

1. Provide manufacturer’s written warranty covering materials and installation (labor) stating obligations, remedies, limitations and exclusions.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Experience: Installer with not less than 5 years experience in performing specified Work similar to scope of this Project, with a record of successful in-service performance and completion of projects for a period of not less than 5 years, and with sufficient production capability, facilities, and personnel to produce required Work.
2. Supervision: Installer shall maintain a competent supervisor who is at Project during times specified Work is in progress, and, who is experienced in installing systems similar to type and scope required for Project.
3. Manufacturer Acceptance: Installer shall be certified, approved, licensed or acceptable to manufacturer to install products.

B. Manufacturer’s Technical Representative Qualifications: Direct employee of technical services

department of manufacturer with minimum of 5 years experience in providing recommendations, observations, evaluations, and problem diagnostics. Sales representatives are not acceptable.

- C. Insurance Certification: Assist Owner in preparing and submitting roof installation acceptance certification as necessary in connection with fire and extended-coverage insurance on roofing and associated work.
- D. Quality Standards:
 - 1. Unless otherwise recommended by roofing manufacturer, provide roofing system in accordance with recommendations of the NRCA “Roofing and Waterproofing Manual” for roofing type indicated.
 - 2. Comply with FMG System Loss Prevention Data Sheet 1-49 for attachment and anchorage of nailers, blocking, and other associated members for applicable wind zone for Project.
 - 3. Comply with FMG System Loss Prevention Data Standards 1-28 and 1-28S for attachment and anchorage of roof insulation to metal decking.
- E. Fire-Test-Response Characteristics: Provide roofing system materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: ASTM E 108, Class A, for application and roof slopes indicated.
 - 2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

1.5 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site to comply with requirements of applicable Division 01 Sections.
 - 1. Required Attendees:
 - a. Owner.
 - b. Architect.
 - c. Contractor, including superintendent.
 - d. Installer, including project manager and supervisor.
 - e. Manufacturer’s qualified technical representative.
 - f. Installers of other construction interfaced with Work.
 - g. Owner’s testing agency.
 - 2. Minimum Agenda: Installer shall demonstrate understanding of the Work required by describing detailed procedures for preparing, installing, and cleaning the Work. Demonstration shall include, but not be limited to, following topics:
 - a. Tour representative areas of Work, inspect and discuss condition of substrate, and other preparatory work performed by other trades.
 - b. Review Work requirements (Drawings, Specifications, and other Contract Documents).
 - c. Review required submittals, both completed and yet to be completed.

- d. Review and finalize construction schedule related to Work and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - e. Review required inspection, testing, certifying, and material usage accounting procedures.
 - f. Review environmental conditions and procedures for coping with unfavorable conditions.
 - g. Resolve deviations or differences between Contract Documents and the manufacturer's specifications.
3. Contractor shall record discussions of conference, including decisions and agreements reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.8 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

1.9 WARRANTY

SINGLE-PLY MEMBRANE ROOFING

- A. Manufacturer's Warranty: Furnish manufacturer's written "Total Roofing System" warranty signed by an authorized representative using manufacturer's standard form, without monetary limitation (NDL), agreeing to repair or replace components of roofing system which exhibit defects in materials or workmanship within specified warranty period. "Defects" is defined to include, but not limited to, deterioration or failure to perform as required.
 - 1. Warranty includes roofing, flashings, adhesives, sealants, insulation, fastener systems, cover board, substrate board, and other components of roofing system.
 - 2. Warranty Period: 20 years from date of Substantial Completion.

- B. Installer's Warranty: Furnish installer's written warranty signed by an authorized representative using installer's standard form agreeing to repair or replace components of roofing system which exhibit defects in materials or workmanship within specified warranty period. "Defects" is defined to include, but not limited to, deterioration or failure to perform as required.
 - 1. Warranty includes roofing, flashings, counterflashings, adhesives, sealants, insulation, fastener systems, cover boards, substrate board, roofing accessories, and other components of roofing system.
 - 2. Warranty includes roof edge flashings integral with roofing system as specified in Division 07 Section "Flashing and Sheet Metal".
 - 3. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".

- B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other available manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing system and base

flashings shall remain watertight.

- B. Design Loads: Installed roofing system and base flashings shall withstand design loads including, but not limited to, requirements established by authorities having jurisdiction, applicable local building codes, and as indicated. Contractor shall obtain required design data and identify requirements accommodated on submittal drawings.
- C. Material Compatibility: Provide roofing system materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.
- D. Edge Systems Design: Provide edge systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to SPRI's "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems" ES-1.
- E. Roofing System Design: Provide roofing systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure and external fire exposure.
- F. FMG Listing: Provide roofing system, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a roofing system and that are listed in FMG Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG Approvals markings.
 - 1. Fire/Windstorm Classification at Roof Corner and Perimeter Region: Class 1A-150.
 - 2. Fire/Windstorm Classification at Field of Roof: Class 1A-90.
- G. Energy Performance for Low Slope Roofs: Provide roofing system with initial Solar Reflectance Index not less than 78 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.

2.4 SINGLE-PLY MEMBRANE ROOFING SYSTEM MATERIALS

- A. TPO Membrane Roofing System: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.
 - 1. Thickness: 60 mils (1.5 mm), nominal.
 - 2. Exposed Face Color: As selected by Architect from manufacturer's standard colors.
 - 3. Manufacturers and Products:
 - a. Carlisle SynTec Inc.; Sure-Weld TPO.
 - b. Firestone Building Products Co.; UltraPly TPO.
 - c. GAF Materials Corporation; EverGuard TPO.
 - d. Johns Manville, Inc.; JM TPO.

2.5 SINGLE-PLY MEMBRANE ROOFING SYSTEM AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

- B. Sheet Flashing: Manufacturer's standard sheet flashing membrane, of recommended thickness and compatible with roofing membrane, of same color as roofing membrane, and appropriate for Project roofing application.
- C. Coated Metal Flashing: Manufacturer's standard coated galvanized sheet metal (G90) flashing, minimum 24 gage, of same color as roofing membrane.
- D. Pipe / Stack Flashing: Pre-molded flexible membrane pipe collar with aluminum ring bonded to base as recommended by roofing system manufacturer.
- E. Bonding Adhesive: Manufacturer's standard bonding adhesive.
- F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- G. Metal Termination Bars: Manufacturer's standard extruded aluminum or formed stainless steel bars with upper flange shaped to receive sealant, approximately 1 in by 1/8 in (25 mm by 3 mm) thick, predrilled at 8 in (200 mm) centers, with corrosive resistant fasteners.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed inside and outside corner sheet flashings, in-seam sealants, termination reglets, cover strips, and other accessories.
- I. Lap Sealant: Manufacturer's standard single-component sealant, color to match roofing membrane.

2.6 SUBSTRATE BOARDS

- A. Substrate Boards for Fire-Resistance: ASTM C 1396 / C 1396M, Type X, gypsum board with water-resistant-treated core and with water-repellent paper bonded to core's face, back, and long edges, 5/8 in (15 mm) thick.

2.7 ROOF INSULATION AND ACCESSORIES

- A. General: Provide preformed roof insulation boards that comply with requirements of referenced standards, selected from manufacturer's standard sizes and of thicknesses. Provide accessories recommended by insulation manufacturer for intended use and compatible with roofing membrane.
 - 1. Provide insulation thickness required to maintain minimum aged R-value as indicated on the Drawings.
 - 2. Provide factory, tapered insulation boards where indicated for sloping to drain. Fabricate with 1/4 in (6 mm) per 12 in (300 mm) (1:48) taper, unless otherwise indicated.
 - 3. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- B. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed by using HCFCs as blowing agents to comply with ASTM C 1289, Type II, Class 1, Grade 2, with felt or glass-fiber mat on both major surfaces.

- C. Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.
- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- E. Treated Wood Nailers: As specified in Division 06 Section "Rough Carpentry".

2.8 ROOF COVER BOARDS

- A. Horizontal Roof Cover Boards: Glass-Mat Faced Exterior Gypsum Sheathing Board.
 - 1. Material Quality Standard: ASTM C 1177 / C 1177M.
 - 2. Description: Glass-mat faced exterior gypsum sheathing board specifically manufactured for use beneath roofing systems. Non-combustible moisture-resistant gypsum core with glass-mat facings. Provide in maximum lengths and widths available that will minimize short-edge-to-short-edge butt joints and to correspond to support system indicated.
 - 3. Manufacturers and Products:
 - a. Georgia-Pacific Gypsum LLC; DensDeck Prime or DuraGuard; as recommended by roofing system manufacturer.
 - b. Temple-Inland, Inc.; GreenGlass Primed Roof Board.
 - c. USG; SECUROCK Gypsum-Fiber Roof Board.
 - 4. Thickness: Minimum **1/4 in (6 mm)**; or as required to meet performance requirements.
- B. Vertical Cover Boards (Back of Parapet): As specified in Division 06 Section "Exterior Gypsum Sheathing".

2.9 FLEXIBLE WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately **3/16 in (5 mm)** thick, as recommended by roofing system manufacturer.

2.10 FLASHING AND SHEET METAL

- A. Flashing and Sheet Metal: Refer to Division 07 Section "Flashing and Sheet Metal".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with

Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thickness of insulation.
3. Metal Decking Substrates:
 - a. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Roof Decking".

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 1. Respective manufacturer's written installation instructions.
 2. Accepted submittals.
 3. Contract Documents.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- D. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 SUBSTRATE BOARDS INSTALLATION

- A. Install substrate boards with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
 1. Fasten substrate boards to top flanges of steel deck according to recommendations in FMG Approvals' "RoofNav" and FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.

3.5 INSULATION INSTALLATION

- A. General: Comply with FMG and roofing system manufacturer's written instructions for installing roof insulation. Secure insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
- B. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is **2 in (50 mm)** or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of **6 in (150 mm)** in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding **1/4 in (6 mm)** with insulation. Cut and fit insulation within **1/4 in (6 mm)** of nailers, projections, and penetrations.
- G. Steel Roof Deck Substrate: At Contractor's option, provide one of the following methods according to performance criteria requirements for specified Windstorm Resistance Classification:
 - 1. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 2. Mechanically Fastened and Adhered Insulation: Install base layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type. Install subsequent layers of insulation in a layer of cold fluid-applied adhesive.

3.6 ROOF COVER BOARDS INSTALLATION

- A. General: Comply with FMG and roofing system manufacturer's written instructions for installing roof cover boards. Secure roof cover boards to insulation substrate according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
- B. Install roof cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of **6 in (150 mm)** in each direction. Loosely butt roof cover boards together.
 - 1. At Contractor's option, provide one of the following fastening methods according to performance criteria requirements for specified Windstorm Resistance Classification:
 - a. Fasten roof cover boards through insulation into roof deck.
 - b. Adhere roof cover boards to insulation substrate in a layer of cold fluid-applied

adhesive.

- C. Secure roof cover boards to insulation to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturer's written instructions.

3.7 SINGLE-PLY MEMBRANE ROOFING SYSTEM INSTALLATION; GENERAL REQUIREMENTS

- A. Install roofing membrane according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow it to relax before installing.
- B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.
- D. Coordinate installation of roofing system so insulation and other components of roofing system not intended for permanent exposure are not subjected to extreme heat, precipitation, or left uncovered at the end of the workday or when inclement weather is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a temporary protection layer set in roofing adhesive with joints and edges sealed.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
 - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- E. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by roofing system manufacturer. Stagger end laps. Apply roofing membrane with side laps shingled with slope of roof deck.
- F. Securely attach and tie-in roofing membrane at roof drains and piping / stack flashings in accordance with roofing system manufacturer's written instructions.

3.8 FULLY ADHERED SINGLE-PLY MEMBRANE ROOFING INSTALLATION

- A. Adhere sheet membrane over area to receive roofing and install according to roofing system manufacturer's written instructions.
- B. Adhere roofing membrane at terminations, penetrations, corners, and perimeter of roofing.
- C. Seams:
 - 1. TPO Applications: Clean seam areas, overlap roofing membrane, and heat weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.

- a. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
- b. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
- c. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.

3.9 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Seams:
 1. TPO Applications: Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Heat weld side and end laps to ensure a watertight seam installation.
- D. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.10 WALKWAY INSTALLATION

- A. Flexible Walkways: Install flexible walkway products at locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Manufacturer's qualified technical representative shall inspect first day's Work and periodically inspect Work to ensure installation is proceeding in accordance with manufacturer's designs, recommendations, instructions and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings, and conclusions of inspection.
- B. Owner's Testing Agency Field Service: The Owner may employ and pay a qualified independent testing agency to perform field quality control. Materials and installation failing to meet specified requirements shall be replaced at Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be done at Contractor's expense.

3.12 REPAIR, CLEANING, AND PROTECTION

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

- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manufactured reglets with counterflashing.
2. Formed roof-drainage sheet metal fabrications.
3. Formed low-slope roof sheet metal fabrications.
4. Formed steep-slope roof sheet metal fabrications.
5. Formed wall sheet metal fabrications.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Distinguish between shop- and field-assembled work.
3. Include identification of finish for each item.
4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.

- C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product certificates.

- B. Product test reports.

- C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.
- B. Mockups: Build mockups to verify selections made under Sample submittals to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
 - 1. Build mockup of typical roof **edge**, including **fascia trim**, approximately **5 feet** long.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: **2** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with **NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual"** requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- D. SPRI Wind Design Standard: Manufacture and install **copings and roof edge flashings** tested according to SPRI ES-1 and capable of resisting the following design pressure:
- E. Recycled Content of Copper-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **40** percent.
- F. Recycled Content of Steel-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **25** percent.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide **zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation**; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Surface: **Manufacturer's standard clear acrylic coating on both sides.**
 - 2. Exposed Coil-Coated Finish:
 - 3. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 4. Color: **selected by Architect from manufacturer's full range.**

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Copper Sheet: Copper, hardware bronze or passivated Series 300 stainless steel.
 - 3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
 - 5. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Solder:
 - 1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, **Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.**

- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch (13 mm)** wide and **1/8 inch (3 mm)** thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 MANUFACTURED REGLETS

- A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated **with thru-wall reliever and thru-wall insert installed by mason.**
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. Fry Reglet Corporation.
 - b. Hickman, W. P. Company.
 - c. Keystone Flashing Company, Inc.
 - d. National Sheet Metal Systems, Inc.
 - 3. Material: **Copper, 16 oz./sq. ft. (0.55 mm thick).**
 - 4. Finish: **Natural.**

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Obtain field measurements for accurate fit before shop fabrication.
 - 2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 1. Form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, filled with butyl sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
 - C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
 - D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
 - F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. **Rivet joints where necessary for strength, per standard.**
 - H. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. **Rivet joints where necessary for strength, per standard.**

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum **96-inch- (2400-mm-)** long sections. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. **Shop fabricate interior and exterior corners.**
- B. Downspouts: Fabricate **rectangular** downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from **same material as downspouts and anchors.**
 1. Fabricate from the following materials:
 - a. Copper: **16 oz./sq. ft. (0.55 mm thick), triple thickness after folding.**
 - b. Aluminum: **0.024 inch (0.61 mm), triple thickness after folding.**
 - c. Stainless Steel: **0.016 inch (0.40 mm), triple thickness after folding.**
 - d. Galvanized Steel: **16 GA.**
- C. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, **4-inch- (100-mm-)** wide wall flanges to interior, and base extending **4 inches (100 mm)** beyond cant or tapered strip into field of roof. Fabricate from the following materials:

1. Copper: **16 oz./sq. ft. (0.55 mm)** thick.
 2. Aluminum: **0.032 inch (0.81 mm)** thick.
 3. Stainless Steel: **26 GA** thick.
 4. Galvanized Steel: **26 GA** thick.
 5. Aluminum-Zinc Alloy-Coated Steel: **0.028 inch (0.71 mm)** thick.
- D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes. Fabricate from the following materials:
1. Copper: **16 oz./sq. ft. (0.55 mm)** thick.
 2. Aluminum: **0.032 inch (0.81 mm)** thick.
 3. Stainless Steel: **26 GA** thick.
 4. Galvanized Steel: **26 GA** thick.
- E. Splash Pans: Fabricate to dimensions and shape required and from the following materials:
1. Copper: **16 oz./sq. ft. (0.55 mm thick)**
 2. Aluminum: **26 GA (1.02 mm)** thick.
 3. Stainless Steel: **26 GA (0.48 mm)** thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum **96-inch- (2400-mm-)** long, but not exceeding **12-foot- (3.6-m-)** long sections. **Lap 5” at joints with Sonneborn NP1 sealant. Shop fabricate interior and exterior corners.**
1. Fabricate from the Following Materials:
 - a. Copper: **16 oz./sq. ft. (0.68 mm thick).**
 - b. Aluminum: **0.032 inch** thick.
 - c. Stainless Steel: **26 GA** thick.
 - d. Galvanized Steel: **26 GA** thick.
 - e. Aluminum-Zinc Alloy-Coated Steel: **0.028 inch (0.71 mm)** thick.
- B. Copings: Fabricate in minimum **96-inch- (2400-mm-)** long, but not exceeding **12-foot-(3.6-m-)** long, sections. **Lap** joint of same thickness as copings. Furnish with continuous cleat to support edge of external leg **only**. Miter corners, **fasten and seal** watertight. Shop fabricate interior and exterior corners.
1. Fabricate from the Following Materials:
 - a. Copper: **16 oz./sq. ft. (0.82 mm thick)**
 - b. Aluminum: **0.032 inch (1.27 mm)** thick.
 - c. Stainless Steel: **26 GA** thick.
 - d. Galvanized Steel: **26 GA** thick.
- C. Base Flashing: **Shop fabricate interior and exterior corners.** Fabricate from the following materials:

1. Copper: **16 oz./sq. ft. (0.68 mm thick)**
2. Aluminum: **0.032 inch (1.02 mm)** thick.
3. Stainless Steel: **26 GA** thick.
4. Galvanized Steel: **26 GA** thick.

D. Counterflashing and Flashing Receivers: Fabricate from the following materials:

1. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
2. Aluminum: **0.032 inch (0.81 mm)** thick.
3. Stainless Steel: **26 GA** thick.
4. Galvanized Steel: **26 GA** thick.

E. Roof-Penetration Flashing: Fabricate from the following materials:

1. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
2. Stainless Steel: **26 GA** thick.
3. Galvanized Steel: **26 GA** thick.

F. Roof-Drain Flashing: Fabricate from the following materials:

1. **Lead: 3 sheet Lead, 36" x 36" minimum only.**

2.8 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:

1. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
2. Aluminum: **0.032 inch (0.81 mm)** thick.
3. Stainless Steel: **26 GA** thick.
4. Galvanized Steel: **26 GA** thick.

B. Valley Flashing: Fabricate from the following materials:

1. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
2. Stainless Steel: **26 GA** thick.
3. Galvanized Steel: **26 GA** thick.

C. Drip Edges: Fabricate from the following materials:

1. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
2. Aluminum: **0.032 inch (0.81 mm)** thick.
3. Stainless Steel: **26 GA** thick.
4. Galvanized Steel: **26 GA** thick.

D. Eave and Rake Flashing: Fabricate from the following materials:

1. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
2. Aluminum: **0.032 inch (0.81 mm)** thick.
3. Stainless Steel: **26 GA** thick.
4. Galvanized Steel: **26 GA** thick.

2.9 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum **96-inch- (2400-mm-)** long, but not exceeding **12-foot- (3.6-m-)** long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend **6 inches (150 mm)** beyond each side of wall openings; and form with **½ inch** high, end dams. Fabricate from the following materials:
1. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
 2. Stainless Steel: **26 GA** thick.
- B. Opening Flashings in Frame Construction: Fabricate head, sill, **jamb**, and similar flashings to extend **4 inches (100 mm)** beyond wall openings. Form head and sill flashing with **½ -inch** high, end dams. Fabricate from the following materials:
1. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
 2. Aluminum: **0.032 inch (0.81 mm)** thick.
 3. Stainless Steel: **26 GA** thick.
 4. Galvanized Steel: **26 GA** thick.
- C. Wall Expansion-Joint Cover: Fabricate from the following materials:
1. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
 2. Aluminum: **0.032 inch** thick.
 3. Stainless Steel: **26 GA** thick.
 4. Galvanized Steel: **26 GA** thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than **2 inches (50 mm)**.
- B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.
- C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than **6 inches (150 mm)** staggered **24 inches (600 mm)** between courses. Overlap side edges not less than **3-1/2 inches (90 mm)**. Roll laps and edges with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than **12 inches (300 mm)** apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 5. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of **uncoated-aluminum, zinc, and stainless-steel** sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of **10 feet (3 m)** with no joints within **24 inches (600 mm)** of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, filled with sealant concealed within joints.
 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate **substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.**
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of **1-1/2 inches (38 mm)**; however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder **metallic-coated steel and aluminum** sheet.
2. Do not use torches for soldering.
3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
5. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.

H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Hanging Gutters: Join sections with **riveted and soldered joints if possible, or joints sealed with sealant and rivets**. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.
- C. Downspouts: Join sections with **1-1/2-inch (38-mm)** telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately **60 inches (1500 mm)** o.c. **Use rivets to hold joint.**
- D. Splash Pans: Install where downspouts discharge on **low-slope roofs**. Set in asphalt roofing cement or elastomeric sealant compatible with the substrate.
- E. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
- F. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of **1 inch (25 mm)** below **scupper or gutter** discharge.
- G. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of **4 inches (100 mm)** in direction of water flow.

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.

- C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm).
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. **Use metal base with minimum 8 inch high tube, flash-in base. Use collar and cap as counterflashing.**

3.5 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in **Section 042000 "Unit Masonry" and Section 044200 "Exterior Stone Cladding."**
- C. Reglets: Installation of reglets is specified in **Section 033000 "Cast-in-Place Concrete" and Section 042000 "Unit Masonry."**
- D. Opening Flashings in Frame Construction: Install continuous head, sill,[**jamb,**] and similar flashings to extend **4 inches (100 mm)** beyond wall openings.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Penetrations in fire-resistance-rated walls.
 2. Penetrations in horizontal assemblies.
 3. Penetrations in smoke barriers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- B. Product test reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."
- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
1. Penetration firestopping tests are performed by **a qualified testing agency acceptable to authorities having jurisdiction.**
 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems bearing marking of qualified testing and inspection agency.
- C. Preinstallation Conference: Conduct conference at **Project site.**

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Grace Construction Products.
 2. Hilti, Inc.
 3. Johns Manville.
 4. 3M Fire Protection Products.
 5. Tremco, Inc.; Tremco Fire Protection Systems Group.
 6. USG Corporation.

2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg (2.49 Pa)**.
1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of **0.01-inch wg (2.49 Pa)**.
1. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (**0.025 cu. m/s per sq. m**) of penetration opening at **0.30-inch wg (74.7 Pa)** at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- C. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- D. Install fill materials for firestopping by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.2 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within **6 inches (150 mm)** of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.3 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections.

- B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.
- C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.4 PENETRATION FIRESTOPPING SCHEDULE – (See Fire Rated Walls indicated on plans)

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where Intertek ETL SEMKO-listed systems are indicated, they refer to design numbers in Intertek ETL SEMKO's "Directory of Listed Building Products" under "Firestop Systems."
- C. Where FM Global-approved systems are indicated, they refer to design numbers listed in FM Global's "Building Materials Approval Guide" under "Wall and Floor Penetration Fire Stops."
- D. Firestopping with No Penetrating Items:
 - 1. UL-Classified Systems: **C-AJ-0090 for Concrete or Drywall to 6” thick.**
- E. Firestopping for Metallic Pipes, Conduit, or Tubing:
 - 1. UL-Classified Systems: **W-J-1067 for 8” CMU, W-L-1054 for Drywall minimum of 2” x 4”.**
- F. Firestopping for Cable Trays with Electric Cables:
 - 1. UL-Classified Systems: **C-AJ-4071 for 8” CMU.**
 - 2. UL-Classified Systems: **W-L-4011 for Drywall minimum of 2 ½” wide.**
- G. Firestopping for Insulated Pipes:
 - 1. UL-Classified Systems: **C-AJ-5090 for Concrete or CMU maximum diameter of 18”.**
 - 2. UL-Classified Systems: **W-L-5029 for Drywall with maximum diameter 18-5/8”.**

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Immersible joint sealants.
 - 4. Mildew-resistant joint sealants.
 - 5. Latex joint sealants.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples: For each kind and color of joint sealant required.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Preconstruction laboratory test reports.
- C. Preconstruction field-adhesion-test reports.
- D. Field-adhesion-test reports.
- E. Sample warranties.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 - 3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with **stone and masonry** substrates.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: **Two** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Colors of Exposed Joint Sealants: **As selected by Architect from manufacturer's full range.**

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 791.
 - b. GE Construction Sealants; SCS2000 SilPruf.

- c. May National Associates, Inc., a subsidiary of Sika U.S.; Bondaflex Sil 265 LTS.
 - d. Pecora Corporation; PCS.
 - e. Sika Corporation U.S.
- B. Silicone, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Uses T and NT.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation.
 - b. Soudal USA; RTV 50.

2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Construction Chemicals, LLC, Building Systems; Sonalastic TX1.
 - b. Polymeric Systems, Inc.; Flexiprene 1000.
 - c. Sherwin-Williams Company (The).
 - d. Sika Corporation U.S.; Sikaflex Textured Sealant.
 - e. Tremco Incorporated; Dymonic.
- B. Urethane, Immersible, S, NS, 50, T, NT, I: Immersible, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Uses T, NT, and I.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Tremco Incorporated.
- C. Urethane, Immersible, S, P, 50, T, NT, I: Immersible, single-component, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 50, Uses T, NT, and I.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Tremco Incorporated.

2.4 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

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

- a. Dow Corning Corporation; 786-M White.
- b. GE Construction Sealants; SCS1700 Sanitary.
- c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 100 WF.
- d. Soudal USA; RTV GP.
- e. Tremco Incorporated; Tremsil 200.

2.5 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

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

- a. BASF Construction Chemicals, LLC, Building Systems; Sonolac.
- b. May National Associates, Inc., a subsidiary of Sika Corporation U.S.
- c. Pecora Corporation.
- d. Sherwin-Williams Company (The).
- e. Tremco Incorporated.

2.6 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C 1330, **or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated**, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. BASF Construction Chemicals, LLC, Building Systems.
- b. Construction Foam Products, a division of Nomaco, Inc.

- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.7 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.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove laitance and form-release agents from concrete.
 - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform **3** tests for the first **1000 feet (300 m)** of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each **1000 feet (300 m)** of joint length thereafter or one test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:
 - a. Control and expansion joints in brick pavers.
 - b. Isolation and contraction joints in cast-in-place concrete slabs.
 - c. Joints between plant-precast architectural concrete paving units.
 - d. Joints in stone paving units, including steps.
 - e. Tile control and expansion joints.
 - f. Joints between different materials listed above.
 - g. Other joints as indicated on Drawings.
2. Joint Sealant: **Urethane, P, 50, T, NT.**
3. Joint-Sealant Color: **As selected by Architect from manufacturer's full range of colors.**

B. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces subject to water immersion.

1. Joint Locations:
 - a. Joints in pedestrian plazas.
 - b. Other joints as indicated on Drawings.
2. Joint Sealant: **Urethane, immersible, S, P, 25, T, NT, I.**
3. Joint-Sealant Color: **As selected by Architect from manufacturer's full range of colors.**

- C. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Joints between plant-precast architectural concrete units.
 - c. Control and expansion joints in unit masonry.
 - d. Joints in dimension stone cladding.
 - e. Other joints as indicated on Drawings.
 2. Joint Sealant: **Silicone, nonstaining, S, NS, 50, NT.**
 3. Joint-Sealant Color: **As selected by Architect from manufacturer's full range of colors.**
- D. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in stone flooring.
 - c. Control and expansion joints in brick flooring.
 - d. Control and expansion joints in tile flooring.
 - e. Other joints as indicated on Drawings.
 2. Joint Sealant: **Urethane, S, P, 25, T, NT.**
 3. Joint-Sealant Color: **As selected by Architect from manufacturer's full range of colors.**
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Tile control and expansion joints.
 - c. Vertical joints on exposed surfaces of **unit masonry, concrete, walls, and partitions.**
 - d. Joints on underside of plant-precast structural concrete **beams and planks.**
 - e. Other joints as indicated on Drawings.
 2. Joint Sealant: **Urethane, S, NS, 25, NT.**
 3. Joint-Sealant Color: **As selected by Architect from manufacturer's full range of colors.**
- F. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.

- c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: **Acrylic latex.**
 - 3. Joint-Sealant Color: **As selected by Architect from manufacturer's full range of colors.**
- G. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
- 1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: **Silicone, mildew resistant, acid curing, S, NS, 25, NT.**
 - 3. Joint-Sealant Color: **As selected by Architect from manufacturer's full range of colors.**
- H. Joint-Sealant Application: Concealed mastics.
- 1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: **Butyl-rubber based.**
 - 3. Joint-Sealant Color: **As selected by Architect from manufacturer's full range of colors.**

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical joint sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- B. Samples: For each kind and color of acoustical joint sealant required.
- C. Acoustical-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.

1.4 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: **One** year from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: **One** year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.

2.2 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a.
 - b. GE Construction Sealants; RCS20 Acoustical.
 - c. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
 - d. Pecora Corporation.
 - e. Tremco, Incorporated; Tremco Acoustical Sealant.
 - f. USG Corporation; SHEETROCK Acoustical Sealant.
 - 2. Colors of Exposed Acoustical Joint Sealants: **As selected by Architect from manufacturer's full range of colors.**
 - 3. Locations: **As specified in this section and indicated on plans.**
- B. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- C. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- D. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hollow-metal work.

1.2 DEFINITIONS

- A. **Minimum Thickness:** Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 ACTION SUBMITTALS

- A. **Product Data:** For each type of product.
- B. **Shop Drawings:** Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.
- C. **Samples for Initial Selection:** For units with factory-applied color finishes.
- D. **Samples for Verification:** For each type of exposed finish required.
- E. **Schedule:** Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 1. Amweld International, LLC.
 2. Ceco Door Products; an Assa Abloy Group company.
 3. Republic Doors and Frames.
 4. Steelcraft; an Ingersoll-Rand company.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings **and temperature-rise limits** indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

- A. Standard-Duty Doors and Frames: SDI A250.8, Level 1.
 - 1. Physical Performance: **Level C** according to SDI A250.4.
 - 2. Doors:
 - a. Type: **Equal to Regent Series by Ceco Door.**
 - b. Thickness: **1-3/4 inches (44.5 mm).**
 - c. Face: **Uncoated**, cold-rolled steel sheet, minimum thickness of **0.032 inch (0.8 mm).**
 - d. Gage: **18 GA.**
 - e. Edge Construction: **Model 1, Full Flush.**
 - f. Core: **Honeycomb Core.**
 - 3. Frames:
 - a. Materials: **Uncoated**, cold-rolled steel sheet, minimum thickness of **0.042 inch (1.0 mm).**
 - b. Construction: **Face welded.**
 - c. Gage: **16 GA.**
 - 4. Exposed Finish: **Prime.**

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
 - 1. Physical Performance: **Level A** according to SDI A250.8.
 - 2. Doors:
 - a. Type: **Equal to Trio E series by Ceco Door.**
 - b. Thickness: **1-3/4 inches (44.5 mm).**

- c. Face: Metallic-coated steel sheet, minimum thickness of **0.053 inch (1.3 mm)**, with minimum **A60** coating.
 - d. Gage: **16 GA.**
 - e. Edge Construction: **Model 1, Full Flush.**
 - f. Core: **Steel stiffened laminated core.** 22 gauge stiffeners are placed no more than 6" apart.
 - g. Flush Door Thermal Characteristic Value: Core Calculated R value of 11.01
3. Frames:
- a. Materials: Metallic-coated steel sheet, minimum thickness of **0.053 inch (1.3 mm)**, with minimum **A60** coating.
 - b. Construction: **Face welded.**
 - c. Gage: **16 GA.**
4. Exposed Finish: **Prime.**

2.5 FRAME ANCHORS

A. Jamb Anchors:

- 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
- 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
- 3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
- 4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:

- 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
- 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), **04Z (12G)** coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: From corrosion-resistant materials.
- G. Grout: ASTM C 476, except with a maximum slump of **4 inches (102 mm)**, as measured according to ASTM C 143/C 143M.
- H. Glazing: Section 088000 "Glazing."

2.7 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 - 2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 - 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than **16 inches (406 mm)** from top and bottom of frame. Space anchors not more than **32 inches (813 mm)** o.c., to match coursing, and as follows:

- 1) Two anchors per jamb up to **60 inches (1524 mm)** high.
 - 2) Three anchors per jamb from **60 to 90 inches (1524 to 2286 mm)** high.
 - 3) Four anchors per jamb from **90 to 120 inches (2286 to 3048 mm)** high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each **24 inches (610 mm)** or fraction thereof above **120 inches (3048 mm)** high.
- b. Stud-Wall Type: Locate anchors not more than **18 inches (457 mm)** from top and bottom of frame. Space anchors not more than **32 inches (813 mm)** o.c. and as follows:
- 1) Three anchors per jamb up to **60 inches (1524 mm)** high.
 - 2) Four anchors per jamb from **60 to 90 inches (1524 to 2286 mm)** high.
 - 3) Five anchors per jamb from **90 to 96 inches (2286 to 2438 mm)** high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each **24 inches (610 mm)** or fraction thereof above **96 inches (2438 mm)** high.
- c. Compression Type: Not less than two anchors in each frame.
- d. Postinstalled Expansion Type: Locate anchors not more than **6 inches (152 mm)** from top and bottom of frame. Space anchors not more than **26 inches (660 mm)** o.c.
6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.
- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- E. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with **mitered** hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 4. Provide loose stops and moldings on inside of hollow-metal work.
 5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: SDI A250.10.

2.9 ACCESSORIES

- A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of **0.020-inch- (0.5-mm-)** thick, cold-rolled steel sheet set into **0.032-inch- (0.8-mm-)** thick steel frame.
- B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- C. Grout Guards: Formed from same material as frames, not less than **0.016 inch (0.4 mm)** thick.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.

6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
 8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus **1/16 inch (1.6 mm)**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus **1/16 inch (1.6 mm)**, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus **1/16 inch (1.6 mm)**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus **1/16 inch (1.6 mm)**, measured at jambs at floor.
- B. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: **1/8 inch (3.2 mm)** plus or minus **1/32 inch (0.8 mm)**.
 - b. Between Edges of Pairs of Doors: **1/8 inch (3.2 mm)** to **1/4 inch (6.3 mm)** plus or minus **1/32 inch (0.8 mm)**.
 - c. At Bottom of Door: **5/8 inch (15.8 mm)** plus or minus **1/32 inch (0.8 mm)**.
 - d. Between Door Face and Stop: **1/16 inch (1.6 mm)** to **1/8 inch (3.2 mm)** plus or minus **1/32 inch (0.8 mm)**.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than **9 inches (230 mm)** o.c. and not more than **2 inches (51 mm)** o.c. from each corner.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with **wood-veneer** faces.
2. **Factory finishing** flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of door. **Include factory-finishing specifications.**

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

C. Samples: For **factory-finished doors**.

1.3 INFORMATIONAL SUBMITTALS

A. Quality Standard Compliance Certificates: **AWI Quality Certification** Program certificates.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that **a certified participant in AWI's Quality Certification Program**.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Graham Wood Doors; an Assa Abloy Group company.
 2. Haley Brothers, Inc.
 3. Marlite.
 4. Marshfield Door Systems, Inc.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with **I.S.1-A, "Architectural Wood Flush Doors."**
1. Provide **AWI Quality Certification** Labels indicating that doors comply with requirements of grades specified.
- B. WDMA I.S.1-A Performance Grade:
1. Heavy Duty unless otherwise indicated.
 2. Extra Heavy Duty: **public toilets, janitor's closets, and assembly spaces.**
 3. Standard Duty: **Closets.**
- C. Fire-Rated Wood Doors: Doors complying with **NFPA 80** that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to **NFPA 252**.
1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- D. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to **UL 1784**.
- E. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf (3100 N).
 - b. Screw Withdrawal, Edge: 400 lbf (1780 N).
- F. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors

1. Grade: **Premium, with Grade A faces.**
2. Species: **Maple – select white.**
3. Cut: **Plain sliced.**
4. Match between Veneer Leaves: **Slip match.**
5. Assembly of Veneer Leaves on Door Faces: **Center-balance match.**
6. Core: **Either glued wood stave or structural composite lumber.**
7. Construction: **Seven plies.** Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. **Faces are bonded to core using a hot press.**
8. Construction: **Seven plies,** either bonded or nonbonded construction.

2.4 DOORS FOR OPAQUE FINISH

A. Interior Solid-Core Doors

1. Grade: **Custom.**
2. Faces: **Hardboard or MDF.**
3. Core: **Either glued wood stave or structural composite lumber.**
4. Construction: **Seven plies.** Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. **Faces are bonded to core using a hot press.**
5. Construction: **Seven plies,** either bonded or nonbonded.

2.5 LIGHT FRAMES AND LOUVERS

- A. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.
- B. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet; **factory primed for paint finish;** and approved for use in doors of fire-protection rating indicated.

C. Metal Louvers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Louvers, Inc.
 - b. Anemostat; a Mestek company.
 - c. L & L Louvers, Inc.
 - d. Louvers & Dampers, Inc.; a division of Mestek, Inc.
 - e. McGill Architectural Products.
2. Metal and Finish: Hot-dip galvanized steel, 0.040 inch (1.0 mm) thick, **factory primed for paint** finish.

2.6 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 1. Comply with **NFPA 80** requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
- C. Openings: Factory cut and trim openings through doors.
 1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 3. Louvers: Factory install louvers in prepared openings.

2.7 SHOP PRIMING

- A. Doors for Opaque Finish: Shop prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in **Section 099123" Interior Painting."**

2.8 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors that are indicated to receive transparent finish.
- C. Use only paints and coatings that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hardware: For installation, see **Section 087100 "Door Hardware."**
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to **NFPA 80**.
 - 2. Install smoke- and draft-control doors according to **NFPA 105**.
- C. Job-Fitted 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 for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
 - a. Comply with **NFPA 80** for fire-rated doors.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Access doors and frames for walls and ceilings.
 - 2. Floor access doors and frames.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each door face material.
- D. Schedule: Types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 tested according to the following test method:
 - 1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
 - 2. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or comparable product by one of the following:
 - 1. Access Panel Solutions.
 - 2. Babcock-Davis.
 - 3. Cendrex Inc.
 - 4. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
 - 5. Larsen's Manufacturing Company.
 - 6. Milcor Inc.
- C. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

- D. Flush Access Doors with Exposed Flanges:
1. Basis-of-Design Product: **Milcor access door – Style M**
 2. Assembly Description: Fabricate door to fit flush to frame. Provide manufacturer's standard-width exposed flange, proportional to door size.
 3. Locations: **Wall and ceiling.**
 4. Door Size: **As scheduled on drawings.**
 5. Uncoated Steel Sheet for Door: **Nominal 0.060 inch** (1.52 mm), 16 gage.
 - a. Finish: **Factory prime.**
 6. Frame Material: Same material, thickness, and finish as door.
 7. Hinges: Concealed spring that **opens 175 degrees.**
 8. Hardware: **Screwdriver cam latch with key lock.**

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum **G60 (Z180)** or **A60 (ZF180)** metallic coating.
- E. Frame Anchors: Same type as door face.
- F. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.4 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.
 1. For recessed doors with plaster infill, provide self-furring expanded metal lath attached to door panel.

- E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 - 1. For cylinder locks, **furnish six keys per lock and key all locks alike.**
 - 2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.
- F. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.5 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
 - 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
 - 2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil (0.025 mm) for topcoat.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Electric operated overhead rolling grilles.
- B. Related sections:
 - 1. 05 5000 Miscellaneous Metals.
 - 2. 06 0153 Rough Carpentry.
 - 3. 08 7100 Hardware.
 - 4. Division 26, electrical wiring and conduit, fuses, disconnected switches, connection of operator to power supply, and installation of control station and wiring.
- C. Products that may be supplied, but are not installed under this section:
 - 1. Control station.
 - 2. Manual release pull handle.
- D. Alternates:
 - 1. Cornell.
 - 2. Amarr.
 - 3. Clopay.

1.2 SYSTEM DESCRIPTION

- A. Design requirements:
 - 1. Cycle life:
 - a. Design grilles of standard construction for normal use of up to 5 cycles per day maximum, and an overall maximum of 50,000 operating cycles for the life of the grille.
 - b. Design grilles of special construction for high cycle use. Expected cycles of up to 5 per day.
 - 2. Safety:
 - a. Chain operated doors shall be designed so that the door immediately stops upward or downward travel and is maintained in a stationary position when the hand chain is released by user.

1.3 SUBMITTALS

- A. Reference section 01 3300 Submittal Procedures: submit the following items:
 - 1. Product Data.
 - 2. Shop Drawings: include special conditions not detailed in Product Data. Show interface with adjacent work.
 - 3. Quality Assurance/Control Submittals:
 - a. Provide proof of manufacturer ISO 9001:2015 registration
 - b. Provide proof of manufacturer and installment qualifications - see 1.3 below.
 - c. Provide manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years experience in producing grilles of the type specified.
2. Installer Qualifications: Manufacturer's approval.

1.5 DELIVERY STORAGE AND HANDLING

- A. Reference Section 01 6600 Product Storage and Handling Requirements.
- B. Follow manufacturer's instructions.

1.6 WARRENTY

- A. Standard Warranty: Two years from date of shipment against defects in material and workmanship.
- B. Maintenance: Submit for owner's consideration and acceptance of a maintenance service agreement for installed products.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: Cookson – 1901 South Litchfield Rd, Goodyear, AZ 85338. Telephone: (800) 294 – 4358. Underwriters Laboratories, Inc. (UL), ISO 9001:2015 Registered.
 1. Distributor: Texoma Builders Supply – 2701 Commerce St, Wichita Falls, TX 76301.
- B. Model: ESG10
- C. Approved Equal: Cornell – 24 Elmwood Dr, Mountain Top, PA 18707. Telephone: (800) 233 – 8366.
- D. Substitutions: Reference Section 01 2513 Product Substitution Procedures.

2.2 MATERIALS

A. Curtain:

1. ESG10 Straight Pattern
 - a. Horizontal Rods: Solid 5/16 inch (8mm) diameter, 5056 H32 aluminum alloy.
 - 1) Vertical Spacing: 2 inches (50.8mm) on center.
 - b. Vertical Chains: Grommetted aluminum links, 3/4 inch (19 mm) wide, positioned by E-rings on 3 inch (76.2 mm) centers. Provide double E-rings on horizontal bars on both sides of end chains to retain curtain guides.
2. Bottom Bar: 2 x 3-1/2 inch (50.8 x 88.9 mm) extruded aluminum tubular section reinforced with 3 x 2 x 3/16 inch (76.2 x 50.8 x 4.76 mm) aluminum angle(s).

3. Finish:
 - a. Aluminum Curtain and Bottom Bar:
 - 1) Curtain: Clear anodized.
 - 2) Bottom Bar: Clear anodized.
 - b. Stainless Steel Curtain with Aluminum Bottom Bar:
 - 1) Curtain: Factory polished.
 - 2) Bottom Bar: Clear anodized.
 - c. Stainless Steel Curtain with Stainless Steel Bottom Bar: Factory Polished
 - d. Galvanized Steel Rods with Aluminum Chains and Bottom Bar:
 - 1) Rods: Galvanized steel, unpainted.
 - 2) Chains and Bottom Bar: Clear anodized.

- B. Guides, Wall Mounted: Heavy duty extruded aluminum sections with snap-on cover to conceal fasteners and polypropylene pile runners on both sides of curtain. Provide [steel] [aluminum] mounting angle as required for face of wall installation.

- C. Guides, Tube Mounted: Heavy duty extruded aluminum sections with snap-on cover to conceal fasteners and polypropylene pile runners on both sides of curtain. Provide [steel] [aluminum] tubes. Floor saddles and hardware as recommended by manufacturer to support grille.
 1. Finish, Aluminum Guide Components:
 - a. [Mill finish] [Clear anodized] [Medium bronze anodized] [Dark bronze anodized] [Black anodized]
 2. Finish, Steel: Mounting Angles.
 - a. Zirconium treatment followed by a corrosion inhibitive baked-on zinc-rich gray polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness.

- D. Counterbalance Shaft Assembly:
 1. Barrel: Steel pipe capable of supporting current load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width.
 2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of grille to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.

- E. Brackets: Fabricate from minimum 3/16 inch (4.76 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
 1. Finish:
 - a. Zirconium treatment followed by a corrosion inhibitive baked-on zinc-rich gray polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness.

- F. Hood and Fascia: 0.040 inch (1.016 mm) aluminum with reinforced top and bottom edges. Provide minimum ¼ inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.
 1. Finish:
 - a. Aluminum: Clear anodized.

2.3 ACCESSORIES

- A. Locking:
 1. Motor Operated: Keyed cylinder locking into both jambs operable from both sides of curtain with motor interlock cutout switches.

- B. Emergency Egress System: Provide wall mounted manual release system pull handle to disengage motor operator and automatically open grille for emergency egress without the use of electrical power. Release of pull handle will reset grille to normal motor operation,

- C. Operator and Bracket Mechanism Cover: Provide 0.040 inch (1.016 mm) aluminum sheet metal cover to enclose exposed moving operating components at coil area of unit. Finish to match door hood.

2.4 OPERATION

- A. Supply Model MG Electric Motor Operator: Industrial duty – rated for a maximum of 20 cycles per hour, cULus listed, Totally Enclosed Non Ventilated gear head operator(s) rated (1/3) (1/2) or (3/4) hp as recommended by door manufacturer for size and type of door, 120 Volts, 3 Phase. Free solenoid actuated brake, provisions for auxiliary push-up operation and control station(s). Motor shall be high starting torque, industrial type, protected against overload with an auto-reset thermal sensing device. Primary speed reduction shall be heavy-duty, lubricated gears with mechanical braking to hold the door in any position. Operator shall be equipped with a disconnect cable for auxiliary push-up operation. Operator drive and door driven sprockets shall be provided with #50 roller chain. Provide an integral Motor Mounted Interlock system to prevent damage to door and operator when mechanical door locking devices are provided. Operator shall be capable of driving the door at a speed of 6 to 9 inches per second (15 to 23 cm per/sec). Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The electrical contractor shall mount the control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.
 - 1. Control Station: Flush mounted, “Open/Close” key switch with “Stop” push button; NEMA 1B.
- B. Provide operator to function with constant pressure close operator to meet UL325-2010 listing standard requirements.
- C. Sensing/Weather Edge: Provide automatic reversing control by an automatic sensing switch within neoprene or rubber astragal extending full width of grille bottom bar.
 - 1. Provide an electric sensing edge device. Contact before grille fully closes shall cause door to immediately stop downward travel and reverse direction to the fully opened position. Provide a wireless sensing edge connection to motor operator eliminating the need for a physical traveling electric cord connection between bottom bar sensing edge device and motor operator.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.
- B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
- C. Commencements of work by installer is acceptance of substrate.

3.2 INSTALLATION

- A. General: Install grille and operating equipment with necessary hardware, anchors, inserts, hangers and supports.
- B. Follow manufacturer’s installation instructions.

3.3 ADJUSTING

- A. Following completion of installation, including related work by other, lubricate, test, and adjust grilles for ease of operation, free from warp, twist, or distortion.

3.4 CLEANING

- A. Clean surfaces soiled by work as recommended by manufacturer.
- B. Remove surplus materials and debris from the site.

3.5 DEMONSTRATION

- A. Demonstrate proper operation to Owner's Representative.
- B. Instruct Owner's Representative in maintenance procedures.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. **Exterior and interior** storefront framing.
2. **Storefront framing** for window walls.
3. **Exterior and interior** manual-swing entrance doors **and door-frame units**.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, full-size details, and attachments to other work.
1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Samples: For each exposed finish required.
- D. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.
- E. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.
- B. Product test reports.
- C. Field quality-control reports.
- D. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 WARRANTY

- A. Special Warranty: **Manufacturer** or **Installer** agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: **Two** years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Warranty Period: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 - 2. Failure also includes the following:

- a. Thermal stresses transferring to building structure.
- b. Glass breakage.
- c. Noise or vibration created by wind and thermal and structural movements.
- d. Loosening or weakening of fasteners, attachments, and other components.
- e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: **As indicated on Structural Drawings.**
2. Other Design Loads: **As indicated on Structural Drawings.**
3. **For Structural Requirements see “General Notes”.**

D. Suppliers/Contractors:

1. **In an effort for total coordination, one supplier/contractor shall provide the entire Door/Frame assembly EXCEPT the security, locking, and panic exit devices, which shall be supplied by another separate single supplier/contractor.**
2. **The Door/Frame assembly shall include door, frame, glass, hinged, pulls, closer, threshold, weatherstripping, and any other miscellaneous items.**

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide **Kawner Trifab 451 T** or comparable product by one of the following:

1. Arcadia, Inc.
2. Arch Aluminum & Glass Co., Inc.
3. Commercial Architectural Products, Inc.
4. Kawneer North America.
5. United States Aluminum.

2.3 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: **Thermally broken.**
2. Glazing System: Retained mechanically with **gaskets on four sides.**
3. Glazing Plane: **Center.**
4. Finish: **Clear anodic finish.**
5. Fabrication Method: **Field-fabricated stick system.**
6. Sill Flashing: **Provide end caps at all sill flashings.**

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
 - 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - a. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
 - d. Structural Profiles: ASTM B 308/B 308M.
 - 2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
 - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
 - 1. Door Construction: **1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch- (3.2-mm) thick**, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - 2. Door Design: **Wide stile with 10" bottom rail.**
 - 3. Glazing Stops and Gaskets: **Beveled**, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide non-removable glazing stops on outside of door.
 - 4. Door Sizes: **As scheduled in drawings.**

2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware **not specified** in this Section is specified in **Section 087100 "Door Hardware."** That hardware shall include only security, locking, and panic exit devices.

- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
 - 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- C. Cylinders: **As specified in Section 087100 "Door Hardware."**
 - 1. Keying: **Master** key system. Permanently inscribe each key with a visual key control number and include notation "**DO NOT DUPLICATE**".
- D. Weather Stripping: Manufacturer's standard replaceable components with sweeps.
- E. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of **1/2 inch** (12.7 mm). Provide **Pemko #1715** heavy duty aluminum threshold, **5" x 1/2" with #1715A mill finish.**
- F. Hinges: heavy duty per manufacturer standards.

2.6 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: As recommended by manufacturer.

2.7 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from **interior**.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
- F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

- A. **Clear Anodic Finish:** AAMA 611, **AA-M12C22A41, Class I, 0.018 mm** or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 1. Comply with manufacturer's written instructions.
 2. Do not install damaged components.
 3. Fit joints to produce hairline joints free of burrs and distortion.
 4. Rigidly secure nonmovement joints.
 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
 6. Seal perimeter and other joints watertight unless otherwise indicated.
- B. Metal Protection:
 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- F. Install glazing as specified in Section 088000 "Glazing."

- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.2 FIELD QUALITY CONTROL

- A. Testing Agency: **Subcontractor with the Architect in attendance will** perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on **representative areas of aluminum-framed entrances and storefronts**.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Perform a minimum of **two** tests in areas as directed by Architect.
- C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.3 ENTRANCE DOOR SECURITY, LOCKING, AND PANIC EXIT DEVICES HARDWARE SETS

- 1. Door/Frame Assembly: By **one supplier/contractor**.
- 2. **Security, Locking Devices, and Panic Exit Devices by another single supplier/contractor as specified in Section 087100 Door Hardware.**

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Mechanical door hardware for the following:
 - a. Swinging doors.
 - b. Sliding doors.
 - c. Folding doors.
 - 2. Cylinders for door hardware specified in other Sections.
 - 3. Electrified door hardware.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Details of electrified door hardware.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Other Action Submittals:
 - 1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Format: Use same scheduling sequence and format **and use same door numbers** as in the Contract Documents.
 - b. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - 2. Keying Schedule: Prepared by or under the supervision of Hardware Supplier, detailing Owner's final keying instructions for locks.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Door Hardware: **None**
2. Electrical Parts: **One set. (DELETE)**

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
 1. For door hardware, an **Architectural Hardware Consultant (AHC) or one who is an Electrified Hardware Consultant (EHC)**.
- C. Source Limitations: Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- D. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- E. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- F. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- G. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- H. Accessibility Requirements: For door hardware on doors in an accessible route, comply with **the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines ICC/ANSI A117.1**.
 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than **1/2 inch (13 mm) high**.
 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

- I. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- B. Deliver keys **and permanent cores** to Owner by personal delivery to facility locksmith.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: **Two** years from date of Substantial Completion, unless otherwise indicated.
 - a. Exit Devices: **Two** years from date of Substantial Completion.
 - b. Manual Closers: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled **in Part 3 "Door Hardware Schedule" Article** to comply with requirements in this Section.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and **named manufacturers' products or as listed herein.**
 - 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
 - 2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

- A. Hinges: BHMA A156.1. **Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.**
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:
 - a. Bommer Industries, Inc.
 - b. Hager Companies.

- c. IVES Hardware; an Ingersoll-Rand company.
- d. McKinney Products Company; an ASSA ABLOY Group company.
- e. Stanley Commercial Hardware; Div. of The Stanley Works.

2.3 CONTINUOUS HINGES

- A. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:
 - a. Bommer Industries, Inc.
 - b. Hager Companies.
 - c. IVES Hardware; an Ingersoll-Rand company.
 - d. McKinney Products Company; an ASSA ABLOY Group company.
 - e. Select Products Limited.
 - f. Stanley Commercial Hardware; Div. of The Stanley Works.
 - g. Zero International.

2.4 MECHANICAL LOCKS AND LATCHES

- A. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
- B. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** as follows:
 - a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
No Substitute

2.5 MANUAL FLUSH BOLTS

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:
 - a. Door Controls International, Inc.
 - b. Hiawatha, Inc.
 - c. IVES Hardware; an Ingersoll-Rand company.
 - d. Rockwood Mfg.
 - e. Trimco.

2.6 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** as follows:
 - a. Von Duprin; an Ingersoll-Rand company. **No Substitute.**

2.7 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
1. Manufacturer: Same manufacturer as for locking devices.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 3. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** as follows:
 - a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company. **No Substitute.**
- B. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.8 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
1. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders. **Permanent cores shall be factory keyed, into existing Corbin key system, as directed by the Owner.**
- B. Keys: **Nickel silver.**
1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: **"DO NOT DUPLICATE."**
 2. Quantity: provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.
 - c. Grand Master Keys: Five.
 - d. Great-Grand Master Keys: Five.
Or less, as directed by Owner.

2.9 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; **stainless steel**, unless otherwise indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:

- a. Hager Companies.
- b. IVES Hardware; an Ingersoll-Rand company.
- c. Rockwood Manufacturing Company.
- d. Trimco.

2.10 ACCESSORIES FOR PAIRS OF DOORS

- A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; **and with internal override.**
- B. Astragals: BHMA A156.22.

2.11 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** as follows:
 - a. LCN Closers; an Ingersoll-Rand company. **No Substitute.**

2.12 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; **Satin Stainless Steel** base metal, as scheduled.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. Hager Companies.
 - c. IVES Hardware; an Ingersoll-Rand company.
 - d. Rockwood Manufacturing Company.
 - e. Stanley Commercial Hardware; Div. of The Stanley Works.
 - f. Trimco.

2.13 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:
 - a. Architectural Builders Hardware Mfg., Inc.
 - b. Glynn-Johnson; an Ingersoll-Rand company.
 - c. Rixson MFG; An Assa Abloy Ground Company

- d. Rockwood Manufacturing Company.
- e. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.14 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:
 - a. Hager Companies.
 - b. National Guard Products.
 - c. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - d. Reese Enterprises, Inc.
 - e. Zero International.

2.15 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:
 - a. Hager Companies.
 - b. National Guard Products.
 - c. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - d. Reese Enterprises, Inc.
 - e. Zero International.

2.16 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick **stainless steel**; with manufacturer's standard machine or self-tapping screw fasteners.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. Rockwood Manufacturing Company.
 - d. Trimco.

2.17 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on **schedule** or comparable product by one of the following:

- a. Hager Companies.
- b. Rockwood Manufacturing Company.
- c. Stanley Commercial Hardware; Div. of The Stanley Works.
- d. Trimco.

2.18 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; **use threaded-to-the-head wood screws for wood doors and frames.**
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
 - 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
 - 5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.19 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
- C. Mounting Heights: Mount door hardware units at heights **indicated on Drawings to comply with the following** unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- E. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every **30 inches (750 mm)** of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- F. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every **30 inches (750 mm)** of door height greater than **90 inches (2286 mm)**.
- G. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as **directed by Owner**.
 - 2. Furnish permanent cores to Owner for installation.
- H. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- I. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, **in equipment room**. Verify location with Architect.
 - 1. Configuration: Provide **one power supply for each door opening** with electrified door hardware.
- J. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- K. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- L. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- M. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- N. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

- O. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.2 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

3.3 DOOR HARDWARE SCHEDULE:

Hardware Sets

SET #01

Doors: A101, A116

2	Continuous Hinge	DFM 83 HD1 PT		PE
2	Power Transfer	EPT 10 CON	SP313	VO
1	Mullion	KR4954 7'6"	SP313	VO
1	Exit Device	QEL RX 98NL-OP x 110MD-NL CON	US10B, 313	VO
1	Exit Device	QEL RX 98EO CON	313	VO
1	Rim Cylinder	CR3080-178-6 CT6R	613E	CR
1	Mortise Cylinder	CR1080-114-A02-6 CT6R	613E	CR
2	Core	CR8000 RESTRICTED KEYWAY	613E	CR
2	Door Pull	BF158	313	RO
1	Closer	4642 REG	DKBRZ	LC
1	Closer	4040 XP REG TBSRT	DKBRZ	LC
1	Adapter Plate	4040XP 18TJ	DKBRZ	LC
2	Wire Harness	CON-12		SC
2	Wire Harness	CON-192P		SC
1	Wireless Receiver	8310-865		LC
2	Wall Actuator	8310-853		LC
1	Threshold	171 A 72" Tapcon Screws		PE
2	Switch	7764		LO
1	Power Supply	PS902 900-2RS		VO

NOTE: Weatherstripping by door supplier.

Card reader, and connection of electrified components to EAC system, by security integrator.

SET #02

Doors: A133, A144

2	Continuous Hinge	DFM 83 HD1		PE
1	Mullion	KR4954 7'6"	SP313	VO
1	Exit Device	98EO	313	VO
1	Exit Device	98NL-OP x 110MD-NL	US10B, 313	VO
1	Rim Cylinder	CR3080-178-6 CT6R	613E	CR
1	Mortise Cylinder	CR1080-114-A02-6 CT6R	613E	CR
2	Core	CR8000 RESTRICTED KEYWAY	613E	CR
2	Door Pull	BF158	313	RO

2 Closer	4040 XP REG TBSRT	DKBRZ	LC
2 Adapter Plate	4040XP 18TJ	DKBRZ	LC
2 Switch	7764		LO
1 Threshold	171 A 72" Tapcon Screws		PE

NOTE: Weatherstripping by door supplier.
 Connection of electrified components to EAC system, by security integrator.

SET #03

Doors: A115

1 Continuous Hinge	DFM 83 HD1		PE
1 Exit Device	98NL-OP x 110MD-NL	US10B, 313	VO
1 Rim Cylinder	CR3080-178-6 CT6R	613E	CR
1 Core	CR8000 RESTRICTED KEYWAY	613E	CR
1 Door Pull	BF158	313	RO
1 Closer	4040 XP SCUSH 30 SHOE SUPPORT 61 STOP SPACER TBSRT	DKBRZ	LC
1 Switch	7764		LO
1 Threshold	171 A 36" Tapcon Screws		PE

NOTE: Weatherstripping by door supplier.
 Connection of electrified components to EAC system, by security integrator.

SET #04

Doors: A139A, A142

1 Continuous Hinge	DFM 83 HD1		PE
1 Exit Device	98EO	313	VO
1 Closer	4040 XP SCUSH 30 SHOE SUPPORT 61 STOP SPACER TBSRT	DKBRZ	LC
1 Switch	7764		LO
1 Threshold	171 A 36" Tapcon Screws		PE

NOTE: Weatherstripping by door supplier.
 Connection of electrified components to EAC system, by security integrator.

SET #05

Doors: C101A, D101, E101, F101

1 Continuous Hinge	DFM 83 HD1		PE
1 Exit Device	98EO	313	VO
1 Exit Device Trim	AUNTT620-NR	613E	YA
1 Mortise Cylinder	CR1080-114-A02-6 CT6R	613E	CR
1 Core	CR8000 RESTRICTED KEYWAY	613E	CR
1 Closer	4040 XP SCUSH 30 SHOE SUPPORT 61 STOP SPACER TBSRT	DKBRZ	LC
1 Switch	7764		LO
1 Threshold	171 A 36" Tapcon Screws		PE

NOTE: Weatherstripping by door supplier.

Connection of electrified components to EAC system, by security integrator.

SET #06

Doors: A116A

2 Hinges	5BB1 4 1/2 x 4 1/2 CON TW4	652	IV
4 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Mullion	KR4954 7'6"	SP313	VO
1 Fire Exit Device	QEL 98EO-F 425-SNB (QTY-6)	US32D	VO
1 Fire Exit Device	QEL 98NL-OP-F x 110MD-NL 425-SNB (QTY-6)	US26D, US32D	VO
1 Rim Cylinder	CR3080-178-6 CT6R	626	CR
1 Mortise Cylinder	CR1080-114-A02-6 CT6R	626	CR
2 Core	CR8000 RESTRICTED KEYWAY	626	CR
2 Door Pull	BF158	US32D	RO
1 Closer	4642 REG	AL	LC
1 Closer	4040 XP REG/62A TBSRT	AL	LC
2 Wall Bumper	406	US32D	RO
2 Wall Actuator	8310-853		LC
1 Wireless Receiver	8310-865		LC
2 Wire Harness	CON-6		SC
2 Wire Harness	CON-192P		SC
1 Power Supply	PS902 900-2RS-FA		VO
2 Door Silencers	608-RKW	GREY	RO

NOTE: Electrified exit devices to be connected to fire alarm system, to hold devices retracted, to be released to latch, in the event of a fire.

Automatic operator to be connected to retract latches, if extended, to allow function of operator.

SET #07

Doors: A102

2 Continuous Hinge	DFM 83 HD1		PE
2 Dummy Push Bar	330	313	VO
2 Door Pull	BF158	313	RO
1 Closer	4642 REG	DKBRZ	LC
1 Closer	4040 XP REG TBSRT	DKBRZ	LC
1 Adapter Plate	4040XP 18TJ	DKBRZ	LC
1 Wireless Receiver	8310-865		LC
2 Wall Actuator	8310-853		LC

SET #08

Doors: A133A, A144A

2 Continuous Hinge	DFM 83 HD1		PE
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2 Dummy Push Bar	330	313	VO
2 Door Pull	BF158	313	RO
2 Adapter Plate	4040XP 18TJ	DKBRZ	LC
2 Closer	4040 XP REG TBSRT	DKBRZ	LC

SET #09

Doors: C109, D109, E109, F109

1 Exit Device	98EO	313	VO
1 Exit Device Trim	AUNTT620-NR	613E	YA
1 Core	CR8000 RESTRICTED KEYWAY	613E	CR
1 Mortise Cylinder	CR1080-114-A02-6 CT6R	613E	CR
1 Door Stop	463-RKW	32D	RO

NOTE: Balance of hardware, including hinges, by gate supplier.

SET #10

Doors: C101, D104, E104, F104

6 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
2 Exit Device	9827EO 425-SNB (QTY-6) LBR	US32D	VO
1 Exit Device Trim	AUNTT620-NR	626	YA
1 Mortise Cylinder	CR1080-114-A02-6 CT6R	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
2 Closer	4040 XP REG/62A TBSRT	AL	LC
2 Protection Plate	K1050 10" x 34" CSK	US32D	RO
2 Door Holder	491-RKW	US26D	RO
2 Door Silencers	608-RKW	GREY	RO

SET #11

Doors: A115A, A139

6 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Exit Device	9827EO 425-SNB (QTY-6) LBR	US32D	VO
1 Exit Device	9827NL-OP x 110MD-NL 425-SNB (QTY-6) LBR	US26D, US32D	VO
1 Rim Cylinder	CR3080-178-6 CT6R	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
2 Closer	4040 XP REG/62A TBSRT	AL	LC
2 Protection Plate	K1050 10" x 34" CSK	US32D	RO
2 Door Holder	491-RKW	US26D	RO
2 Door Silencers	608-RKW	GREY	RO

SET #12

Doors: G101

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Exit Device	98EO 425-SNB (QTY-6)	US32D	VO
1 Exit Device Trim	AUNTT620-NR	626	YA
1 Mortise Cylinder	CR1080-114-A02-6 CT6R	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Protection Plate	K1050 10" x 34" CSK	US32D	RO
1 Dome Stop	442	US26D	RO
3 Door Silencers	608-RKW	GREY	RO

SET #13

Doors: B102, H101

1 Continuous Hinge	DFM 83 HD1		PE
1 Lockset	ML2053 LWM CT6R SA	613E	CR
1 Core	CR8000 RESTRICTED KEYWAY	613E	CR
1 Closer	4040 XP REG TBSRT	DKBRZ	LC
1 Wall Bumper	406	10BE	RO

SET #14

Doors: A109, A110, A114, A119, B104, G102, H102, H103, H104, H105

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Lockset	ML2053 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Wall Bumper	406	US32D	RO
3 Door Silencers	608-RKW	GREY	RO

SET #15

Doors: A130, B101

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Lockset	ML2053 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Overhead Stop	10-336	652	RX
1 Protection Plate	K1050 10" x 34" CSK	US32D	RO
3 Door Silencers	608-RKW	GREY	RO

SET #16

Doors: B103

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Lockset	ML2053 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Overhead Stop	10-336	652	RX
3 Door Silencers	608-RKW	GREY	RO

SET #17

Doors: A105

3 Hinges	T4A3786 5 X 4 1/2	26D	MC
1 Lockset	ML2057 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Dome Stop	442	US26D	RO
1 Smoke Seal	S88 D 18'		PE
3 Door Silencers	608-RKW	GREY	RO

SET #18

Doors: A121

3 Hinges	T4A3786 5 X 4 1/2	26D	MC
1 Lockset	ML2057 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Dome Stop	442	US26D	RO
3 Door Silencers	608-RKW	GREY	RO

SET #19

Doors: A113, A126

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Lockset	ML2053 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Protection Plate	K1050 10" x 34" CSK	US32D	RO
1 Wall Bumper	406	10BE	RO
3 Door Silencers	608-RKW	GREY	RO

SET #20

Doors: A127, A140, A202, A203, A207

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Lockset	ML2057 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Dome Stop	442	US26D	RO
3 Door Silencers	608-RKW	GREY	RO

SET #21

Doors: C107, D102, E102, F103

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Passage Set	ML2010 LWM SA	626	CR
1 Closer	4040 XP REG/62A TBSRT	AL	LC

1 Protection Plate	K1050 10" x 34" CSK	US32D	RO
1 Wall Bumper	406	US32D	RO
3 Door Silencers	608-RKW	GREY	RO

SET #22

Doors: C105, D106, E106, F106

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Passage Set	ML2010 LWM SA	626	CR
1 Wall Bumper	406	10BE	RO
3 Door Silencers	608-RKW	GREY	RO

SET #23

Doors: C103, D103, E103, F102

3 Hinges	T4A3786 4 1/2 X 4 1/2	26D	MC
1 Lockset	ML2053 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Dome Stop	442	US26D	RO
3 Door Silencers	608-RKW	GREY	RO

SET #24

Doors: A123, C104, D105, E105, F105, G104

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Push Plate	70F 8 X 16	US32D	RO
1 Door Pull	110 X 70C	US32D	RO
1 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Protection Plate	K1050 10" x 34" CSK	US32D	RO
1 Wall Bumper	406	10BE	RO
3 Door Silencers	608-RKW	GREY	RO

SET #25

Doors: A125

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Push Plate	70F 8 X 16	US32D	RO
1 Door Pull	110 X 70C	US32D	RO
1 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Overhead Stop	9-336	652	RX
1 Protection Plate	K1050 10" x 34" CSK	US32D	RO
3 Door Silencers	608-RKW	GREY	RO

SET #26

Doors: A124

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
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1 Privacy Set	ML2030 LWM M19V SA	626	CR
1 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Protection Plate	K1050 10" x 34" CSK	US32D	RO
1 Wall Bumper	406	US32D	RO
3 Door Silencers	608-RKW	GREY	RO

SET #27

Doors: A132

1 Continuous Hinge	DFM 83 HD1		PE
1 Lockset	ML2053 LWM CT6R SA	613E	CR
1 Core	CR8000 RESTRICTED KEYWAY	613E	CR
1 Adapter Plate	4040XP 18TJ	DKBRZ	LC
1 Closer	4040 XP REG TBSRT	DKBRZ	LC
1 Dome Stop	442	10BE	RO

SET #28

Doors: A136

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Lockset	ML2057 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Closer	4040 XP CUSH TBSRT	AL	LC
1 Smoke Seal	S88 D 17'		PE
3 Door Silencers	608-RKW	GREY	RO

SET #29

Doors: A145, A145A, A208, A209, A210

6 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
2 Flush Bolts	555 12"	US26D	RO
1 Lockset	ML2057 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
2 Dome Stop	442	US26D	RO
1 Dust Proof Strike	570	US26D	RO
1 Astragal	357 SS 84"		PE
2 Door Silencers	608-RKW	GREY	RO

SET #30

Doors: A141

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Lockset	ML2053 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Wall Bumper	406	10BE	RO
1 Smoke Seal	S88 D 17'		PE
3 Door Silencers	608-RKW	GREY	RO

SET #31

Doors: A143

8 Hinges	T4A3786 4 1/2 X 4 1/2	26D	MC
1 Set Flush Bolts	2845 24"	US26D	RO
	NOTE: 24" rod at top, and 12" at bottom.		
1 Lockset	ML2057 LWM CT6R SA	626	CR
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
2 Magnetic Holder	998 24VAC/DC	689	RX
1 Coordinator	2672	US28	RO
2 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Dust Proof Strike	570	US26D	RO
1 Smoke Seal	S88 D 25'		PE
2 Door Silencers	608-RKW	GREY	RO

SET #32

Doors: A111

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Fire Exit Device	98L-F x 996L-R&V 425-SNB (QTY-6)	US26D, US32D	VO
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Rim Cylinder	CR3080-178-6 CT6R	626	CR
1 Closer	4040 XP CUSH TBSRT	AL	LC
1 Protection Plate	K1050 10" x 34" CSK	US32D	RO
1 Smoke Seal	S88 D 17'		PE
3 Door Silencers	608-RKW	GREY	RO

SET #33

Doors: A205, A206, A211

3 Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1 Fire Exit Device	98L-F x 996L-R&V 425-SNB (QTY-6)	US26D, US32D	VO
1 Core	CR8000 RESTRICTED KEYWAY	626	CR
1 Rim Cylinder	CR3080-178-6 CT6R	626	CR
1 Closer	4040 XP REG/62A TBSRT	AL	LC
1 Protection Plate	K1050 10" x 34" CSK	US32D	RO

1	Wall Bumper	406	10BE	RO
1	Smoke Seal	S88 D 17'		PE
3	Door Silencers	608-RKW	GREY	RO

SET #34

Doors: A130A

1	Gate Spring Hinge	4007MRB	26D	MC
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SET #35

Doors: A129, A131, A137, A138

NOTE: All hardware by door supplier.

SET #36

Doors: A107

NOTE: All existing hardware to be re-used.

END OF SECTION 087100

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Glass for **windows, doors, interior borrowed lites, storefront framing and glazed curtain walls.**
2. Glazing sealants and accessories.

1.2 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Preconstruction adhesion and compatibility test report.

1.5 QUALITY ASSURANCE

- A. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: **10** years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - 1. Warranty Period: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Glass Product: Subject to compliance with requirements, provide product indicated in glass schedules or comparable product by one of the following based on Cardinal Class Industries, Low E 366 (matching glass color is of extreme importance)
 - 1. AGC Glass Company North America, Inc.
 - 2. Vitro Industries, Inc.
 - 3. Saint-Gobain Corporation.
 - 4. Guardian

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

- B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the International Building Code and ASTM E 1300.
 - 1. **All Glazing shall meet Structural Design requirements as noted in the structural general notes.**
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
 - 1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
 - 2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 - 3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of **the SGCC or manufacturer**. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. **Provide glass that complies with performance requirements and is not less than the thickness indicated.**
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass **as needed to comply with "Performance Requirements" Article**. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass **as needed to comply with "Performance Requirements"**. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

- B. Low E Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
- C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

2.5 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
 - 1. Sealing System: **Dual seals.**
 - 2. Spacer: **Aluminum with clear anodic finish.**

2.6 GLAZING SEALANTS

- A. General:
 - 1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - 3. Field-applied sealants shall have a VOC content of not more than 250 g/L.
 - 4. Sealants shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
 - 5. Colors of Exposed Glazing Sealants: **As selected by Architect from manufacturer's full range.**
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Corning Corporation; 790.
 - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
 - c. Sika Corporation U.S.; Sikasil WS-290.
 - d. Tremco Incorporated; Spectrem 1.

2.7 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer

rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.8 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.2 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Apply heel bead of elastomeric sealant.
- F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.3 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.4 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. 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 buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

3.5 MONOLITHIC GLASS SCHEDULE

- A. Glass Type: **Tempered clear annealed, heat-strengthened, fully tempered** float glass.
 - 1. Minimum Thickness: **1/4"**.
 - 2. Safety glazing required.
- B. Glass Type : Interior glass float glass.
 - 1. Thickness: **1/4"**

3.6 INSULATING GLASS SCHEDULE

- A. Glass Type: **Store Front/Curtain Wall** Insulating glass: **Clear Low E insulating glass**.
 - 1. Basis-of-Design Product: **VITRO Low E insulating glass with double edge with 1/4" Solarban XL70**.
 - 2. Overall Unit Thickness: **1 inch (25 mm)**.
 - 3. Minimum Thickness of Each Glass Lite: **1/4"**
 - 4. Outdoor Lite: **Heat-strengthened** float glass.
 - 5. Interspace Content: **Air**.
 - 6. Indoor Lite: **Heat-strengthened** float glass.
 - 7. Winter Nighttime U-Factor: **0.28** maximum.
 - 8. Summer Daytime U-Factor: **0.26** maximum.
 - 9. Safety glazing: **Yes required, or where indicated**.
 - 10. Solar Heat Gain Coefficient: **Not more than .28**

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings and soffits.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested according to ASTM E 119.
- B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413.

2.2 FRAMING SYSTEMS

- A. Steel Studs and Runners: ASTM C 645. **Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.**
 1. Minimum Base-Metal Thickness: **.018 inch (25 Gauge) and .033 (20 Gauge) where indicated on drawings.**
 2. Depth: **As indicated on Drawings.**
- B. Slip-Type Head Joints: Where indicated, provide **one of** the following in thickness not less than indicated for studs and in width to accommodate depth of studs:
 1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above.
 - a. Products: Subject to compliance with requirements, **provide deflection track from one of the following:**
 - 1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
 - 2) MBA Building Supplies.
 - 3) Steel Network Inc. (The): Series.

- 4) Superior Metal Trim; Superior Flex Track System (SFT).
- 5) Telling Industries.

- C. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Metal **Thickness: 0.018 inch (0.45 mm) and .0451 inch where indicated on drawings.**
 2. Depth: **As indicated on Drawings.**
- D. Resilient Furring Channels: **1/2-inch- (13-mm-) deep**, steel sheet members designed to reduce sound transmission.
1. Configuration: **Asymmetrical.**

2.3 AUXILIARY MATERIALS

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide **asphalt saturated organic felt.**

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.

- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum **1/2-inch** (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 5. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place **studs 6 inches (150 mm) o.c.**
- E. Direct Furring:
1. Screw to metal framing.
 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced **24 inches** (610 mm) o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than **1/8 inch** (3 mm) from the plane formed by faces of adjacent framing.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Exterior sheaths.
3. Wet areas backer board.
4. Texture finishes.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples:

1. Textured Finishes: **Manufacturer's standard size or as directed by Architect** for each textured finish indicated and on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. **Weather barrier per section 072500 shall be provided and installed by this Contractor for complete coordinated assembly.**

2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. CertainTeed Corp.
 2. Georgia-Pacific Gypsum LLC.
 3. National Gypsum Company.
 4. USG Corporation.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 1. Thickness: **5/8 inch (15.9 mm).**
 2. Long Edges: **Tapered.**
- C. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Thickness: **1/4 inch (6.4 mm)**.
2. Long Edges: **Tapered**.

D. Gypsum Ceiling Board: ASTM C 1396/C 1396M, Type X

1. Thickness: 5/8".
2. Long Edges: Tapered.

2.3 EXTERIOR GYPSUM BOARD SHEATHING

1. Material: **Georgia Pacific Gypsum DensGlass Sheathing**.
2. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard.
3. Type: **Fire rated Type X**.
4. Thickness: **5/8"**.
5. Long Edges: **Square**.

2.4 TILE BACKING PANELS

A. Tile Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

1. **Georgia Pacific DenShield Tile Backer**.
2. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.
 - b. Custom Building Products.
 - c. National Gypsum Company.
 - d. USG Corporation.
3. Thickness: **5/8 inch (15.9 mm)**.
4. Mold Resistance: ASTM D 3273, **score of 10** as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: **Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet**.

B. Exterior Trim: ASTM C 1047.

1. Material: **Hot-dip galvanized steel sheet, plastic, or rolled zinc**.

C. Aluminum Trim: ASTM B 221 (ASTM B 221M), **Alloy 6063-T5**.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Exterior Gypsum Soffit Board: Paper.
 - 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

2.7 AUXILIARY MATERIALS

- A. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing).
 - 1. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **10** percent.
- D. Acoustical Joint Sealant: ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Pecora Corporation.
 - b. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - c. USG Corporation; SHEETROCK Acoustical Sealant.
- E. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- F. Weather Barrier: As specified in Section 072500 "Weather Barrier" for moisture and vapor resistance. Weather barrier **to be applied by this** Contractor for total assembly coordination.

2.8 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.
- B. Non-Aggregate Finish: Pre-mixed, vinyl texture finish for spray application.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; ProRoc Easi-TEX Spray Texture.
 - b. National Gypsum Company; Perfect Spray EM Texture.
 - c. USG Corporation; BEADEX FasTex Wall and Ceiling Spray Texture.
 - 2. Texture: **Orange Peel**. Verify with Architect.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide **1/4- to 1/2-inch- (6.4- to 12.7-mm-)** wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
 - 1. Aluminum Trim: Install in locations **indicated on Drawings**.
 - 2. Control Joints: Install control joints **at locations indicated on Drawings or according to ASTM C 840 and in specific locations approved by Architect for visual effect**.
- E. Prefill open joints, **rounded or beveled edges**, and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 0
 - a. This level requires **no taping, finishing, or corner beads**.
 - 2. Level 1
 - a. All interior angles and joints should have tape set into joint compound. The surface should be free of excess joint compound. **Ridges and tool marks are acceptable**.
 - b. At this level, fasteners are not necessarily covered. This level may be called "fire-taping" if it meets the code requirement for fire resistance. This level of finish is generally **utilized for nonpublic areas of a building, such as a garage or attic**.
 - 3. Level 2
 - a. At this level, all interior angles and joints should have tape embedded in joint compound and wiped with a trowel or joint knife, leaving a thin coating of compound. Fastener heads, corner beads, and other accessories are covered with a coat of joint compound. **Ridges and tool marks are acceptable**, but the surface **should not have excess joint compound**. If joint compound is applied over the tape when it is embedded, this is considered a separate coat of compound to satisfy the requirements of this level.
 - b. Level 2 is sometimes specified when water-resistant gypsum backerboard is used as a substrate for tile. This level is **specified for garages and other areas where appearance is not important**.
 - 4. Level 3

- a. All joints and interior angles should have tape that's embedded in joint compound plus one additional coat of joint compound. Accessories and the **heads of fasteners must be covered with two separate coats of joint compound**. All joint compound must be **smooth and free of ridges and tool marks**.
 - b. For Level 3 and above, the prepared surface should be coated with a drywall primer that's compatible with the wallcovering, paint, or other decoration being applied to it. The application of primer, however, is usually outside the responsibility of the drywall installer and finisher.
5. Level 4
- a. All joints and interior angles should have tape that's embedded in joint compound plus two separate coats of compound over all flat joints and one separate coat over interior angles. Accessories and **fastener heads are covered with three separate coats of joint compound**. All joint compound is smooth and free of ridges and tool marks.
 - b. For a light texture, wallcovering, or flat paints. **Gloss and semigloss paints are not recommended over this level**. The **weight and texture of wallcoverings must be carefully considered to ensure that joints and fasteners will be adequately concealed**. Wallcoverings that are lightweight, glossy, or have limited patterns are especially vulnerable to revealing imperfections in the surface.
6. Level 5
- a. At level 5, all joints and interior angles have tape that's embedded in joint compound plus **two separate coats of compound** over all flat joints and one separate coat over interior angles. Accessories and **fastener heads are covered with three separate coats of joint compound**. **A thin skim coat of joint compound is applied over the entire surface**. The surface should be smooth and free of ridges and tool marks.
 - b. **This level represents the highest quality of finish**, and it is the one **required where gloss, semigloss, or nontextured flat paints** are used or **where severe lighting conditions exist**. It provides the most uniform surface and minimizes the possibility of joints or fasteners showing through the finish.
- H. Texture Finish Application: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Mix and apply finish using powered spray equipment, to produce a uniform texture **matching approved mockup** and free of starved spots or other evidence of thin application or of application patterns.
- I. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- J. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain tile.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples:

1. Each type and composition of tile and for each color and finish required.
2. Assembled samples, with grouted joints, for each type and composition of tile and for each color and finish required.

1.3 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of floor tile installation.
2. Build mockup of wall tile installation.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 EXTRA MATERIALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering and identified with labels describing contents.

1. Tile and Trim Units: **Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.**

PART 2 - PRODUCTS

2.1 TILE PRODUCTS

A. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. Tile Type **PT-1: Porcelain Wall/Floor Tile**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product:
Subject to compliance with requirements, provide **Interceramic-Boardroom**, or approved equal by one of the following:
 - a. Dal-Tile International Inc.
 - b. Crossville, Inc.
 - c. Interceramic
3. Composition: **Porcelain.**
4. Module Size: **12" x 24" & 24" x 24", and Mosaic 2"x 4" Bricklay accent, with full tile as base.**
5. Face: **Pattern of design indicated on drawing.**
6. Grout Joint: **1/16"**
7. Surface: **Slip-resistant.**
8. Coefficient of Friction:
 - 1) **Wet: Greater than or equal to .50**
 - 2) **Dry: Greater than or equal to .60**
9. Finish: As selected by Architect.
10. Tile Color and Pattern: **As selected by Architect from manufacturer's full range of colors and textures including matte, polished and structured finishes.**
11. Grout Color: **As selected by Architect from manufacturer's full range.**
12. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cap: Surface bullnose, module size as large as offered.
 - b. Wainscot Cap: Schluter Systems Metal Edge Protection. Color as selected by Architect.
 - c. External Corners: Surface bullnose, module size as large as offered.
 - d. Internal Corners: Cove, module size as large as offered.

C. Tile Type **PT-2: Porcelain Wall/Floor Tile (Coffee Bar)**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product:
Subject to compliance with requirements, provide **Interceramic - Construct**, or approved equal by one of the following:
 - a. Dal-Tile International Inc.
 - b. Crossville, Inc.
 - c. Interceramic
3. Composition: **Porcelain.**
4. Module Size: **12" x 12" Intersect Mosaic, Hexagon 10 1/2" x 12".**
5. Face: **Pattern of design indicated on drawing.**
6. Grout Joint: **1/16"**
7. Surface: **Slip-resistant.**

8. Coefficient of Friction:
 - 1) **Wet: Greater than or equal to .50**
 - 2) **Dry: Greater than or equal to .60**
9. Finish: As selected by Architect.
10. Tile Color and Pattern: **As selected by Architect from manufacturer's full range of colors and textures including matte, polished and structured finishes.**
11. Grout Color: **As selected by Architect from manufacturer's full range.**
12. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cap: Surface bullnose, module size as large as offered.
 - b. Wainscot Cap: Schluter Systems Metal Edge Protection. Color as selected by Architect.
 - c. External Corners: Surface bullnose, module size as large as offered.
 - d. Internal Corners: Cove, module size as large as offered.

D. Tile Type **PT-3: Porcelain Wall Tile (Coffee Bar)**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product:

Subject to compliance with requirements, provide **Interceramic - Burano**, or approved equal by one of the following:

 - a. Dal-Tile International Inc.
 - b. Crossville, Inc.
 - c. Interceramic
3. Composition: **Porcelain.**
4. Module Size: **12" x 24" , 2" x 4" Victorian Mosaic.**
5. Face: **Pattern of design indicated on drawing.**
6. Grout Joint: **1/16"**
7. Surface: **Slip-resistant.**
8. Coefficient of Friction:
 - 1) **Wet: Greater than or equal to .50**
 - 2) **Dry: Greater than or equal to .60**
9. Finish: As selected by Architect.
10. Tile Color and Pattern: **As selected by Architect from manufacturer's full range of colors and textures including matte, polished and structured finishes.**
11. Grout Color: **As selected by Architect from manufacturer's full range.**
12. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cap: Surface bullnose, module size as large as offered.
 - b. Wainscot Cap: Schluter Systems Metal Edge Protection. Color as selected by Architect.
 - c. External Corners: Surface bullnose, module size as large as offered.
 - d. Internal Corners: Cove, module size as large as offered.

2.2 TILE BACKING PANELS

- A. Backer Units: ANSI A118.9 or ASTM C 1325.
 - 1. Products: Subject to compliance with requirements, provide Georgia Pacific DenShield tile backer:
 - 2. Thickness: **5/8 inch (15.9 mm)**.

2.3 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated.
- B. Chlorinated-Polyethylene-Sheet: Non-plasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; **0.030-inch (0.76-mm)** nominal thickness.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Noble Company (The); Nobleseal TS.

2.4 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
- B. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. Bostik, Inc.
 - b. Custom Building Products.
 - c. MAPEI Corporation.
 - d. Summitville Tiles, Inc.
 - 3. For wall applications, provide non-sagging mortar.
- C. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. Custom Building Products.
 - c. MAPEI Corporation.
 - d. Summitville Tiles, Inc.
 - 2. Prepackaged, dry-mortar mix to which only water must be added.
 - 3. Prepackaged, dry-mortar mix combined with liquid-latex additive.

4. For wall applications, provide non-sagging mortar.

2.5 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10.
- B. Standard Cement Grout: ANSI A118.6.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. Custom Building Products.
 - c. MAPEI Corporation.
 - d. Summitville Tiles, Inc.
- C. Grout for Pre-grouted Tile Sheets: Same product used in factory to pre-grout tile sheets.

2.6 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Grout Sealer: Manufacturer's standard **silicone** product for sealing grout joints and that does not change color or appearance of grout.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bostik, Inc.; CeramaSeal
 - b. MAPEI Corporation; KER
 - c. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with **thin-set mortar** with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, use factory blended tile or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Exterior tile floors.
 - b. Tile floors in wet areas.
 - c. Tile swimming pool decks.
 - d. Tile floors in laundries.
 - e. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
 - f. Tile floors composed of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: **1/16 inch (1.6 mm)**.
 2. Quarry Tile: **3/8 inch (9.5 mm)**.
 3. Paver Tile: **3/8 inch (9.5 mm)**.
 4. Glazed Wall Tile: **1/16 inch (1.6 mm)**.
 5. Decorative Thin Wall Tile: **1/16 inch (1.6 mm)**.
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- I. Install **backer units and fiber-cement underlayment** and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. **Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.**
- J. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- K. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

3.4 EXTERIOR TILE INSTALLATION SCHEDULE

- A. Exterior Floor Installations:
1. Tile Installation F101: Cement mortar bed (thickset) **bonded to concrete**; TCA F101.
 - a. Tile Type: **Porcelain Tile**.
 - b. Thin-Set Mortar for Cured-Bed Method: **Latex-portland cement mortar**.
 - c. Grout: **Sand-portland cement** grout.

3.5 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
1. Interior Wall Installations: Wall installations to be TCA W223 for wall tile over CMU and TCA W242 for wall tile over metal studs and wall board Tile Installation F113: Thin-set mortar; TCA F113.

- a. Tile Type: **Porcelain Tile**.
- b. Thin-Set Mortar: **Latex-portland** cement mortar.
- c. Grout: **Sand-portland cement** grout.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at **Project site**.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Evaluation reports.
- C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to NVLAP.
- B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of typical ceiling area as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Comply with ASTM E 1264 for **Class A** materials.
 - 2. Smoke-Developed Index: **50** or less.

2.2 ACOUSTICAL PANEL CEILINGS, GENERAL

- A. Mineral-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- B. Acoustical Panel Standard: Comply with ASTM E 1264.
- C. Metal Suspension System Standard: Comply with ASTM C 635.
- D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

2.3 ACOUSTICAL CEILING PANELS

- A. Manufacturers: Subject to compliance with requirements, **provide products by one of the following:**
- B. Basis-of-Design Product: Subject to compliance with requirements, provide **Armstrong Acoustical Ceiling Tile, Cortega #770** or comparable product by one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corp.
 - 3. Chicago Metallic Corporation.
 - 4. Tectum Inc.
 - 5. USG Interiors, Inc.; Subsidiary of USG Corporation.
- C. **Type 1: Cortega #770**
 - 1. Color: **White.**
 - 2. Light Reflectance: **0.86.**
 - 3. NRC: **55, Type E-400 mounting according to ASTM E 795.**
 - 4. CAC: **33.**
 - 5. Performance Characteristics: **Sag resistance, anti-mold and mildew.**
 - 6. Edge/Joint Detail: **Square.**
 - 7. Thickness: **5/8 inch.**
 - 8. Modular Size: **24 by 24 inches.**
- D. **Type 2: National Gypsum Gridstone Vinyl Faced Gypsum Board Panels.**
 - 1. Color: **White.**
 - 2. Light Reflectance: **1.0.**
 - 3. NRC:

4. CAC: **46.**
5. Performance Characteristics: **Washable.**
6. Edge/Joint Detail: **Square.**
7. Thickness: **1/2 inch.**
8. Modular Size: **24 by 24 inches.**

2. SUSPENSION SYSTEM

- a. Ceiling Suspension grid: Installer shall provide and install standard Metal Heavy Duty 15/16"
- b. suspension T-Grid system using Main Runners, Cross-tees, Wall Angle or Shadow Moldings of
- c. types, structural classifications, and black finishes indicated and that comply with applicable ASTM
- d. 635 requirements, seismic codes and ordinances. A #12 gauge wire hanger shall be installed on 4'
- e. centers along each main runner. All wire hangers are to be attached to an industry standard
- f. connecting device meeting recommended loading requirements (i.e., inserts, screw eyes, etc.).

3. ACCESSORIES

- a. Acoustic Batt Insulation: Specified in Section [07 21 16] 6 inch thick [Thickness determined by desired NRC rating] supplied and installed by Contractor.
- b. Touch-up Paint: Type and colour to match acoustic wood panels.
- c. Shop Finishing: Panels shall be shop-finished with stain per architect's selection [optional] and clear, semi-gloss varnish (wood veneer) or painted (matte finish) per color selection by architect.

2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, **provide products by one of the following:**
- B. Basis-of-Design Product: Subject to compliance with requirements, provide **Armstrong** or comparable product by one of the following:
 1. Armstrong World Industries, Inc.
 2. CertainTeed Corp.
 3. Chicago Metallic Corporation.
 4. USG Interiors, Inc.; Subsidiary of USG Corporation.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation; with prefinished **15/16-inch** wide metal caps on flanges.

1. Structural Classification: **Intermediate-duty system.**
 2. End Condition of Cross Runners: **Butt-edge** type.
 3. Face Design: **Flat, flush.**
 4. Cap Material: **Steel** cold-rolled sheet.
 5. Cap Finish: **Painted white.**
- E. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.
 1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient molding accessories.
 - 3. Stair Nosings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches (300 mm) long.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. FloorScore Compliance: Resilient **base accessories and stair nosings and stair nosings** shall comply with requirements of FloorScore certification.

2.2 THERMOSET-RUBBER BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Roppe Corporation, USA.
 - 2. Armstrong
- B. Product Standard: ASTM F 1861, **Type TS** (rubber, vulcanized thermoset), **Group 2** (solid, homogeneous).
 - 1. Style and Location:
 - a. Style B, Cove: **Provide in areas with gyp board walls at sealed concrete floors.**
(no base at metal liner panels)
- C. Thickness: **1/8" 0.125 inch (3.2 mm).**
- D. Height: **4 inches (102 mm) or as indicated on Finish Schedule.**
- E. Lengths: **Coils in manufacturer's standard length.**

- F. Outside Corners: **Wrapped.**
- G. Colors: **As selected by Architect from full range of industry colors.**

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

3.3 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Vinyl composition floor tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: Units of each color and pattern of floor tile required.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. FloorScore Compliance: Resilient tile flooring shall comply with requirements of FloorScore certification.
- C. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 VINYL COMPOSITION FLOOR TILE

- A. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Mannington Mills, Inc.
 - 3. Tarkett/ Azrock.
- B. Tile Standard: ASTM F 1066, **Class 1, solid-color tile.**

- C. Wearing Surface: **Smooth**.
- D. Thickness: **0.125 inch (3.2 mm)**.
- E. Size: **12 by 12 inches (305 by 305 mm)**.
- F. Colors and Patterns: **As selected by Architect from full range of industry colors**.

2.3 LUXURY VINYL PLANK:

- A. Product: Armstrong Flooring Diamond 10 “Unbound” Wood Visuals.
- B. Tile Standard: ASTM F1700, Class III, Type B – embossed surface.
- C. Thickness: 5.0 mm/0.20 in.
- D. Size: 7” x 59” or 9” x 59.
- E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.4 LUXURY VINYL TILE:

- A. Product: Armstrong Flooring Diamond 10 “Unbound” Concrete Visuals or Textile Visuals.
- B. Tile Standard: ASTM F1700, Class III, Type B – embossed surface.
- C. Thickness: 5.0 mm/0.20 in.
- D. Size: 36” x 36”.
- E. Colors and Patterns: As selected by Architect from full range of industry colors/patterns.

2.5 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
 - 1. Adhesives shall comply with the following limits for VOC content:
 - a. Vinyl Composition Tile Adhesives: 50 g/L or less.
 - b. Rubber Floor Adhesives: 60 g/L or less.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to **ASTM F 710**.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after **substrate alkalinity** falls within range on pH scale recommended by manufacturer in writing, **but not less than 5 or more than 10 pH**.
 - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
 - a. Per Manufacturer's written instructions.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until they are the same temperature as the space where they are to be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.2 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles **in pattern indicated**.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles **with grain direction alternating in pattern of colors and sizes indicated, or if none, lay with grain direction alternating in adjacent tiles (basket-weave pattern)**.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.3 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Cover floor tile until Substantial Completion.

END OF SECTION 096519

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes modular carpet tile.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Type of subfloor.
 - 3. Type of installation.
 - 4. Pattern of installation.
 - 5. Pattern type, location, and direction.
 - 6. Pile direction.
- C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the **Commercial II** certification level.

- 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.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

1.8 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

1.9 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. **Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.**
 - 3. Warranty Period: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MODULAR CARPET

- A. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - 1. Shaw Floors
 - 2. Tandus Flooring
 - 3. Mohawk Carpet
 - 4. Carpet #1: **CPT-1, Tarkett Essentialist Collection, or approved equal.**
 - a. Pattern: **Saveur or Substance.**
 - b. Fiber Content: **T6.6 Nylon.**
 - c. Size: **18" x 36".**
 - d. Pile Characteristic: **Stratatec Patterned Loop.**
 - e. Dye Method: **100% Solution Dyed.**
 - f. Color: **As selected by Architect from manufacturer's full range.**
 - g. Primary Backing: **Manufacturer's standard ER3 Tile.**
 - 5. Carpet #2: **CPT-2 Tarkett Tandus Centiva, or approved equal**
 - a. Pattern: **FlightPath & Airspace.**
 - b. Fiber Content: **100 percent nylon 6,6.**
 - c. Size: **18" x 36".**

- d. Pile Characteristic: **Stratatec Patterned Loop** .
 - e. Dye Method: **100% Solution Dyed**.
 - f. Color: **As selected by Architect from manufacturer's full range**.
 - g. Primary Backing/ Backcoating: **Manufacturer's standard ER3 Tile**.
6. Carpet #3: **CPT-3 Walk-Off Carpet- Mohawk Group Tuff Stuff II Collection**, or approved equal
- a. Pattern: **Step In Style II**.
 - b. Fiber Content: **Duracolor, Premium Nylon**.
 - c. Size: **24" x 24"**.
 - d. Pile Characteristic: **Textured Performance Cut & Loop**.
 - e. Dye Method: **Solution Dyed**.
 - f. Color: **As selected by Architect from manufacturer's full range**.
 - g. Primary Backing/ Backcoating: **Manufacturer's standard**.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
 - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 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. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. 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.

- E. Installation: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- F. Installation Method: **As recommended in writing by carpet tile manufacturer.**
- G. Maintain dye lot integrity. Do not mix dye lots in same area.
- H. 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.
- I. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- J. 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, nonstaining marking device.
- K. Install pattern parallel to walls and borders.
- L. 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.
- M. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

END OF SECTION 096813

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sound absorptive ceiling panels.
- B. Sound absorptive wall panels.
- C. Miscellaneous accessories.

1.2 RELATED SECTIONS

- A. Section 09511 - Suspended Acoustical Ceilings: Conventional grid-supported acoustic ceilings.
- B. Section 15840 - Air Terminal Units.
- C. Section 16510 - Interior Luminaires.

1.3 REFERENCES

- A. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2000.
- B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2000.
- C. ASTM E 795 - Standard Practices for Mounting Test Specimens during Sound Absorption Tests; 2000.

1.4 SUBMITTALS

- A. Submit manufacturer's recommended installation instructions and documentation certifying conformance with specified performance requirements.
- B. Shop Drawings: Submit drawings indicating layout for all areas to receive work of this section, including locations of light fixtures, ceiling diffusers, and grilles. Indicate pattern of units, cut units, details, and coordination requirements for work of other sections.
- C. Samples: Submit for approval two samples of sound absorptive panel and suspension systems, not less than 12 inches (305 mm) by 18 inches (457 mm) in size and demonstrating colors, textures, and finishes that will be provided in the finished work.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installers shall have demonstrated experience in assembly and installation of products similar to those specified in this section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original unopened and undamaged packages with labels legible and intact.
- B. Store materials in unopened packages in a manner that will avoid damage from the environment and from construction operations.
- C. Handle in accordance with manufacturer's instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not begin installation of acoustic panels until building has been enclosed and environmental conditions approximate interior conditions that will prevail when building is occupied.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: **Eckel Industries, Inc.**, please contact:

AEC, Inc.
2855 Trinity Square Drive, Suite 110
Carrollton, TX 75006
Ph (972) 488-1066
Fax (972) 488-0554
www.aeccorp.com

- B. Other Manufacturers may be approved if deemed equal.

2.3 ACOUSTIC PANELS

- A. Acceptable Manufacturer: Armstrong Industries
- B. Requests for substitutions will be considered as approved equals.

2.4 ACOUSTIC PANELS

- A. Acoustic Panels: **Geometrik Manufacturing, INC or Armstrong Woodworks Acoustical Panels**
 - 1. Type 2: **Model Geo Square**
 - 2. Penetrations: **Perforated. Round 8 mm on 32mm counters.**
 - 3. Width: **24"**
 - 4. Length: **24"**
 - 5. Panel Thickness: **3/4"**
 - 6. Finish: **200 Sheen Clear, species plain sliced Maple veneer**
 - 7. Edge Style: **Square**

B. Panel Performance:

1. Fire: Provide panels that demonstrate the following performance when tested in accordance with ASTM E84:
 - a. Flame Spread: 25 maximum
 - b. Smoke Density: 50 maximum

C. Panel Construction: **Fire Retardant Medium Density Fiberboard with Face Cut Veneers.**

D. Provide woodworks canopy hanging kit w/adjustable hangers.

2.5 SUSPENSION SYSTEM

1. Ceiling Suspension grid: Installer shall provide and install standard Metal Heavy Duty 15/16'' suspension T-Grid system using Main Runners, Cross-tees, Wall Angle or Shadow Moldings of types, structural classifications, and black finishes indicated and that comply with applicable ASTM 635 requirements, seismic codes and ordinances. A #12-gauge wire hanger shall be installed on 4' centers along each main runner. All wire hangers are to be attached to an industry standard connecting device meeting recommended loading requirements (i.e., inserts, screw eyes, etc.).

2.6 ACCESSORIES

1. Matching perimeter trim to be supplied by wood ceiling manufacturer.
2. Acoustic Batt Insulation: Specified in Section [07 21 16] 1 inch thick supplied and installed by Contractor.
3. Touch-up Paint: Type and color to match acoustic wood panels.

2.7 FINISH

1. Shop Finishing: Panels shall be shop-finished with stain per architect's selection and clear, semi-gloss varnish (wood veneer) per color selection by architect.
2. Due to nature of real wood (variation in grain, texture and color) the finished product may range from light to dark affecting the look of the panels.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive work of this section. Do not begin installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install panels on walls and ceilings in locations and in patterns indicated on the drawings.
- B. Install each unit as indicated on Architect's drawings and in accordance with manufacturer's printed instructions, using approved anchors and fasteners.

3.3 ADJUST AND CLEAN

- A. After installation of acoustic panels, clean all dirty or discolored surfaces, using cleaning materials and methods acceptable to manufacturer. Replace damaged components as directed by the Architect.
- B. Remove debris caused by work of this section on a daily basis. At completion of acoustic panel installation, remove all crates, cartons, packages, and debris from the project site.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on **substrates**.
 - 1. Concrete.
 - 2. Concrete masonry units (CMU).
 - 3. Steel.
 - 4. Cast iron.
 - 5. Galvanized metal.
 - 6. Aluminum (not anodized or otherwise coated).
 - 7. Wood.
 - 8. Gypsum board.

1.2 DEFINITIONS

- A. **Gloss Level 1:** Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523. (**Considered Flat**)
- B. **Gloss Level 2:** Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523. (**Considered Velvet-Like**)
- C. **Gloss Level 3:** 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523. (**Considered Egg-Shell**)
- D. **Gloss Level 4:** 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523. (**Considered Satin**)
- E. **Gloss Level 5:** 35 to 70 units at 60 degrees, according to ASTM D 523. (**Considered Semi-Gloss**)
- F. **Gloss Level 6:** 70 to 85 units at 60 degrees, according to ASTM D 523. (**Considered Traditional Gloss**)
- G. **Gloss Level 7:** More than 85 units at 60 degrees, according to ASTM D 523. (**Considered High- Gloss**)

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples: For each type of paint system and in each color and gloss of topcoat.

- C. Product List: For each product indicated. Include printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: **5** percent, but not less than **1 gal. (3.8 L)** of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least **100 sq. ft. (9 sq. m)**.
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the Manufacturer's: listed in other Part 2 articles for the paint category indicated.
 - 1. Devoe Paint.
 - 2. Pittsburgh Paints.
 - 3. Sherwin-Williams.
- B. All products used shall be the Commercial Top-Line products of that manufacturer.

2.2 PAINT, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Colors: **As selected by Architect from manufacturer's full range.**
1. Some small percent of surface area may be painted with deep tones.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMU): 12 percent.
 3. Wood: 15 percent.
 4. Gypsum Board: 12 percent.
 5. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.
- E. Existing Conditions: Provide matching texture and sheers unless noted otherwise on plans.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

1. **No flat paint used unless specifically approved by Architect.**
2. **Items in bold for this job as a minimum.**

A. **Masonry** – Poured or Pre-cast Concrete, Stucco, Brick

1. **Satin Paint Finish:**
 - a. **Acrylic Latex- Premium Durability:**
 - 1) **1 coat DR 1502 Exterior Latex Primer/Sealer White**
(For uneven, porous or honey-combed surfaces)
 - 2) **2 coats RGN6800 Regency Exterior Satin Paint**
 - b. **Acrylic Latex – Productivity:**
 - 1) **1 coat DR 1502 Exterior Latex/ Primer Sealer White**
or **DRH6502 Hydro-Shur Hydrosealer WB Pigmented Bonding Sealer White**
(For uneven, porous or honey-combed surfaces)
 - 2) **2 coats DR-16XXN Wonder Shield Exterior Satin Paint**
2. **Elastomeric and Texture High Build Latex Coatings:**
 - a. **Elastomeric Coatings:**
 - 1) **1 coat DR 1502 Exterior Latex Primer/Sealer White**
(For uneven, porous or honey-combed surfaces)
 - 2) **2 coats DN2270 DECRA-FLEX 300 Exterior Elastomeric Coating Fine**
(Sand Finish)
 - b. **High Build Acrylic Coating:**

- 1) 1 coat DR 1502 Exterior Latex Primer/Sealer White
(For uneven, porous or honey-combed surfaces)
 - 2) 2 coats DN 2221 DECRA-FLEX 200 Exterior Elastomeric Coating Smooth
- c. Texture Coatings:
- 1) 1 coat DR 1502 Exterior Latex Primer/Sealer White
(For uneven, porous or honey-combed surfaces)
 - 2) 1 coat DN3230 Texture Coating – Interior/Exterior Satin Paint Medium Texture
- B. **Masonry** – Concrete Block (CMU), Cinder Block, Split Face Block
1. Satin Paint Finish:
 - a. Acrylic Latex – Premium Durability:
 - 1) 1 coat DV52903 Devoe Interior/Exterior Latex Block Filler Primer White or 4000 Bloxfil Acrylic Block Filler
 - 2) 2 coats RGN Regency Exterior Satin Paint
 - b. **Acrylic Latex – Productivity:**
 - 1) **1 coat DV52903 Devoe Interior/ Exterior Latex Block Filler Primer (For uneven, porous or honey-combed surfaces)**
 - 2) **2 coats DR-16XXN Wonder Shield Exterior Satin Paint**
 2. Elastomeric and Texture High Build Latex Coatings:
 - a. Elastomeric Coatings:
 - 1) 1 coat DV52903 Devoe Interior/ Exterior Latex Block Filler Primer White
(For uneven, porous or honey-combed surfaces)
 - 2) 2 coats DN2270 DECRA-FLEX 300 Exterior Elastomeric Coating Fine
(Sand Finish)
 - b. High Build Acrylic Coating:
 - 1) 1 coat DV52903 Devoe Interior/ Exterior Latex Block Filler Primer White
(For uneven, porous or honey-combed surfaces)
 - 2) 2 coats DN2221 DECRA-FLEX 200 Exterior Elastomeric Coating Smooth
 - c. Texture Coatings:
 - 1) 1 coat DV52903 Devoe Interior/ Exterior Latex Block Filler Primer White
 - 2) 1 coat DN3230 Texture Coating Interior/ Exterior Flat Paint Medium Texture
- C. **Masonry** – Cementitious Siding, Flexboard, Transite, and Shingles
1. Satin Paint Finish:
 - a. Acrylic Latex – Premium Durability:
 - 1) 1 coat DR 1502 Exterior Latex Primer/ Sealer
 - 2) 2 coats RGN6800 Regency Exterior Satin Paint
 - b. **Acrylic Latex – Productivity:**
 - 1) **1 coat DR 1502 Exterior Latex Primer/ Sealer**
 - 2) **2 coats DR-16XXN Wonder Shield Exterior Satin Paint**
- D. **Masonry** – Concrete Floors and Decking
1. **Satin/Gloss:**
 - a. **Acrylic Latex Satin (no hot tire exposure):**

1) **2 coats DR78XX Latex Acrylic Floor Enamel**

E. **Wood** – Siding, Trim, Shutters, Sash, Doors

1. Semi-Gloss Paint Finish:

a. Acrylic Latex – Premium Durability:

- 1) 1 coat DR 1502 Exterior Latex Primer/Sealer
or DR 1102N Exterior Alkyd Primer/Sealer
- 2) 2 coats RGN6900 Regency Exterior Semi-Gloss Paint

b. **Acrylic Latex – Productivity:**

- 1) **1 coat DR 1502 Exterior Latex Primer/Sealer White**
- 2) **2 coats DR-17XXN Wonder Shield Exterior Semi-Gloss Paint**

F. **Wood** – Rough Lumber, Shingles, Shakes, and Plywood Siding (T-1-11)

1. Solid Color Satin Finishes:

a. Acrylic Latex Solid Color Stain:

- 1) 2 coats 2600 Wood Pride Water-Based Siding Solid Color Stain

2. Semi-Transparent Color Stain Finishes:

a. Acrylic Latex Semi-Transparent Color Stain:

- 1) 2 coats FLD3X FLOOD TWP Semi-Transparent Wood Finish

G. **Wood** – Decks

1. Solid Color Stain Finishes:

a. Acrylic Latex Solid Color Stain:

- 1) 2 coats FLD14X FLOOD SWF-Solid Color Wood Finish

2. Semi-Transparent Color Stain Finishes:

a. Acrylic Latex Semi-Transparent Color Stain Finishes:

- 1) 2 coats FLD3X FLOOD TWF-Semi Semi-Transparent Wood Finish

3. Waterborne Alkyd Natural Wood Tones Stain Finishes:

a. Water-Based Alkyd Clear and Natural Wood Tones:

- 1) 2 coats FLD46X FLOOD CWF-UV5 Premium Wood Finish

4. Solventborne Natural Wood Tones Stain Finishes:

a. Solvent-based Clear and Natural Wood Tones:

- 1) 2 coats FLD14X FLOOD CWF-UV5 Oil Premium Clear Oil Wood Finish

H. **Wood** – Pressed Board, Hard Board, Particle Board, PVC Composition Trim

1. Semi-Gloss Paint Finish:

a. Acrylic Latex – Premium Durability:

- 1) 1 coat DR1502 Primz²²⁰ Acrylic Exterior Primer/Sealer
or DR1102 Primz²²⁰ Alkyd Exterior Primer/Sealer
- 2) 2 coats RGN6900 Regency Exterior Semi-Gloss Paint

b. **Acrylic Latex – Productivity:**

- 1) **1 coat DR 1502 Primz²²⁰ Acrylic Exterior Primer/Sealer
or DR1102N Primz²²⁰ Alkyd Exterior Primer/Sealer**
- 2) **2 coats DR-17XXN Wonder Shield Exterior Semi-Gloss Paint**

- I. **Wood** – Covered or Protected Flooring and Decking
 - 1. Satin/Gloss Finish:
 - a. Acrylic Latex Satin (no hot tire exposure):
 - 1) 2coats DR78XX Acrylic Floor Enamel

- J. **Metal** – Structural Iron and Ferrous Steel (Including Tanks and Water Towers)
 - 1. **Semi-Gloss Paint Finish:**
 - a. **Acrylic High Performance (low UV/Abrasion):**
 - 1) **2 coats 4206 DEVFLEX 4206QD Dry Interior/Exterior Waterborne Semi-Gloss Enamel**
 - 2. Semi-Gloss Paint Finish:
 - a. Urethane High Performance (high UV/Abrasion):
 - 1) 1 coat 4030 TRU-GLAZE-WB Waterborne Epoxy Primer
 - 2) 2 coats 378H DEVTHANE 378H Aliphatic Urethane Semi-Gloss Enamel

- K. **Metal** – Miscellaneous Ferrous Steel (Including Railings, Catwalks, Fire Escapes)
 - 1. Semi-Gloss Paint Finish:
 - a. Acrylic High Performance (low UV/Abrasion):
 - 1) 1 coat 4020 DEVFLEX 4020PF Direct to Metal Primer and Flat Finish.
 - 2) 2 coats 4216L DEVFLEX 4216HP High Performance Waterborne Acrylic Semi-Gloss Enamel
 - b. **Solvent-Based Alkyd High Performance (low UV/Abrasion):**
 - 1) **1 coat 4160 DEVGUARD 4160 Multi-Purpose Tanks & Structural Primer**
 - 2) **2 coats 4306 DEVGUARD 4306 Rust Preventative Semi-Gloss Enamel**
 - c. Urethane High Performance (high UV/Abrasion):
 - 1) 1 coat 4030 TRU-GLAZE-WB 4030 Waterborne Epoxy Primer
 - 2) 2 coats 378H DEVTHANE 378H Aliphatic Urethane Semi-Gloss Enamel

- L. **Metal** – Shop Primed Metal Doors, Trim, Panels, and Miscellaneous Surfaces:
 - 1. Semi-Gloss Paint Finish:
 - a. Water-Based Alkyd (protected exterior metal trim):
 - 1) 1 coat 4020 DEVFLEX 4020PF Direct to Metal Primer and Flat Finish
 - 2) 2 coats DP73XX Mirrolac Speed Interior/ Exterior Advanced Alkyd Semi-Gloss Paint
 - b. Acrylic High Performance (low UV/Abrasion):
 - 1) 1 coat 4020 DEVFLEX 4020PF Direct to Metal Primer and Flat Finish
 - 2) 2 coats 4216L DEVFLEX 4216HP High Performance Waterborne and Acrylic Semi-Gloss Enamel
 - c. **Solvent-Based Alkyd High Performance (low UV/Abrasion):**
 - 1) **1 coat 4160 DEVGUARD 4160 Multi-Purpose Tank and Structural Primer**
 - 2) **2 coats 4306 DEVGUARD 4306 Rust Preventative Semi-Gloss Enamel**
 - d. Urethane High Performance (high UV/Abrasion):
 - 1) 1 coat 4030 TRU-GLAZE-WB 4030 Waterborne Epoxy Primer
 - 2) 2 coats 378H DEVTHANE 378H Aliphatic Urethane Semi-Gloss Enamel

- M. **Metal** – Non-Ferrous Galvanized, Aluminum, Copper
1. Semi-Gloss Paint Finish:
 - a. Water-Based Alkyd (protected exterior metal trim):
 - 1) 1 coat 4020 DEVFLEX 4020PF Direct to Metal Primer and Flat Finish
 - 2) 2 coats DP73XX Mirrolac Speed Interior/ Exterior Advanced Alkyd Semi-Gloss Paint
 - b. **Acrylic High Performance (low UV/Abrasion):**
 - 1) **1 coat 4020 DEVFLEX 4020PF Direct to Metal Primer and Flat Finish**
 - 2) **2 coats 4216L DEVFLEX 4216HP High Performance Waterborne Acrylic Semi-Gloss Enamel**
 - c. Solvent-Based Alkyd High Performance (low UV/Abrasion):
 - 1) 1 coat 4160 DEVGUARD 4160 Multi-Purpose Tank & Structural Primer
 - 2) 2 coats 4306 Rust Preventative Semi-Gloss Enamel
 - d. Urethane High Performance (high UV/Abrasion):
 - 1) 1 coat 4030 TRU-GLAZE-WB 4030 Waterborne Epoxy Primer
 - 2) 2 coats 378H DEVTHANE 378H Aliphatic Urethane Semi-Gloss Enamel
- N. **Traffic and Handicap Marking** (Miscellaneous Surfaces Including Concrete and Asphalt)
1. Flat Paint Finish:
 - a. **Acrylic Latex:**
 - 1) **1 coat TRAFFIC PAINT Water Reducible Acrylic (Aexcel)**
 - b. Solvent-Based Alkyd:
 - 1) 1 coat ZONE MARKING PAINT Alkyd (Aexcel)

3.6 INTERIOR PAINTING SCHEDULE

1. **No Flat Paint unless specifically approved by Architect.**
2. **Items in bold for this job as a minimum.**

A. **Drywall** (Gypsum Board)

1. Lo-Lustre Finish:
 - a. Acrylic Latex – Premium Durability:
 - 1) 1 coat DR-50801 Latex High Hiding Wall Primer/Sealer White
 - 2) 2 coats RGN53XX Regency Paint + Primer in One Interior Satin Paint
 - b. Acrylic Latex – No VOC/Low Odor:
 - 1) 1 coat DRN3160 Wonder-Pure Odor-Free Primer/Sealer
 - 2) 2 coats DRN32XX Wonder-Pure Odor-Free Interior Eggshell
 - c. Acrylic Latex – Productivity:
 - 1) 1 coat DRN53360 PVA Wall Interior Primer-Sealer
 - 2) 2 coats DRN35XX Wonder-Tones Interior Satin Paint
 - d. **Latex- Productivity:**
 - 1) **1 coat DRN53360 PVA Wall Interior Primer Sealer**
 - 2) **2 coats DR-218XX Wonder-Pro Interior Eggshell Paint**

- e. Solvent-Based Alkyd:
 - 1) 1 coat DR-50801 Latex High Hide Interior Primer Sealer
 - 2) 2 coats DR23XX Velour Alkyd Eggshell Interior Paint
- f. Water-Based Alkyd:
 - 1) 1 coat DR-50801 Latex High Hide Interior Primer Sealer
 - 2) 2 coats DP72XX Mirrolac Speed Interior/Exterior Advanced Alkyd Eggshell Paint
- g. Acrylic High Performance:
 - 1) 1 coat DR-50801 Latex High Hide Interior Primer Sealer
 - 2) 2 coats 4212 DEVFLEX 4212HP High Performance Waterborne Acrylic Eggshell Enamel
- h. Water-Based Epoxy Coatings (HIPAC):
 - 1) 1 coat DR-50801 Latex High Hide Interior Primer Sealer
 - 2) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
- i. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):
 - 1) 1 coat DR-50801 Latex High Hide Interior Primer Sealer
 - 2) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating

B. Masonry – Concrete Block (CMU)

- 1. Lo Lustre Finish:
 - a. Acrylic Latex – Premium Durability
 - 1) 1 coat DV53902 Devoe Interior/Exterior Latex Block Filler Primer White
 - 2) 2 coats RGN53XX Regency Paint + Primer in One Interior Satin Paint
 - b. Acrylic Latex – No VOC/ Low Odor:
 - 1) 1 coat DV53902 Devoe Interior/Exterior Latex Block Filler Primer White
 - 2) 2 coats DRN32XX Wonder-Pure Odor-Free Interior Eggshell
 - c. **Acrylic Latex – Productivity:**
 - 1) **1 coat DV53902 Devoe Interior/Exterior Latex Block Filler Primer White**
 - 2) **2 coats DRN35XX Wonder-Tones Interior Satin Paint**
 - d. Latex – Productivity:
 - 1) 1 coat DV53902 Devoe Interior/Exterior Latex Block Filler Primer White
 - 2) 2 coats DR-218XX Wonder-Pro Interior Eggshell Paint
 - e. Solvent-Based Alkyd:
 - 1) 1 coat DV53902 Devoe Interior/Exterior Latex Block Filler Primer White
 - 2) 1 coat DR-50801 Latex High Hide Interior Primer Sealer
 - 3) 2 coats DR23XX Velour Alkyd Eggshell Interior Paint
 - f. Water-Base Alkyd:
 - 1) 1 coat DV53902 Devoe Interior/Exterior Latex Block Filler Primer White

- 2) 2 coats DP72XX Mirrolac Speed Interior/Exterior Advanced Alkyd Eggshell Paint
- g. Acrylic High Performance:
 - 1) 1 coat 4000 BLOXFIL 4000 Interior/Exterior Heavy Duty Acrylic Block Filler
 - 2) 2 coats 4212 DEVFLEX 4212HP High Performance Waterborne Acrylic Eggshell Enamel.
- h. Water-Based Epoxy Coatings (HIPAC):
 - 1) 1 coat 4000 BLOXFIL 4000 Interior/Exterior Heavy Duty Acrylic Block Filler
 - 2) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
- i. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):
 - 1) 1 coat 4000 BLOXFIL 4000 Interior/Exterior Heavy Duty Acrylic Block Filler
 - 2) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy

C. **Masonry – Plaster**

- 1. Lo Lustre Paint:
 - a. Acrylic Latex – Premium Durability:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats RGN53XX Regency Paint + Primer in One Interior Satin Paint
 - b. Acrylic Latex – No VOC/Low Odor:
 - 1) DRN3160 Wonder-Pure Odor-Free Primer-Sealer
 - 2) 2 coats DRN32XX Wonder-Pure Odor-Free Interior Eggshell
 - c. Acrylic Latex – Productivity:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats DRN358XX Wonder-Tones Interior Satin Paint
 - d. **Latex – Productivity:**
 - 1) **1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer**
 - 2) **2 coats DR-218XX Wonder-Pro Interior Eggshell Paint**
 - e. Solvent-Based Alkyd:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats DR23XX Velous Alkyd Eggshell Interior Paint
 - f. Water-Based Alkyd:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats DP72XX Mirrolac Speed Interior/Exterior Advanced Alkyd Eggshell Paint
 - g. Acrylic High Performance:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer

- 2) 2 coats 4212 DEVFLEX 4212HP High Performance Waterborne Acrylic Eggshell Enamel
 - h. Water-Based Epoxy Coatings (HIPAC):
 - 1) 2 coats TRU-GLAZE-AB 4426 Waterborne Epoxy Semi-Gloss Coating
 - i. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):
 - 1) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating
- D. **Masonry** – Smooth Concrete, Unglazed Brick
- 1. Lo Lustre Finish:
 - a. Acrylic Latex – Premium Durability:
 - 1) 1 coat DRH6502 Hydro-Shur Hydrosealer WB Pigmented Bonding Sealer White
 - 2) 2 coats RGN53XX Regency Paint + Primer in One Interior Satin Paint
 - b. Acrylic Latex – No VOC/Low Odor:
 - 1) 1 coat DRN3160 Wonder-Pure Odor-Free Primer Sealer
 - 2) 2 coats DRN32XX Wonder-Pure Odor-Free Interior Eggshell
 - c. Acrylic Latex – Productivity:
 - 1) 1 coat DRH6502 Hydro-Shur Hydrosealer AB Pigmented Bonding Sealer White
 - 2) 2 coats DRN35XX Wonder-Tones Interior Satin Paint
 - d. **Latex – Productivity:**
 - 1) **1 coat DRH6502 Hydro-Shur Hydrosealer WB Pigmented Bonding Sealer White**
 - 2) **2 coats DR-218XX Wonder-Pro Interior Eggshell Paint**
 - e. Solvent-Based Alkyd:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats DR23XX Velour Alkyd Eggshell Interior Paint
 - f. Water-Based Alkyd:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats DP72XX Mirrolac Speed Interior/Exterior Advanced Alkyd Eggshell Paint
 - g. Acrylic High Performance:
 - 1) 1 coat DRH6502 Hydro-Shur Hydrosealer WB Pigmented Bonding Sealer White
 - 2) 2 coats 4212 DEVFLEX 4212HP High Performance Waterborne Acrylic Eggshell Enamel
 - h. Water-Based Epoxy Coatings (HIPAC):
 - 1) 1 coat 4030 TRU-GLAZE-WB 4030 Waterborne Epoxy Primer
 - 2) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
 - i. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):

- 1) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating

E. **Masonry** – Concrete Floors and Decking

1. **Satin Finish:**
 - a. **Solvent-Based Alkyd Gloss:**
 - 1) 2 coats DR77XX Devoe Alkyd Polyurethane Floor Enamel (Add Skid-Tex for non-skid surface)
 - b. **Acrylic Latex Satin (no hot tire exposure):**
 - 1) 2 coats DR78XX Devoe Acrylic Floor Enamel (Add Skid-Tex for non-skid surface)
 - c. **Water-Based Epoxy Coatings (HIPAC):**
 - 1) **2 coats 4426 TRU-GLAZE-WB Waterborne Epoxy Semi-Gloss Coating**
 - 2) **2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating**

F. **Acoustical Plaster**, Acoustical Tile

1. **Flat Finish:**
 - a. **Acrylic Latex – No VOC/Low Odor:**
 - 1) 1 coat DRN31XX Wonder-Pure Odor-Free Interior Flat Paint
 - b. **Acrylic Latex:**
 - 1) 1 coat DRN36XX Wonder-Tones Interior Latex Flat Paint
 - c. **Latex:**
 - 1) **1 coat DR-202XX Wonder-Pro Interior Flat Paint**
 - d. **Water-Based Acrylic Dryfall:**
 - 1) **1 coat DN1280 Waterborne Interior Flat Dry Fall**

G. **Wood** – Wood Paneling, Wood Trim, Doors, Cabinets

1. **Stained and Varnished Satin:**
 - a. **Water-Based Varnish**
 - 1) 1 coat 1700 WOOD PRIDE Oil-Based Wood Stain
 - 2) 2 coats 1802 WOOD PRIDE Water-Based Satin Varnish
 - b. **Solvent-Based Polyurethane Varnish:**
 - 1) **1 coat 1700 WOOD PRIDE Oil-Based Wood Stain**
 - 2) **2 coats 1902 WOOD PRIDE Polyurethane Satin Varnish**
2. **Clear Satin:**
 - a. **Water-Based Varnish:**
 - 1) 1 coat 1808 WOOD PRIDE Water-Based Gloss Varnish
 - 2) 2 coats 1802 WOOD PRIDE Water-Based Satin Varnish
 - b. **Solvent-Based Polyurethane Varnish:**
 - 1) 1 coat 1908 WOOD PRIDE Polyurethane Gloss Varnish
 - 2) 2 coats 1902 WOOD PRIDE Polyurethane Satin Varnish
3. **Lo Lustre Finish:**
 - a. **Acrylic Latex – Premium Durability:**
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats RGN53XX Regency Paint + Primer in One Interior Satin Paint

- b. Acrylic Latex – No VOC/Low Odor:
 - 1) 1 coat DRN3160 Wonder-Pure Odor-Free Primer-Sealer
 - 2) 2 coats DRN32XX Wonder-Pure Odor-Free Interior Eggshell
- c. Acrylic Latex – Productivity:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats DRN35XX Wonder-Tones Interior Satin Paint
- d. **Latex – Productivity:**
 - 1) **1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer**
 - 2) **DR-218XX Wonder-Pro Interior Eggshell Paint**
- e. Solvent-Based Alkyd:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats DR23XX Velour Alkyd Eggshell Interior Paint
- f. Water-Based Alkyd:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats DP72XX Mirrolac Speed Interior/Exterior Advanced Alkyd Eggshell Paint
- g. Acrylic High Performance:
 - 1) 1 coat DR518X Kilstain-WB Interior/Exterior Primer Sealer
 - 2) 2 coats
- h. Water-Based Epoxy Coatings (HIPAC):
 - 1) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
or 4428 TRU-GLAZE-WB 4428 Waterborne Epoxy Gloss Coating
- i. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):
 - 1) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating
or 4508H TRU-GLAZE 4508 Gloss Epoxy Coating

H. **Wood – Floors and Steps**

- 1. Satin Finish:
 - a. Solvent-Based Alkyd Gloss:
 - 1) 2 coats DR77XX Devoe Alkyd Polyurethane Floor Enamel (Add Ski-Tex for non-skid surface)
 - b. Acrylic Latex Satin (no hot tire exposure):
 - 1) 2 coats DR78XX Devoe Acrylic Floor Enamel (Add Skid-Tex for non-skid surface)
 - c. **Water-Based Epoxy Coatings (HIPAC):**
 - 1) **2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating**
 - 2) **2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating or 4508H TRU-GLAZE 4508 Gloss Epoxy Coating (Add Skid-Tex for non-skid surface)**

2. Stained and Varnished Gloss Finish:
 - a. Water-Based Varnish:
 - 1) 1 coat 1700 WOOD PRIDE Oil-Based Wood Stain
 - 2) 2 coats 1802 WOOD PRIDE Water-Based Satin Varnish
 - b. Solvent-Based Polyurethane Varnish:
 - 1) 1 coat 1700 WOOD PRIDE Oil-Based Wood Stain
 - 2) 1902 WOOD PRIDE Polyurethane Satin Varnish
3. Clear Satin:
 - a. Water-Based Varnish:
 - 1) 1 coat 1808 WOOD PRIDE Water-Based Gloss Varnish
 - 2) 2 coats 1802 WAAD PRIDE Water-Based Satin Varnish
 - b. Solvent-Based Polyurethane Varnish:
 - 1) 1 coat 1908 WOOD PRIDE Polyurethane Gloss Varnish
 - 2) 2 coats 1902 WOOD PRIDE Polyurethane Satin Varnish

I. **Metal** – Unprimed Ferrous Metal

1. Semi-Gloss Finish:
 - a. Acrylic Latex: Premium Durability:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats RGN54XX Regency Paint + Primer in One Interior Semi-Gloss Paint
 - b. Acrylic Latex – No VOC/Low Odor:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats DRN33XX Wonder-Pure Odor-Free Interior Semi-Gloss Paint
 - c. Acrylic Latex – Productivity:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats DRN39XX Wonder-Tones Interior Semi-Gloss Paint
 - d. **Latex – Productivity:**
 - 1) **1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish**
 - 2) **2 coats DR-236XX Wonder-Pro Interior Semi-Gloss Paint**
 - e. Solvent-Based Alkyd:
 - 1) 1 coat 4160 DEVGUARD 4160 Multi-Purpose Tank and Structural Primer
 - 2) 2 coats DR26XX Velour Alkyd Semi-Gloss Interior Paint
 - f. Water-Based Alkyd:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats DP73XX Mirrolac Speed Interior/Exterior Advanced Alkyd Semi-Gloss Paint
 - g. Acrylic High Performance:

- 1) 1 coat 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats 4216 DEVFLEX 4216HP High Performance Waterborne Acrylic Semi-Gloss Enamel
- h. Water-Based Epoxy Coatings (HIPAC):
- 1) 1 coat 203 DEVRAN 203 Waterborne Epoxy Primer
 - 2) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
- i. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):
- 1) 1 coat 201H DEVRAN 201 Universal Epoxy Primer
 - 2) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating

J. **Metal** – Galvanized

1. Semi-Gloss Finish:

a. **Acrylic Latex – Premium Durability:**

- 1) **1 coat 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish**
- 2) **2 coats RGN54XX Regency Paint + Primer in One Interior Semi-Gloss Paint**

b. Acrylic Latex – No VOC/Low Odor:

- 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
- 2) 2 coats DRN33XX Wonder-Pure Odor-Free Interior Semi-Gloss

c. Acrylic Latex – Productivity:

- 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
- 2) 2 coats RGN65XX Regency Paint + Primer in One Interior Gloss Paint

d. Latex – Productivity:

- 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
- 2) 2 coats RGN65XX Regency Paint + Primer in One Interior Gloss Paint

e. Solvent-Based Alkyd:

- 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
- 2) 2 coats DR26XX Velour Semi-Gloss Interior Paint

f. Water-Based Alkyd:

- 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
- 2) 2 coats DP73XX Mirrolac Speed Interior/Exterior Advanced Alkyd Semi-Gloss Paint

g. Acrylic High Performance:

- 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
- 2) 2 coats 4216L DEVFLEX 4216HP High Performance Waterborne Acrylic Semi-Gloss Enamel

h. Water-Based Epoxy Coatings (HIPAC):

- 1) 1 coat 4030 TRU-GLAZE-WB 4030 Waterborne Epoxy Primer
- 2) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating

- i. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):
 - 1) 1 coat 201H DEVRAN 201 Universal Epoxy Primer
 - 2) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating

K. **Metal** – Aluminum

- 1. Lo Lustre Finish:
 - a. Acrylic Latex – Premium Durability:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats RGN53XX Regency Paint + Primer in One Interior Satin Paint
 - b. Acrylic Latex – No VOC/Low Odor:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats DRN32XX Wonder-Pure Odor-Free Interior Eggshell
 - c. Acrylic Latex – Productivity:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats DRN35XX Wonder-Tones Interior Satin Paint
 - d. **Latex – Productivity:**
 - 1) **1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish**
 - 2) **2 coats DRN 35XX Wonder-Tones Interior Satin Paint**
 - e. Solvent-Based Alkyd:
 - 1) 1 coat 4160 DEVGUARD 4160 Multi-Purpose Tank and Structural Primer
 - 2) 2 coats DR23XX Velour Alkyd Eggshell Interior Paint
 - f. Water-Based Alkyd:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats DP72XX Mirrolac Speed Interior/Exterior Advanced Alkyd Eggshell Paint
 - g. Acrylic High Performance:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats 4212 DEVFLEX 4212HP High Performance Waterborne Acrylic Eggshell Enamel
 - h. Water-Based Epoxy Coatings (HIPAC):
 - 1) 1 coat 4030 TRU-GLAZE-WB 4030 Waterborne Epoxy Primer
 - 2) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
 - i. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):
 - 1) 1 coat 201H DEVRAN 201 Universal Epoxy Primer
 - 2) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating

L. **Metal** – Shop Primed Ferrous Metal

- 1. Semi-Gloss Finish:
 - a. **Solvent-Based Alkyd High Performance:**
 - 1) **2 coats 4306 DEVGUARD 4306 Rust Preventative Semi-Gloss Enamel**
 - b. Water-Based Alkyd:

- 1) 2 coats DP73XX Mirrolac Speed Interior/Exterior Advanced Alkyd Semi-Gloss Paint
- c. Acrylic High Performance:
 - 1) 2 coats 4216L DEVFLEX 4216HP High Performance Waterborne Acrylic Semi-Gloss Enamel
- d. Water-Based Epoxy Coatings (HIPAC):
 - 1) 1 coat 4030 TRU-GLAZE-WB 4030 Waterborne Epoxy Primer
 - 2) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
- e. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):
 - 1) 1 coat 201H DEVRAN 201 Universal Epoxy Primer
 - 2) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating

M. **Metal** – Handrails and Risers

- 1. Semi-Gloss Finish:
 - a. **Solvent-Based Alkyd High Performance:**
 - 1) **1 coat 4160 DEVGUARD 4160 Multi-Purpose Tank and Structural Primer**
 - 2) **2 coats 4306 DEVGUARD 4306 Ruse Preventative Semi-Gloss Enamel**
 - b. Water-Based Alkyd:
 - 1) 1 coat 4020 DEVFLEX 4020PF Direct to Metal Primer and Flat Finish
 - 2) 2 coats DP73XX Mirrolac Speed Interior/Exterior Advanced Alkyd Semi-Gloss Paint
 - c. Acrylic High Performance:
 - 1) 1 coat 4020 DEVFLEX 4020PF Direct to Metal Primer and Flat Finish
 - 2) 2 coats 4216L DEVFLEX 4216HP High Performance Waterborne Acrylic Semi-Gloss Enamel
 - d. Water-Based Epoxy Coatings (HIPAC):
 - 1) 1 coat 4030 TRU-GLAZE-WB 4030 Waterborne Epoxy Primer
 - 2) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
 - e. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant)
 - 1) 1 coat 201H DEVRAN 201 Universal Epoxy Primer
 - 2) 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating

N. **Metal** – Flooring, Steps, and Catwalks

- 1. Semi-Gloss Finish:
 - a. **Solvent-Based Alkyd Gloss:**
 - 1) **2 coats DR77XX Devoe Alkyd-Polyurethane Floor Enamel (Add Skid-Tex for non-skid surfaces)**
 - b. Water-Based Epoxy Coatings (HIPAC):

- 1) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
 - 2) or 2 coats 224HS DEVRAN 224HS Semi-Gloss Epoxy High Build Coating
- O. **Metal** – Machinery, Equipment, and Fixtures (Shop Primed)
1. Semi-Gloss Finish:
 - a. **Solvent-Based Alkyd High Performance:**
 - 1) **1 coat 4160 DEVGUARD 4160 Multi-Purpose Tank and Structural Primer**
 - 2) **2 coats 4306 DEVGUARD 4306 Rust Preventative Semi-Gloss Enamel**
 - b. Water-Based Alkyd:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats DP73XX Mirrolac Speed Interior/Exterior Advanced Alkyd Semi-Gloss Paint
 - c. Acrylic High Performance:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 2 coats 4216L DEVFLEX 4216HP High Performance Waterborne Acrylic Semi-Gloss Enamel
 - d. Water-Based Epoxy Coatings (HIPAC):
 - 1) 1 coat 4030 TRU-GLAZE-WB 4030 Waterborne Epoxy Primer
 - 2) 2 coats 4426 TRU-GLAZE-WB 4426 Waterborne Epoxy Semi-Gloss Coating
 - e. Solvent-Based Epoxy Coatings (Chemical/Moisture Resistant):
 - 1) 1 coat 201H DEVRAN 201 Universal Epoxy Primer
 - 2) 2 coats 4426 DEVRAN 224HS Semi-Gloss Epoxy High Build Coating
- P. **Metal** – Decking (Ferrous Unprimed), Bar Joists (Unprimed)
1. Semi-Gloss Finish:
 - a. **Water-Based Acrylic Dryfall:**
 - 1) **1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish**
 - 2) **1 coat DN1482 Waterborne Interior Eggshell Dry Fall**
 - b. **Solvent-Based Alkyd Dryfall:**
 - 1) **1 coat 4160 DEVGUARD 4160 Multi-Purpose Tank and Structural Primer**
 - 2) **1 coat DN1582 Solventborne Interior Eggshell Dry Fall**
 - c. Solvent-based Modified Epoxy Dryfall:
 - 1) 1 coat 4382 UNI-GRIP 4382 Modified Epoxy Eggshell Dry Fog Primer and Finish
- Q. **Metal** – Decking (Pre-Primed/Pre-Finished), Bar Joists (Shop Primed)
1. Eggshell Finish:
 - a. Water-Based Acrylic Dryfall:
 - 1) 1 coat 4020 DEVFLEX 4020PF DTM Primer and Flat Finish
 - 2) 1 coat DN1482 Waterborne Interior Eggshell Dry Fall
 - b. Solvent-Based Alkyd Dryfall:

- 1) 1 coat DN1582 Solventborne Interior Eggshell Dry Fall
 - c. Solvent-Based Modified Epoxy Dryfall:
 - 1) 1 coat 4382 UNI-GRIP 4382 Modified Epoxy Eggshell Dry Fog Primer and Finish
- R. **Metal** – Decking (Galvanized)
- 1. Eggshell Finish:
 - a. **Water-Based Acrylic Dryfall:**
 - 1) **1 coat DN1482 Waterborne Interior Eggshell Dry Fall**
 - b. Solvent-Based Alkyd Dryfall:
 - 1) 1 coat DN1370 SPRAYMASTER DTG Direct-to-Galvanized Alkyd Flat Dryfall
or 4160 DEVGUARD 4160 Multi-Purpose Tank and Structural Primer
 - 2) 1 coat DN1582 Solventborne Interior Eggshell Dry Fall
 - c. Solvent-Based Modified Epoxy Dryfall:
 - 1) 1 coat 4382 UNI-GRIP 4382 Modified Epoxy Eggshell Dry Fog Primer and Finish

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Provide items as outlined below. Scope of Work includes blocking as specified in Section 06100.

1.2 QUALITY ASSURANCE

A. Use adequate number of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the requirements and the methods needed for proper installation of the work of this Section.

1.3 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the Owner furnished items before, during and after installation.

1.4 QUALITY ASSURANCE

A. Meeting ASTM-E84 Class I rating.

PART 2 PRODUCTS

2.1 CORNER GUARDS : Flexible (3/4" x 3/4" x 8'-0") Corner Guard, Model 349F by Inpro Corporation Door and Wall Protection Systems (800) 222-5556. Install at all exposed and finished drywall corners. Color as selected by Architect from manufacturers Element and Standard colors.

2.2 CHAIR RAILS : 3" tall Chair rail, Model number 2700W by Inpro Corporation Door & Wall Protection Systems (800) 222-5556. Install as indicated on Plans. Color as selected by Architect from Woodland Colors.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install per manufacturer's recommendations.

B. All applications to be true and plumb.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Visual display board assemblies.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For visual display units.
 - 1. Include plans, elevations, sections, details, and attachment to other work.
 - 2. Show locations of panel joints.
- C. Samples: For each type of visual display unit indicated.
- D. Product Schedule: For visual display units.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

- A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: **50** years from date of Substantial Completion.
 - 2. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: **25** or less.
 - 2. Smoke-Developed Index: **50** or less.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 VISUAL DISPLAY BOARD ASSEMBLY

- A. Manufacturers: Subject to compliance with requirements, [**provide products by the following**] [**provide products by one of the following**] [**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:

Basis-of-Design Product: Subject to compliance with requirements, provide Claridge Products and Equipment, Inc. or comparable product by one of the following:

- 1. Architectural School Products Ltd.
- 2. Best-Rite Manufacturing; a brand division of MooreCo, Inc.
- 3. Claridge Products and Equipment, Inc.
- B. Markerboard Panel: **Porcelain-enamel-faced** markerboard panel on core indicated.
 - 1. Color: **White**.
- C. Tackboard Panel: **Natural-cork** tackboard panel on core indicated.
 - 1. Fabric Wrapped Edge: Wrap edge of tackboard panel with fabric facing.
 - 2. Color and Pattern: **As selected by Architect from full range of industry colors.**
- D. Aluminum Frames: Fabricated from not less than 0.062-inch- (1.57-mm-) thick, extruded aluminum; **standard size and shape.**
 - 1. Field-Applied Trim: Manufacturer's standard, **snap-on trim with no visible screws or exposed joints.**
 - 2. Aluminum Finish: **Clear anodic** finish.
- E. Vinyl Trim: **As selected by Architect from full range of industry colors.**
- F. Joints: Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, **balanced around center of board, as acceptable to Architect.**

- G. Combination Assemblies: Provide **hidden spline** between abutting sections of visual display panels.
- H. Chalktray: Manufacturer's standard; continuous.
 - 1. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.
 - 2. Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends.
- I. Display Rail: Manufacturer's standard, extruded-aluminum display rail with **plastic-impregnated-cork** insert, end stops, **and continuous paper holder**, designed to hold accessories.
 - 1. Size: **Length indicated on Drawings.**
 - 2. Map Hooks and Clips: **Two** map hooks with flexible metal clips for every **48 inches (1200 mm)** of display rail or fraction thereof.
 - 3. Tackboard Insert Color: **As selected by Architect from full range of industry colors.**
 - 4. Aluminum Color: Match finish of visual display assembly trim.
- J. Paper Holder Display Rail: Extruded aluminum; designed to hold paper by clamping action.

2.3 MARKERBOARD PANELS

- A. Porcelain-Enamel Markerboard Panels: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction, consisting of moisture-barrier backing, core material, and porcelain-enamel face sheet with **low-gloss** finish. Laminate panels under heat and pressure with manufacturer's standard, flexible waterproof adhesive.
 - 1. Face Sheet Thickness: **0.021 inch (0.53 mm)** uncoated base metal thickness.
 - 2. Manufacturer's Standard Core: Minimum **1/4 inch** (6 mm) thick, with manufacturer's standard moisture-barrier backing.

2.4 TACKBOARD PANELS

- A. Tackboard Panels:
 - 1. Facing: **1/4-inch- (6-mm-) thick natural cork.**
 - 2. Core: **Manufacturer's standard.**

2.5 MATERIALS

- A. Porcelain-Enamel Face Sheet: PEI-1002, with face sheet manufacturer's standard two- or three-coat process.
- B. Natural-Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish **with surface-burning characteristics indicated.**
- C. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063.

- D. Adhesives for Field Application: Mildew-resistant, non-staining adhesive for use with specific type of panels, sheets, or assemblies; and for substrate application; as recommended in writing by visual display unit manufacturer.

2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish: **AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.**

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- B. Field-Assembled Visual Display Board Assemblies: Coordinate field-assembled units with grounds, trim, and accessories indicated. Join parts with a neat, precision fit.
 - 1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, **balanced around center of board, as acceptable to Architect.**
 - 2. Where size of visual display board assemblies or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.
- C. Factory-Fabricated Visual Display Board Assemblies: Adhere to wall surfaces with **egg-size** adhesive gobs at 16 inches (400 mm) o.c., horizontally and vertically.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes permanent bronze building plaque.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For plaques.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show plaque mounting heights, locations of supplementary supports to be provided by others, and accessories.
 - 3. Show message list, typestyles, graphic elements, and layout for each plaque at full scale.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Plaque Schedule: Use same designations specified or indicated on Drawings or in a plaque or sign schedule.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of plaques that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: **Five** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PLAQUES, GENERAL

- A. Regional Materials: Plaques shall be manufactured within 500 miles (800 km) of Project site.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in **the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1** for signs.

2.3 PLAQUES

- A. Cast Plaque: Plaque with background texture, border, and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: **Plaque shall be vertical 24 x 28, with 20 lines of lettering, 3 font sizes with script to follow.** Subject to compliance with requirements, provide **product indicated on Drawings** comparable product by one of the following:
 - a. APCO Graphics, Inc.
 - b. A. R. K. Ramos Signage Systems.
 - c. Metal Arts; Division of L & H Mfg. Co.
 - d. Metallic Arts.
 - e. Southwell Company (The).
 - 3. Plaque Material: **Cast Bronze**
 - 4. Plaque Thickness: **0.25 inch (6.35 mm).**
 - 5. Finishes:
 - a. Integral Metal Finish: **Raised surface.**
 - 6. Background Texture: **Leatherette.**
 - 7. Integrally Cast Border Style: **Square.**
 - 8. Mounting: **Concealed studs.**

2.4 MATERIALS

- A. Casting: **Bronze**

2.5 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of plaques, noncorrosive and compatible with each material joined, and complying with the following:
 - 1. Use concealed fasteners and anchors unless indicated to be exposed.
 - 2. For exterior exposure, furnish **brass** devices unless otherwise indicated.

3. Exposed Metal-Fastener Components, General:
 - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
4. Plaque Mounting Fasteners:
 - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of plaque, screwed into back of plaque, or screwed into tapped lugs cast integrally into back of plaque.
 - b. Through Fasteners: Exposed metal fasteners matching plaque finish, with type of head indicated, installed in predrilled holes.

2.6 FABRICATION

- A. General: Provide manufacturer's standard plaques according to requirements indicated.
 1. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
 2. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 3. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match plaque finish.
 4. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.
- B. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into panel surface indicated to produce precisely formed copy, incised to uniform depth.
 1. Engraved Metal: Fill engraved graphics with manufacturer's standard baked enamel.
- C. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted plaques to suit plaque construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.
 1. Aluminum Brackets: Factory finish brackets with baked-enamel or powder-coat finish **to match plaque-background color** unless otherwise indicated.
 2. Stainless-Steel Brackets: Factory finish brackets **to match plaque background** unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install plaques using mounting methods indicated and according to manufacturer's written instructions.

1. Install plaques level, plumb, true to line, and at locations and heights indicated, with plaque surfaces free of distortion and other defects in appearance.
2. Install plaques so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that plaque surfaces are clean and free of materials or debris that would impair installation.
4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of plaque. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place plaque in position and push until flush to surface, embedding studs in holes. Temporarily support plaque in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place plaque in position and flush to surface, install washers and nuts on studs projecting through opposite sides of surface, and tighten.
2. Through Fasteners: Drill holes in substrate using predrilled holes in plaque as template. Countersink holes in plaque if required. Place plaque in position and flush to surface. Install through fasteners and tighten.
3. Brackets: Remove loose debris from substrate surface and install bracket supports in position so that plaque is correctly located and aligned.
4. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of plaque and of suitable quantity to support weight of plaque after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as plaque is applied and to prevent visibility of cured adhesive at plaque edges. Place plaque in position, and push to engage adhesive. Temporarily support plaque in position until adhesive fully sets.

C. Remove temporary protective coverings and strippable films as plaques are installed.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid plastic toilet compartments including the following: (Hiny Hiders)
 - 1. Floor mounted overhead-braced toilet compartments.
 - 2. Privacy screens.

1.2 RELATED SECTIONS

- A. Section 05500 – MISCELLANEOUS METALS
- B. Section 06100 – ROUGH CARPENTRY: Anchorage/blocking for attachment of partitions.

1.3 REFERENCES

- A. ASTM A 666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01340.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 3. Preparation instructions and recommendations.
 - 4. Storage and handling requirements and recommendations.
 - 5. Installation methods.
- C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.
- B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.
- C. Materials: Doors, panels and pilasters shall be constructed from High Density

Polyethylene (HDPE) resins. Partitions shall be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. All plastic components shall be covered with a protective plastic masking.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. (Labor not included in warranty.)

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Scranton Products, which is located at: 801 E. Corey St. ; Scranton, PA 18507; Toll Free Tel: 800-445-5148; Email: [request info \(info@scrantonproducts.com\)](mailto:info@scrantonproducts.com); Web: www.scrantonproducts.com
 - 1. Fabricator: Santana Toilet Partitions.
 - 2. Fabricator: Comtec Toilet Partitions.
 - 3. Fabricator: Capitol Toilet Partitions.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01630.

2.2 MATERIAL

- A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface;
- B. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.

- C. Stainless Steel Castings: ASTM A167, Type 304.
- D. Aluminum: ASTM 6463-T5 alloy.

2.3 SOLID PLASTIC TOILET COMPARTMENTS

- A. Basis of Design: Hiny Hiders Toilet Partitions as manufactured by and supplied by Scranton Products.
 - 1. Style: Floor mounted overhead-braced toilet compartments.
- B. Doors, panels, and pilasters shall be 1 inch (25 mm) thick with all edges rounded to a radius. Doors and dividing panels shall be mounted based on height of specified system.
 - 1. Door and Panel Height: 66 inches high (1676 mm).
 - 2. Door Design: FLUSH.
 - 3. Door & Pilaster Edge: Shiplap.
 - 4. Pilasters shall be 82 inches (2083 mm) high fastened to floor.
- C. Panel Color: Metallic Series: Color as selected by Architect.
 - 1. Texture: Hammered.
 - 2. Pilaster shoes shall be 3 inches (76 mm) high stainless steel (type 304, 20 gauge) secured to the pilaster with a stainless steel tamper resistant Torx head sex bolt.
- D. Headrail shall be made of heavy-duty extruded aluminum (6463-T5 alloy) with anti-grip design. The headrail shall have a clear anodized finish and shall be fastened to the headrail bracket by a stainless steel tamper resistant Torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant Torx head screws.
 - 1. Headrail brackets shall be 20 gauge stainless steel with a satin finish and secured to the wall with a stainless steel tamper resistant Torx head screws.
- E. Wall Brackets:
 - 1. Aluminum Brackets: Wall brackets shall be made of heavy-duty aluminum 6463-T5 alloy.
 - 2. The brackets are fastened to the pilaster with stainless steel tamper resistant Torx head screws and fastened to the panels with stainless steel tamper resistant Torx head sex bolts.
 - 3. Bracket Type: Continuous aluminum.
- F. Door Hardware:
 - 1. Hinges: 65 inches (1651 mm) continuous aluminum.
 - 2. Door strike/keeper shall be made of heavy-duty extruded aluminum (6436-T5 alloy) with a bright dip anodized finish and secured to the pilasters with stainless steel tamper resistant Torx head sex bolts. Bumper shall be made of extruded black vinyl.
 - a. Style: 65 inches (1651 mm) continuous aluminum
 - 3. Aluminum Slide Bolt Latch and housing shall be made of heavy-duty

extruded aluminum (6463-T5 alloy). The latch housing shall have a bright dip anodized finish, and the slide bolt and button shall have a black anodized finish.

4. Provide occupancy indicator.
5. Each door shall be supplied with one coat hook/bumper and door pull made of chrome plated Zamak.
6. Equip outswing handicapped doors with second door pull and door stop.

2.4 SOLID PLASTIC PRIVACY SCREENS

- A. Provide plastic privacy screens in urinal applications as indicated. Panelaster type.
- B. Panels, and pilasters, if required, shall be 1 inch (25 mm) thick with all edges rounded to a radius. Screens shall be mounted at 14 inches (356 mm) above the finished floor. Color as selected by Architect from manufacturer's full line of current colors.
- C. Type: Wall mounted screen. Panelaster type.
7. mm) high.
 8. Screen: Urinal screens shall be 24 inches (610 mm) wide by 55 inches (1397 mm) high.
 - a. Pilaster sleeves shall be stainless steel (type 304, 20 gauge) secured to the pilaster with a stainless steel tamper resistant Torx head sex bolt.
 9. Pilaster sleeves shall be 3 inches (76 mm) high secured to the pilaster with a stainless steel tamper resistant Torx head sex bolt.
- D. Wall brackets shall be continuous channel type made of heavy-duty aluminum (6463-T5 alloy). Brackets shall be fastened to panel/pilaster with stainless steel tamper resistant Torx head sex bolts.

PART 3 GENERAL

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

- C. Examine areas to receive toilet partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings.
- C. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).
- D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- E. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Toilet room
 - 2. Private-use toilet accessories.
 - 3. Air dryers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify products using designations indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: **1** year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TOILET ROOM ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. American Specialties, Inc.
 - 2. Bobrick Washroom Equipment, Inc.
 - 3. Bradley Corporation.
 - 4. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
- C. Schedule of Accessories and Manufacturer/Model
 - 1. See schedule for all toilet accessories as shown on the plans.
 - 2. Some items "Owner Furnished/Contractor Installed."
 - 3. Some items "Contractor Furnished/Contractor Installed."

2.2 FABRICATION

- A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of **six** keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least **250 lbf (1112 N)**, when tested according to ASTM F 446.

END OF SECTION

1. GENERAL:
See referenced note in SECTION: SPECIAL CONDITIONS, paragraph 1.
2. WORK INCLUDED:
Furnish labor and materials for identifying devices and other specialty signage indicated on the drawings and specified herein, and or both.
3. RELATED WORK SPECIFIED ELSEWHERE:
a. CMU: SECTION: MASONRY WORK.
4. SUBMITTALS:
Samples: Submit samples of each color and finish required for identifying signs for Architect's approval.
5. PRODUCT DELIVERY, STORAGE AND HANDLING:
a. Deliver materials in unopened, protective packaging to prevent physical damage.
b. Do not begin installation until sufficient materials to complete are received.
6. MATERIALS:
a. Identification Signage - Rigid Vinyl, 3 color sign, with tactile lettering by APCO signs. Provide the MSUTX standard sign package with face-plate, colored text and back-plate, mechanically installed typically with screws/anchors, only installed with double sided tape where substrate cannot be penetrated (such as on glass). Provide like color back plate for side-lite glass installations. See signage schedule below.

<u>SIGN NO.</u>	<u>QTY.</u>	<u>SIZE</u>	<u>COPY (LETTERS)</u>
<u>ADA REGULATORY</u>			
1	5	6 x 8.5	HC WOMEN
2	1	6 x 8.5	HC MEN
3	1	6 x 8.5	HC FAMILY
4	10	4 x 8.5	EXIT
5	6	6 x 8.5	STAIR
<u>ADA IDENTIFICATION</u>			
6	30	5 x 8.5	To Be Determined
7	26	2.5 x 8.5	To Be Determined
8	7	4 x 8.5	To Be Determined
<u>WAYFINDING</u>			
9	7	22 x 22	To Be Determined

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and cabinets for fire extinguishers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Warranty Period: **Five** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 2. Basis-of-Design Product: Subject to compliance with requirements, provide **Larsen's MP Series – 5 lbs (MP5) Fire Extinguisher** or a comparable product by one of the following:
 - a. Guardian Fire Equipment, Inc.
 - b. Larsens Manufacturing Company.
 - c. Potter Roemer LLC.
 - d. Pyro-Chem; Tyco Safety Products.
 3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

2.3 FIRE EXTINGUISHER CABINET – Scheduled on Drawings with Toilet Accessories

- A. Cabinet: Standard **18ga steel**, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with **white** baked-enamel finish.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 2. Basis-of-Design Product: Subject to compliance with requirements, provide **Larsen's FS G2409-3R Fire Extinguisher Box** or a comparable product by one of the following:
 - a. Amerex Corporation.
 - b. Guardian Fire Equipment, Inc.
 - c. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - d. Larsens Manufacturing Company.
 - e. Potter Roemer LLC.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
1. Identify cabinet fire extinguishers with the words "FIRE EXTINGUISHER" in black letter decals applied to clear plexiglass door.
 - a. Orientation: **Vertical.**
 - b. Thickness of Acrylic: ¼”

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Install fire extinguishers cabinets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Cabinets: **54 inches (1372 mm)** above finished floor to top of fire extinguisher.
- C. Cabinets: install square and plumb, at locations indicated.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes plastic-laminate countertops.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
- C. Samples:
 - 1. Plastic laminates, for each color, pattern, and surface finish.

1.3 INFORMATIONAL SUBMITTALS

- A. Woodwork Quality Standard Compliance Certificates: **AWI Quality Certification Program certificates.**

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: **Certified participant in AWI's Quality Certification Program.**
- B. Installer Qualifications: **Fabricator of products.**

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.

- B. Provide **Labels** from **AWI** Certification program indicating that countertops including installation, comply with requirements of grades specified.
- C. Grade: Selections from **Premium Plastic Laminate**.
- D. Regional Materials: Plastic-laminate countertops shall be manufactured within 500 miles (800 km) of Project site.
 - 1. Manufacturers: Subject to compliance with requirements, **provide products by the following**:
 - a. Formica Corporation.
 - b. Wilsonart International; Div. of Premark International, Inc.
- E. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated by manufacturer's designations.
 - 2. Match Architect's sample.
 - 3. As selected by Architect from manufacturer's full range in the following categories:
 - a. Solid colors, **matte** finish.
 - b. Solid colors with core same color as surface, **matte** finish.
 - c. Wood grains, **matte** finish.
 - d. Patterns, **matte** finish.
- F. Edge Treatment: **Same as laminate cladding on horizontal surfaces**.
- G. Core Material at Sinks: **MDF medium-density fiberboard 49 LB. density water resistant fiberboard made with exterior glue**.
- H. Core Thickness: **1-1/8 inch (29 mm)**.
 - 1. Build up countertop thickness to **1-1/2 inches** (38 mm) at front, back, and ends with additional layers of core material laminated to top.
- I. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.
- J. Paper Backing: Provide paper backing on underside of countertop substrate.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
 - 1. Wood Moisture Content: **5 to 10** percent.

2.3 ACCESSORIES

- A. Grommets for Cable Passage through Countertops: **2-inch (51-mm) OD, Color as selected by Architect**, molded-plastic grommets and matching plastic caps with slot for wire passage.

2.4 MISCELLANEOUS MATERIALS

- A. Adhesives: Do not use adhesives that contain urea formaldehyde.
- B. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.5 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets. Ease edges to radius indicated for the following:
 - 1. Solid-Wood (Lumber) Members: **1/16 inch** (1.5 mm) unless otherwise 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.
- C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 1. Seal edges of openings in countertops with a coat of varnish.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

3.2 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops 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.

2. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required.
1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 2. Secure backsplashes to walls with adhesive.
 3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Solid-surface-material countertops and backsplashes.

1.2 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 SOLID-SURFACE-MATERIAL COUNTERTOPS

- A. Configuration: Provide countertops with the following front and backsplash style:
 - 1. Front: **3/4-inch (19-mm) bullnose.**
 - 2. Backsplash: **Straight, slightly eased at corner.**
 - 3. Endsplash: **Matching backsplash.**
- B. Countertops: **3/4-inch- (19-mm-)** thick, solid surface material **with front edge built up with same material.**
- C. Backsplashes: **3/4-inch- (19-mm-)** thick, solid surface material
- D. Window Sills: **3/4" thick**, Solid Surface Material.

2.2 COUNTERTOP MATERIALS

- A. Particleboard: ANSI A208.1, **MDF w/48 lb. density and Water Resistant MDF w/ 49 lb. made with binder containing no added urea formaldehyde. Water resistant MDF for 24" either side of a sink or lavatory.**
- B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

- C. Adhesives: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.
 - 1. Manufacturers: Subject to compliance with requirements, **provide products by one of the following** :
 - a. Formica Corporation.
 - b. Wilsonart International.
 - 2. Colors and Patterns **As selected by Architect from manufacturer's full range of colors**.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. 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.

END OF SECTION

1. GENERAL:
See referenced note in SECTION: SPECIAL CONDITIONS, Paragraph 1.
2. DESCRIPTION OF WORK:
Furnish materials, labor and equipment to excavate, backfill, fill, and grade as required by plans and as specified herein, including, but not limited to, stockpiling and storing excavated material for reuse, disposal of waste material and trenching and backfilling for utility lines. Excavation and backfill of lawn sprinkler lines : not be part of this section; however, methods described apply to work of that section.
3. RELATED WORK SPECIFIED ELSEWHERE:
 - a. Temporary Utilities: SECTION: TEMPORARY FACILITIES.
 - b. Temporary Facilities and Enclosures: SECTION: TEMPORARY FACILITIES.
 - c. Site Clearing and Topsoil Stripping: SECTION: SITE CLEARING.
 - d. Site Mechanical Utilities: DIVISION: MECHANICAL.
 - e. Site Electrical Utilities: DIVISION: ELECTRICAL.
4. APPLICABLE REGULATIONS:
Comply with requirements of governing authorities which have jurisdiction.
5. TESTING:
 - a. On site soil inspection will be conducted. Testing will be paid for by Owner, unless otherwise specified. See paragraph: FIELD QUALITY CONTROL.
 - b. Notify Architect/Engineer at least 24 hours in advance of readiness of each portion of work for testing. Architect may require testing at other times as he deems necessary.
 - c. Do not cover work required to be tested, prior to testing.
6. PROTECTION:
 - a. Barricade excavations occurring as part of work, post with warning lights. Operate warning lights during hours from dusk to dawn each day, as other-wise required.
 - b. Protect structures, utilities, sidewalks, street pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
 - c. Shoring : furnished and installed as necessary to protect workmen, banks, adjacent paving, structures, utilities, shoring, bracing, and sheeting : removed as excavations are backfilled, in manner to prevent caving.
 - d. Use of explosives will not be permitted.
7. DEFINITIONS:
 - a. Satisfactory materials : include materials classified in MIL-STD-619 as GW, GM, GC,

GP, SW, SP, SM, SC & CL. Non-expansive soils for Non-expansive fill : satisfactory materials having plasticity index equal to or less than 20 when tested in accordance with MIL-STD-621, Method 103.

- b. Unsatisfactory materials : include materials classified in MIL-STD-619 as PT, OH, OL, CH, ML, and MH.
- c. Cohesionless and Cohesive Materials: Cohesionless materials include materials classified in MIL-STD-619 as GW, GP, SW, and SP. Cohesive materials classified as GC, SC, ML, CL, MH, AND CH. Materials classified as GM and SM will be identified as COHESIONLESS only when fines have plasticity index of 0.
- d. Degree of Compaction required is expressed as percentage of maximum density at or within 3% above optimum moisture content obtained by test procedure presented in ASTM D-698-70e. (Standard Proctor Density) or ASTM D-1557-70 (Modified Proctor Density) abbreviated hereinafter as percent maximum density at optimum moisture content.

8. MATERIALS:

- a. Backfill and Fill Materials: Provide satisfactory material as specified above and approved by Architect/Engineer for backfill and fill, free of clay, rock or gravel larger than 2" in any dimensions, debris, waste, frozen materials, vegetable and other deleterious matter.
- b. Select Fill:
 - (1) In addition to requirements for fill above, conform to following graduation:
 - Passing 3/4 inch screen - 85 percent
 - Passing 1/4 inch screen - 60 percent
 - Passing No. 40 Mesh Sieve - 50 percent
 - Passing on No. 200 Sieve - 30 percent
 - (2) Material passing No. 40 Sieve at (1) above : meet following plasticity requirements:

Maximum Plasticity Index	Liquid Limit Less Than
12	40
- c. Drainage Fill (Granular Fill):
 - (1) Granular material from Group A-3 (AASHTO). This group is composed entirely of coarse materials such as sand and gravel; lack stability under wheel load except when damp; are only slightly affected by moisture conditions; have no volume change.
 - (2) They cannot be compacted by rolling, but in most instances may be settled by disking and ponding. (Typical material of this group includes steam-deposited mixtures of poorly graded fine sand and limited amounts of coarse sand and gravel). Liquid limit : less than 40 and plasticity index of not more than 6.
- d. Rock: Excavated material : only be considered as rock when Architect/-Engineer agrees that because of its density, most practical and economical method of removing same is by means of pneumatic power drilling. When natural rock is disintegrated to such extent that it can readily be loosened by power shovels or manually by tools not requiring fuel

or power, then such materials : regarded as earth excavation. Boulders less than one cubic yard in volume : regarded as earth excavation.

9. EXISTING UTILITIES:

- a. Locate by hand excavation, existing underground utilities and manhole covers in areas of work. If scheduled for abandonment, coordinate with respective utility company.
- b. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
- c. Should unknown or incorrectly charted piping or other utilities be encountered during excavation, consult Architect immediately for directions as to procedure.
- d. Cooperate with utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

10. EXCAVATION:

- a. General:
 - (1) Excavation of every description and of whatever substances encountered within grading limits of project : performed to lines and grades indicated on drawings.
 - (2) Excavated materials which are considered unsuitable for fill by Architect/Engineer and any surplus of excavated material which is not required for fill or site grading : known as "waste", and : removed from project site.
 - (3) Suitable material from excavations : used on site for filling in low areas.
- b. Structural Excavation:
 - (1) Structural excavation : removed to lines and depths indicated on details, schedules, plans or as established by Architect/Engineer.
 - (2) Final foundation surface : free of loose material, clean, and cut to firm surface, sprinkled and compacted to its original natural state.
 - (3) Excavation material required to be used for backfill : stockpiled by Contractor at locations convenient for rehandling of material during backfilling operations. Locations of storage piles : subject to approval of Architect/Engineer and must be so located as not to interfere with construction of other items of work.
 - (4) No additional payment : made for hauling of waste material off project site. Broken concrete, rock or other similar material : removed from site at no additional cost to Owner.
 - (5) Excavated material to be wasted : disposed of at locations off site. No additional payment : made for waste excavation or overhaul on waste materials. Waste dumps on site : leveled and/or graded in such manner as to leave surface in neat and sightly condition.

11. FILL:

- a. Fill : classified as material required to grade site from existing ground elevations to finish grade as indicated on drawings; or that fill required to construct subgrade for building, addition, drives, walks to lines and grades as shown on drawings.
- b. Building area:
 - (1) Under slabs on grade all fill : compacted select fill in manner specified below.
 - (2) Fill, including select fill, of approved satisfactory materials : placed in successive horizontal layers of not more than 8" (loose thickness) and : compacted as

specified herein. Fill : formed of suitable materials, free of muck, trees, logs, stumps, standing or matted brush, matted roots, rubbish, and frozen materials. Furnish select fill where indicated.

- c. Areas beneath slabs on grade : compacted to between 95% and 100% of maximum density at optimum moisture (ASTM D-698).
- d. Other fill including granular fill and subfill : compacted to 90% maximum density including moisture (ASTM D-1557).

12. **BACKFILL:**

- a. As soon as permissible, excavation under this specification not occupied by permanent structure, : backfilled. It is intent of backfill specifications to secure backfill compacted as near as possible to original state of ground in which excavation has been made.
- b. Backfill : placed in layers of not more than 8" loose measure, and : compacted by sprinkling and mechanical tamping to 95% maximum density at optimum moisture (ASTM D-698). Material used for backfilling : originally excavated material or other suitable materials, free from large lumps, concrete, or other extraneous materials. No backfill : placed against any wall until structure has been in place at least ten (10) days unless other-wise directed by Architect/Engineer in writing. Care : taken to prevent any wedging action of backfill against structure. Backfilling : carried uniformly around structure to approximately same elevation in each lift. No backfilling : done during absence of Architect/Engineer unless authorized to do so. Where walls of excavation are sloped, such slopes : stepped or serrated as directed by Architect/Engineer before backfilling operations.
- c. Backfill around structures from 6" below finish grade to within 1" of finish grade : constructed of selected top soil materials in accordance with SECTION: LANDSCAPE WORK.

13. **GRADING:**

Areas required to be graded : constructed true to grades, shaped to drain, and be maintained free of trash and debris until final inspection has been completed and work has been accepted. Areas to receive topsoil : brought to within 6" of finish grade.

14. **FOOTINGS:**

Spread footing excavations required by this Contract : level bottoms and : free of loose material.

15. **BRACING AND SHORING:**

Support structures on earth retained banks, preventing cave-ins and displacement of adjacent soil, when required to maintain work safe to life, limb and property by installing timbers, cribbing, planking, or sheet piling.

16. **UNKNOWN UTILITIES AND OBSTACLES:**

- a. Unknown Utilities:
 - (1) If any unknown and uncharted utilities are encountered during excavation, promptly notify Architect and wait for his instructions before proceeding.
 - (2) If it is ascertained by Architect that such utility line has been abandoned, Contractor : properly cap line at depth of 12" or more below finish grade, and Contract : modified to account for this extra work.

- (3) If such unknown utilities are encountered and work is continued without contacting Architect for instruction, and damage is caused to said utilities, Contractor : repair, at his own expense, such damage to satisfaction of Owner or Utility Company concerned.
- b. Unknown Obstacles:
 - (1) If any unknown obstacles are encountered, Contractor : remove and/or fill or perform any work necessary to complete work of this Contract. Adjustment for major items covered below.
 - (2) Should Contractor encounter any unforeseen major obstacles in excavation such as abandoned water-well, subsurface streams or cave-ins, etc., which prove to be unduly expensive to overcome, it is intention of Owner to cause survey to be made to determine course of action that : relieve Contractor of undue expense.
17. TRENCHING AND BACKFILLING FOR UTILITIES:
- a. Perform trenching and backfilling for new and/or relocated water, gas, sewer, utility lines, storm sewers, electrical secondary and primary installations as specified in Mechanical and Electrical divisions of these Specifications, to standards herein specified and to lines and grades as shown on drawings.
 - b. Trenching:
 - (1) Materials excavated : unclassified. Trenches : excavated to lines and to grades as shown on drawings or required to meet conditions. Trenches : of such width as to provide approximately 1' space of installation on each side of pipe for maintaining true and straight line and for proper jointing, and as indicated and required for sewer and other utility lines.
 - (2) Bell holes of dimensions sufficient to make joints : dug as required.
 - (3) Bottom of trenches : carefully graded so that pipe to be installed therein : have uniform bearing for its full length. If trench is excavated at any place, except at joints, below proper grade, it : backfilled to grade with suitable material and thoroughly compacted to density equivalent to that of surrounding undisturbed soil.
 - (4) When necessary to prevent caving-in of trench or injury to existing structures or personnel, Contractor : at his own expense, sufficiently shore and brace trenches.
 - (5) Any damage to pipe, conduit, structures or existing pavement caused by caving : replaced as directed by Architect/Engineer at Contractor's expense.
 - (6) Water encountered in trench : pumped or bailed out, and trench : free of water during pipe and tube conduit laying.
 - c. Backfill:
 - (1) Trenches : not be backfilled until pipe line has been inspected, tested, and approved as specified herein. Backfill : compacted backfill, and : so placed as to prevent damage to pipe, protective pipe coatings, and sand or gravel pipe beddings.
 - (2) Backfill : selected from that material excavated from trench, and : not contain organic matter, large rocks, broken concrete, etc.
 - (3) Backfill : compacted to 90% maximum density at optimum moisture.
 - (4) Backfill under proposed drive, pavement, streets, walks, building slabs and foundations: composed of select fill as specified. Compactive effort as hereinbefore specified.
 - (5) Contractor may elect to use any one of following optional methods for

backfilling pipe or conduits, except as hereinbefore specified.

- d. Initial Backfill:
- (1) Initial backfill : consist of materials used to backfill trench from bottom of trench to depth of 1' above top of pipe. Initial backfill : composed of select material from excavation or material and no lumps, stones, rock or other extraneous material exceeding 1/2" in diameter.
 - (2) Backfill : firmly tamped under and around pipe or conduit so as to provide firm support for pipe. Material : compacted at optimum moisture content and : placed immediately after pipe has been laid and joints have been inspected. Backfill : then be placed in successive layers of not more than 12" loose measure on each side of pipe to height of 12" over top of pipe.
 - (3) Contractor may elect to backfill trench to depth of 1' over top of pipe with clean moist sand in lieu of method specified above. Sand : placed, compacted and irrigated in manner satisfactory to Architect/Engineer. No extra payment : due Contractor for this material.
- e. Secondary backfill : consist of materials as hereinbefore specified used to backfill trench from 12" above top of pipe to finish grade as shown on drawings.

19. OPTIONS FOR BACKFILL:

- a. Contractor's Option Number 1:
- (1) Mechanically Tamped: Contractor : backfill to grade by compacting with mechanical tampers in layers not exceeding 8" in depth. Sufficient mechanical tampers : provided so that backfilling will progress without interruptions or delay.
 - (2) Material to be compacted by tamping : maintained at optimum moisture and compacted to 90%. Texas Highway Department Soil Testing Procedure Tex-113-E. Comparative effort as hereinbefore specified.
- b. Contractor's Option Number 2:
- (1) Jetting: Each subsequent layer of secondary backfill : introduced in 3' lifts and compacted with water by use of jetting method. Final lift of secondary backfill : compacted by use of jetting method in combination with use of pneumatic or mechanical tampers or ditch tamping machines.
 - (2) Water for Jetting : delivered under sufficient volume and pressure through approved jetting hose and pipe nozzle. Jetting Hose : have minimum inside dimension of 2". Jetting Hose : connected to approved, 2" minimum, water pump capable of delivering water at volume and pressure as required by Architect/Engineer. Pipe nozzle : of sufficient length to introduce water to depth of not less than 1' above preceding lift. Points of trench jetting : staggered along length of trench and spaced at not more than 3' on centers. Each 5' lift of secondary backfill : jetted initially at depth of not more than 1' above preceding lift. Sufficient water : introduced into secondary backfill to cause complete subsidence of backfill and develop free standing water at surface of each lift.

20. FIELD QUALITY CONTROL:

- a. Testing : include, but not necessarily be limited to, testing soil materials proposed for use in work and field tests of fill compaction. Compaction field tests : made on completed work and may be required at other times at locations and elevations selected by Soils Engineer or Architect.

- b. If, in opinion of Architect, based on reports of testing service, and on inspection, subgrade or fills which have been placed are unsatisfactory, Architect will require additional compaction and testing at expense of Contractor.
- c. Results of density tests of soil in place will be considered satisfactory if average of any 3 consecutive density tests out of 4 have value of not greater than 2% below required density.
- d. Provide 1 field density test for each 5,000 square feet of fill per lift, 1 field density test per lift for each 200 linear feet of trench and footing backfill.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes painted markings applied to **concrete** pavement.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide **Sherwin Williams Premium ALKYD Traffic Paint** or comparable product by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Industries.
 - 3. Pratt & Lambert.
 - 4. Sherwin-Williams Company (The).
- C. Paint Code: **Setfast Premium ALKYD-A300.**

2.2 PAVEMENT-MARKING PAINT

- A. Pavement-Marking Paint: **MPI #32, alkyd traffic-marking paint.**
 - 1. Color: **Yellow.**

PART 3 - EXECUTION

3.1 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow paving to age for a minimum of **30** days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).
 - 1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils. Apply paint so that it cannot run beneath the stencil.
 - 2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal. (0.72 kg/L).

END OF SECTION