

**SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR:
SEMCO ENERGY GAS COMPANY
SEMCO ENERGY EMERGENCY OPERATIONS CENET
BUILD OUT
AEW PROJECT NO. 1584-0003**



SEMCOENERGY

G A S C O M P A N Y

**OWNER:
SEMCO ENERGY GAS COMPANY
1411 3RD STREET, SUITE A
PORT HURON, MICHIGAN 48060**



**586.726.1234
www.aewinc.com**

**ISSUED FOR BIDS:
December 6, 2024**

DOCUMENT 00 01 00

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REQUEST FOR PROPOSAL

PROJECT

SEMCO ENERGY EOC BUILD OUT
AEW Project No. 1584-0003

OWNER

SEMCO Energy Gas Company
1411 3rd Street, Suite A
Port Huron, Michigan 48060

LOCATION

1411 3rd Street, Suite A
Port Huron, Michigan 48060

ARCHITECT/ENGINEER

AEW Inc.
Shelby Township, Michigan 48315
(586) 726-1234
Consultant Engineers

DESCRIPTION

The scope of work involved for this project is as follows: A renovation of existing 4,589 s.f. Suite A for a SEMCO Emergency Operation Center dispatch. Renovations include demolition, new finishes and reworking all mechanical, plumbing, and electrical.

SCOPE OF PROPOSAL

Sealed proposals are invited for the Project and will be received at the office of the Architect until 2:00pm, local time; **January 10, 2024**. Bids will not be publicly opened.

PRE-BID MEETING

A mandatory pre-bid meeting will be held at the project location at **3:30pm, December 12, 2024**.

Pre-bid questions shall be submitted to the Architect before **2:00pm, December 19, 2024**, local time. Email all questions to: Nicole Armstrong, narmstrong@awinc.com. Please include the Project Name and AEW Project Number in the Subject line of the email, "Project Name – Project Number – Pre-Bid Questions" for example.

DOCUMENTS

This solicitation, along with all attachments will be sent through Newforma InfoExchange via email by Nicole Armstrong to invitees only. Documents shall be sent on **December 6, 2024** after **2:00pm**, local time. Any and all Addenda issued by the owner will be sent through Newforma InfoExchange via email by Nicole Armstrong. All Addenda must be viewed or downloaded from the sent link.

BID GUARANTEE AND CONTRACT SECURITY

Each bid proposal shall be accompanied by a certified check, bank draft or satisfactory bid bond in an amount of 5% of the maximum bid amount. Checks shall be made payable to "SEMCO Energy Gas Company". Bids may not be withdrawn for a period of sixty (60) calendar days after receipt of bids. The successful bidder will be required to furnish the required insurance and bond certificates.

RIGHTS OF THE OWNER

The Owner reserves the right to reject any or all proposals and to waive irregularities in bidding, or to accept the lowest responsible proposal that, in the opinion of the Owner, will serve his best interest.

DATED: December 6, 2024

SEMCO Energy Gas Company

SECTION 00 21 13 - INSTRUCTIONS TO BIDDERS

Owner will receive sealed proposals only as set forth in the Request for Proposal and complying with all requirements as contained in Instructions to Bidders.

DOCUMENTS

Bidding documents consist of plans and specifications as prepared by Anderson, Eckstein and Westrick, Shelby Township, Michigan.

Bid documents will be sent to invitees through Newforma InfoExchange via email from Nicole Armstrong, see request for proposal for more information.

BIDDING DOCUMENTS

The Bidding Documents consist of the following:

The Drawings as enumerated in Section 00 85 10, Index of Drawings.

The Specifications as enumerated in the Table of Contents.

All other documents as provided for in Article 1, Paragraph 1, Section 1 of the General Conditions as modified.

EXAMINATION

Each bidder shall examine the Bidding Documents and satisfy himself about the extent of the proposed work by personal examinations of the site and surroundings, and make his own estimate therefrom of the facilities and difficulties attending the performance and completion of the job.

No additional compensation will be allowed on account of conditions which could be determined by examining the Bidding Documents or the site.

INTERPRETATION

If any person contemplating submitting a bid is in doubt as to the true meaning of any part of the Drawings, Specifications, or other Bidding Documents, they must submit to the Architect, a written request for an interpretation thereof. If such an

interpretation is not requested, the bids will be presumed to be based upon the interpretation and directions given by the Architect after Contract award, in accordance with provisions of the Contract. Neither the Owner nor the Architect will be responsible for any verbal explanations or interpretations of the Bidding Documents.

Every request for such interpretation should be in writing, addressed to the Architect at his office, and to be given consideration, must be received at least three (3) days prior to the date fixed for the opening of bids. Any and all such interpretations, and any supplemental instructions will be in the form of written addenda to the Bidding Documents which, if issued, will be sent via email before fixed for the opening of bids. All addenda so issued shall become part of the Bidding Documents.

SUBSTITUTIONS

To obtain approval to use unspecified products, bidders shall submit written requests at least five (5) days before the bid date. Requests received after this time will not be considered. Requests shall clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability. If the product is acceptable, the Architect will approve it in an Addendum issued Newforma InfoExchange via email.

BASIS OF BID

A single lump sum proposal is being entertained for the complete work of this proposal.

Partial or segregated bids or assignments will not be considered. Include quotes for all alternates and unit prices; failure to do so may result in rejection of the proposal.

PREPARATION

Proposal shall be submitted on the form bound in these specifications, Form of Proposal, in original form without erasures, interlineations or alterations.

Submit three (3) copies of proposal, retain one for your records. Oral, fax, email, or telephone proposals will not be accepted.

Proposals must be filled out in ink or typewritten in duplicate. Blank spaces in the proposals must be filled in and no changes shall be made to the phraseology of the proposal. Quotes shall be entered in written and numeric forms. In case of a discrepancy between the written and the numeric form, the written form shall govern.

All bids shall be signed and dated in longhand.

Bids which are not signed by the individual making them should have attached thereto a power of attorney, evidencing authority to act as agent for the person whom it is signed.

Bids which are signed for a partnership should be signed by one of the partners or by an attorney-in-fact. If signed by an attorney-in-fact, evidence of authority to sign the bids shall be attached.

Bids which are signed for a corporation should have the correct corporate name thereon and the signature of the president or other officer legally able to contract in the name of the corporations. In addition, a signed Secretary's Certificate evidencing the authority of the Officer to contract in the name of the corporation shall be included. Any proposal submitted by a corporation shall bear its seal.

BID SECURITY

The successful bidders' securities will be retained until they have signed the Contract and furnished the required payment and performance bonds. The Owner reserves the right to retain the security of the next two lowest bidders for each contract until the lowest bidders enter into contract, or until sixty (60) days after the bid opening, whichever is the shorter. All other bid security will be returned as soon as practicable. If any bidder refuses to enter into a Contract, the Owner will retain his Bid Security as liquidated damages, but not as a penalty.

SUBCONTRACTORS

The Owner and Architect reserve the right to require of bidders tentatively selected for consideration in the awarding of the Contract, a list of the subcontractors whom the Contractor intends to employ.

The Owner reserves the right to disapprove the use of any proposed subcontractor, and in such event, the bidder submitting such subcontractor shall submit another such subcontractor in like manner within the time specified by the Owner. The

Owner reserves the right to reject any bid if such information required by the Owner is not submitted as above indicated.

SUBMITTAL

Submit proposals in sealed opaque envelopes having listed thereon the following:

**PROPOSAL: SEMCO ENERGY BUILD OUT
REQUEST FOR PROPOSAL
SEMCO ENERGY GAS COMPANY
ATTN: Anderson, Eckstein, & Westrick
on behalf of SEMCO Energy**

Contractor: _____

WITHDRAWAL

Proposals for base bids may not be withdrawn for a period of sixty (60) days after the time established for the receiving of proposals. Bidders may withdraw at any time prior to the time set for the receiving of proposals.

IRREGULARITIES

The Owner reserves the right to disqualify Bids before or after opening, upon evidence of collusion with intent to defraud, or other illegal practices upon the part of the bidder.

The Owner also reserves the right to reject any or all bids in whole or in part and to waive any informalities therein.

Any error and/or omission in the proposal form or any other irregularity as a result of negligent preparation shall not furnish cause for relief for any damages resulting therefrom, nor in any way relieve the Contractor from fulfillment of all contractual obligations as provided for in the Bidding Documents.

TAXES AND CONTRIBUTIONS

Proposal, unit prices, alternate prices stated include all taxes or contributions required by bidder's business.

Michigan State sales tax is applicable to this work.

OPENING

There will be no opening of bids read out loud.

BID BREAKDOWN CONSTRUCTION INFORMATION

Upon notice from the Architect, the low bidders shall submit a detailed cost breakdown of all work covered by the Bidding Documents. The breakdown shall show quantity of material and labor, units of material and labor, material cost, labor cost and total cost in a schedule of values on an AIA G703 form.

EXECUTION OF CONTRACT

The Owner reserves the right to accept any and all bids, or to negotiate contract terms with the various bidders when such is deemed by the Owner to be in their best interest.

END OF SECTION 00 21 13

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SECTION 00 40 10 - FAMILIAL DISCLOSURE STATEMENT

All Bidders must complete the following familial disclosure form in compliance with MCL 380.1267 (Public Act 232 of 2004) and attach this information to the bid.

By the attached sworn and notarized statement we are disclosing the following familial relationship(s) that exists between the owner or any employee of the bidder and any member of the Board of trustees, or employees of The Owner and will not accept a Bid that does not include this sworn and notarized disclosure statement.

Disclose any familial relationship and complete the form below in its entirety:

The following are familial relationships as described above (provide employee name, family contact name, family contact position, and familial relationship or NONE.)

PRINT:

Company Name: _____

Phone: _____

Street Address: _____

City / State / Zip: _____

Company Officer: _____ Title: _____

Officer's Signature: _____ Date: _____

STATE OF MICHIGAN)
) SS
COUNTY OF _____)

On this ____ day of _____, 20____, before me a Notary Public in and for said county, personally appeared agent of the said firm _____ and who acknowledged the same to be their free act and deed as such agent.

Notary Public: _____ Expiration Date: _____

Seal Imprint:

AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT

Michigan Public Act No. 517 of 2012

The undersigned, the owner or authorized officer of the below-named Contractor, pursuant to the compliance certification requirement provided in the SEMCO Energy Gas Company (the "Owner") SEMCO Energy Build Out (the "RFP"), hereby certifies, represents and warrants that the Contractor (including its officers, directors and employees) is not an "Iran linked business" within the meaning of the Iran Economic Sanction Act, Michigan Public Act No. 517 of 2012 (the "Act"), and that in the event the Contractor is awarded a contract as a result of the aforementioned RFP, the Contractor will not become an "Iran linked business" at any time during the course of performing any services under the contract.

The Contractor further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than \$250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the Owner's investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on a request for proposal for three (3) years from the date that it is determined that the person has submitted the false certification.

Name of Contractor

By: _____

Its: _____

Date: _____

State of _____)
)SS.
County of _____)

This instrument was acknowledged before me on the ____ day of _____, 20__, by_____.

Notary Public

_____ County, _____

My commission expires on _____

Acting in the County of _____

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SECTION 00 40 30 NON-DISCRIMINATION IN EMPLOYMENT

TO _____

Name of union or organization of workers

The undersigned currently holds contract(s) with _____ (Applicant's Name) involving funds or credit of the U.S. Government of (a) subcontract(s) with a prime contractor holding such contract(s).

You are advised that under the provisions of the above contract(s) or subcontract(s) and in accordance with Executive Order 11246, dated September 24, 1965, the undersigned is obliged not to discriminate against any employee or applicant for employment because of race, color, creed, or national origin. This obligation not to discriminate in employment includes, but is not limited to the following:

HIRING, PLACEMENT, UPGRADING, TRANSFER, DEMOTION, RECRUITMENT, ADVERTISING, SOLICITATION FOR EMPLOYMENT, TRAINING DURING EMPLOYMENT, RATES OF PAY OR OTHER FORMS OF COMPENSATION, SELECTION FOR TRAINING INCLUDING, APPRENTICESHIP, LAYOFF OR TERMINATION.

This notice is furnished to you pursuant to the provisions of the above contract(s) or subcontract(s) and Executive Order 11245.

Copies of this notice will be posted by the undersigned in conspicuous places available to employees or applicants for employment.

PRINT:

Company Name: _____ Phone: _____

Street Address _____

City / State / Zip _____

Company Officer: _____ Title: _____

Officer's Signature: _____ Date: _____

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SEMCO ENERGY EOC BUILD OUT
AEW PROJECT # 1584-0003

DECEMBER 6, 2024

SECTION 00 40 50 CONTRACTOR NOTIFICATION FORM FOR NEW OR RENOVATION WORK
(In accordance with 40 CFR Part 763.84 [d])

As required by the EPA AHERA standard, the Owner is responsible for providing Contractors with information regarding locations of known or assumed asbestos containing material prior to entering a building under the district's jurisdiction.

Please complete this form and return it to Anderson, Eckstein & Westrick, Inc.

I (We) representing and having authority for (company), hereby indicate and agree that a representative of the Owner has provided me information regarding the specific locations and materials that are asbestos-containing materials which may be encountered or have the potential of being encountered during the course of activities involving SEMCO Energy Build Out, 1411 3rd Street, Suite A, Port Huron, MI 48060, 1584-0003.

I expressly agree that neither I nor any of my employees, agents, subcontractors or other individuals or entity over whom I have any responsibility or control, will disturb asbestos-containing materials as listed in the Management Plan for the above-mentioned building, except as required for the completion of the Work and only by licensed abatement contractors per requirements under law.

I further understand and agree that should I, my employees, agents, subcontractors or other individuals or entities over whom I have control, encounter any material suspected of containing asbestos, said materials shall not be disturbed without first notifying the Owner and receiving approval that such material may be disturbed.

PRINT:

Company Name _____ Phone _____

Street Address _____

City / State / Zip _____

Company Officer _____ Title _____

Officer's Signature _____ Date _____

SEMCO ENERGY EOC BUILD OUT
AEW PROJECT #1584-0003

DECEMBER 6, 2024

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**SECTION 00 40 60 CONTRACTOR'S CERTIFICATION OF ASBESTOS-FREE PRODUCT
AND INSTALLATION**

It is hereby understood and agreed that no products/materials containing asbestos, including Chrysotile, Amosite, Crocidolite, Tremolite Asbestos, Anthophyllite Asbestos, Actinolite Asbestos or any combination of these materials that have been chemically treated and/or altered shall be installed or introduced into the building by the Contractor or their employees, agents, subcontractors or other individuals or entities over whom the Contractor has control. The Contractor shall be required to sign this certification statement ensuring that all products or materials installed or introduced into a building will be asbestos-free.

The Contractor shall also be required to furnish certified statements from the manufacturers of supplied materials used during construction verifying their products to be asbestos-free in accordance with the previous paragraph.

Project's Name: _____

Project's Address: _____

Project's City/State/Zip: _____

Architect's Name: _____

Project Number: _____

CONTRACTOR'S CERTIFICATION

We (I) certify and will direct that all products and materials that will be and/or have been installed or introduced into the above-named Project shall be asbestos-free (or less than one-percent (1%) asbestos by weight).

PRINT:

Company Name: _____

Phone: _____

Street Address: _____

SEMCO ENERGY EOC BUILD OUT
AEW PROJECT #1584-0003

DECEMBER 6, 2024

City / State / Zip: _____

Company Officer: _____

Title: _____

Officer's Signature: _____

Date: _____

NON-COLLUSION AFFIDAVIT

County)
) SS:

_____ being first duly sworn, deposes
and says that he is the

(Individual, Partner, Corporate Officer)

making the foregoing proposals or bids; that such bids are genuine and not collusive or sham; such bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any bidder or person, to put in sham a bid, or that such other person shall refrain from bidding and has not in any manner, directly with any person, to fix the bid price of afferent or any other bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the Joint Purchasers or any person or persons proposal are true; and further, that such bidder has not, directly or indirectly submitted this bid, or the contents thereof, or divulged information or data relative thereto any association or to any member or to any member or agent thereof.

Sworn to and subscribed before me this _____ day of _____, 20_____.

Notary Public

My commission expires on _____

BIDDER: THIS AFFIDAVIT MUST BE COMPLETED, SIGNED, NOTARIZED AND INCLUDED IN YOUR BID SUBMISSION.

SECTION 00 41 00 – PROPOSAL FORM/ALL TRADES

Name of Contractor

Address, City, Zip

Phone #/Fax #

Email Address

PROJECT

SEMCO Energy Build Out
1411 3rd Street, Suite A
Port Huron, Michigan 48060

OWNER

SEMCO Energy Gas Company
1411 3rd Street, Suite A
Port Huron, Michigan 48060

ARCHITECT

ANDERSON ECKSTEIN & WESTRICK
51301 SCHOENHERR ROAD
SHELBY TOWNSHIP, MICHIGAN 48315

BASE PROPOSAL

Pursuant to and in compliance with the Invitation to Bid and the Instructions to Bidders, and having carefully examined the Bidding Documents with the Owner to complete the work in accordance with the said Bidding Documents (include an Owner directed contingency of \$60,000.00 in the base bid) for the sum of:

(Sum to be written out)

\$ _____

BREAKDOWN OF BASE PROPOSAL (Submit at time of submission of proposal):

GENERAL CONDITIONS, OVERHEAD & PROFIT	(\$_____)	DOLLARS
DEMOLITION	(\$_____)	DOLLARS
ARCHITECTURAL (INCLUDING STRUCTURAL)	(\$_____)	DOLLARS
MECHANICAL HVAC	(\$_____)	DOLLARS
ELECTRICAL	(\$_____)	DOLLARS
PLUMBING	(\$_____)	DOLLARS
OWNER DIRECTED CONTINGENCY	(\$ <u>60,000</u>)	DOLLARS
TOTAL LUMP SUM BASE PROPOSAL BID	(\$_____)	DOLLARS

TIME OF COMPLETION

The undersigned agrees to complete the work covered by this proposal within ___ calendar days which includes Saturdays, Sundays, and Holidays to run consecutively after date of notice to proceed with work.

VOLUNTARY ALTERNATES

The following voluntary alternates are offered by the bidder. The undersigned agrees the amounts indicated below shall be added to or deducted from the Base Bid, as the case may be, for each alternate which is accepted.

<u>Description of Voluntary Alternates</u>	<u>Add</u>	<u>Deduct</u>
1. _____	_____	_____

- 2. _____
- 3. _____
- 4. _____

PRICE GUARANTEE

The undersigned proposes that the price stated in this Proposal is guaranteed for sixty (60) consecutive days from bid date.

TAXES

The undersigned acknowledges that the price stated above includes all taxes of whatever character or description.

SUPPLEMENTAL FEES

For additional work performed upon instruction of the Owner by subcontractors of the undersigned, add to the subcontractor's prices for such additional work a fee of _____% which includes all the charges of the undersigned for overhead and profit.

Any additional work performed upon instructions of the Owner by persons other than the subcontractors of the undersigned, the charges will be actual cost of all labor and materials (less all discounts) plus the fee of _____% which includes all the charges of the undersigned for overhead and profit and to which shall be added the actual cost of insurance and taxes.

Each proposal covering extra work shall be accompanied with complete itemized materials and labor break downs.

For all revisions involving the deletion of contract work, it is agreed that full credit shall be given the Owner for such work deleted, including overhead and profit as quoted hereinbefore.

ADDENDA

If any addenda or bulletins covering changes to the Bidding Documents have been received during the bidding period, the bidder shall fill in their numbers and dates which acknowledges having received same, and having included in this Proposal the work involved:

_____	Dated	_____
_____	Dated	_____
_____	Dated	_____

BID SECURITY

A bid bond executed by a U.S. Treasury Listed Surety Company acceptable to SEMCO Energy Gas Company or a cashier's check in the amount of 5% of the sum of the proposal payable to SEMCO Energy Gas Company shall be submitted with each proposal. All proposals shall be firm for a period of sixty (60) days.

PERFORMANCE, LABOR, AND MAINTENANCE AND GUARANTEE BOND

Successful bidders will be required to furnish a U.S. Treasury Listed Company Performance, Payment, and 2 year Maintenance and Guarantee Bond in the amount of 100% of their bid. The cost of the Bond shall be included in each proposal.

SEMCO Energy Gas Company reserves the right to reject any and/or all bids in whole or in part and to waive any informality therein. SEMCO Energy Gas Company reserves the right to accept the bid which in its opinion, is in the best interest of the Owner.

FAMILIAL DISCLOSURE

Bidder has included Section 00401 Familial Disclosure Form (bid will not be read without this form)

NEGOTIATION

The undersigned agrees that, should the overall cost exceed the funds available,

he will be willing to negotiate with the Owner and Architect for the purpose of making further reductions in the Contract work, and shall agree to give full credit for all such reductions in the work requested by the Owner, including full value of labor, materials, and subcontract work and reasonable proportionate reductions in overhead and profit, thereby arriving at an agreed upon Contract price.

CONTRACT EXECUTION

The undersigned agrees to execute a Contract for work covered by this Proposal, provided that he be notified of its acceptance within sixty (60) days after the opening of bids.

The undersigned hereby declares that he has the legal status checked below

- () Individual
- () Partnership having the following partners:

- () Corporation incorporated under the State laws of:

This proposal is submitted in the name of, and notice of acceptance should be mailed, faxed, or delivered to:

SEMCO ENERGY EOC BUILD OUT
AEW PROJECT #1584-0003

DECEMBER 6, 2024

Date:

Firm's Name:

Phone No. ()

By:

(Signature)

In the presence of :

Title:

END OF SECTION 00 41 00

SECTION 00 72 00 – GENERAL CONDITIONS

DOCUMENTS:

“The General Conditions of the Contract for the Construction”
A.I.A Documents A-201, 2017 Edition, Forms a part of these Specifications and shall
have the same effect as if bound herein.

This Document is modified as described in Modification of the General Conditions.

Contractors shall be held responsible for having familiarized themselves with this
Document and all other documents affecting their contracts in this Specification.

END OF SECTION 00 72 00

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SECTION 00 81 10 MODIFICATIONS OF THE GENERAL CONDITIONS

Where any Article of the American Institute of Architects General Conditions, (AIA Document A201- 2017 Edition) is supplemented by the following provisions of such Article shall remain in effect and all supplementary provisions shall be considered as added thereto. Where any such article is modified, superseded or deleted herein, provisions of such articles not so specifically modified, superseded or deleted shall remain in effect.

Article 1 - General Provisions

1.1.1 The Contract Documents. Modification: first sentence: "The Contract Documents consist of the entire Bidding Documents package and the Agreement...."

Deletion: last sentence.

Addition: new text as follows (sub-subparagraph to 1.1.1):

1.1.1.1 As used in the Contract Documents, the following terms are defined as indicated below:

OWNER - as defined in Advertisement or Invitation to Bid.

ARCHITECT/ENGINEER - the firm of Anderson, Eckstein and Westrick, Inc.

CONTRACTOR - the person or entity so named in the Agreement who shall be known as the "prime contractor" in addition to references in Article 3.

SUPPLIER - such person or entity that supplies materials or the work to the Contractor or to a subcontractor but performs no work at the site.

N.I.C. - not in contract, work not included in this Contract.

OCCURRENCE: is defined as follows for purposes of insurance. An event which occurs during the policy period, or a continuous or repeated exposure to condition(s) which result, during the policy period, in bodily injury, sickness, or disease, or injury to, or destruction of property, of one or more persons or organizations, including the loss of use thereof, resulting from a common cause, or from exposure to substantially the same general condition existing at, or emanating from each location shall be deemed to result from one occurrence.

Addition: new text as follows (sub-subparagraph to 1.1.3):

- 1.1.3.1 The Contractor is responsible for coordinating and allocating the work of all trades on the project at the time of bidding as well as during the Construction in regards to the providing of labor and materials, and performance of all cutting, coring, patching and repair work necessary to complete the project as required by the various trades including the proper allocation of work to the proper trade as claimed by the trade unions having jurisdiction over such work. Whether the Contractor's own forces perform such work or he allocates it to various subcontractors or trades, the contractor is responsible for such work and the complete project.
- 1.1.3.2 The Contractor shall interface all Contract work with no duplication of cost incurred due to the allocation of same work to more than one trade, and with no omissions of costs of any work due to such work not being properly assigned or allocated to a specific subcontractor, trade or the Contractor.

Addition: new text as follows:

- 1.2.4 The Drawings show the general arrangement, design and extent of the Work and are partially diagrammatic. The Drawings shall not be scaled for rough-in measurements, nor serve as Shop Drawings.
- 1.2.5 RELATION OF SPECIFICATIONS AND DRAWINGS:
- .1 To be equal authority and priority. Should they disagree in themselves, or with each other, bids shall be based on the most expensive combination of quality and quantity of work indicated. The appropriate Work, in the event of the above mentioned disagreements, shall be determined by the Architect.
 - .2 Figures take precedence over scale measurements.
 - .3 Large scale details take precedence over smaller scale details.
 - .4 Architectural Drawings take precedence in regard to dimensions, when in conflict with Mechanical and Structural Drawings, except for the size of the structural members.
 - .5 Specifically titled drawings and sections of the specifications take precedence over indication of the item in a collateral way.
 - .6 Existing conditions take precedence over Drawings and Specifications for dimensions.
 - .7 When multiple requirements are given for any item, all requirements shall be met.

- 1.2.6 CODE, LAWS, ORDINANCES, RULES, and REGULATIONS: Requirements of public authorities apply as minimum requirements only. They do not supersede more stringent requirements given elsewhere in the Contract Documents. If changes must be made to the Contract because of public authorities, appropriate adjustments will be made in the Contract Sum.
- 1.2.7 ENUMERATION OF ITEMS: Lists of "Work Included", "Scope" or "Description of Work" are not intended to enumerate each and every item of work or appurtenance required, and must be used in conjunction with other portions of the Contract Documents.
- 1.2.8 SPECIFIED MATERIALS, PRODUCTS, BRANDS, and AND PROCESSES: When multiple requirements are given for an item complies with all.
- 1.2.9 REFERENCE NOTES: Terms such as "as shown", "as indicated", "as noted" mean there are additional requirements given elsewhere in the Contract Documents. Comply with all requirements.
- 1.2.10 ABBREVIATIONS AND NAMES: Acronyms or abbreviations as referenced in contract documents and listed on the General Abbreviations and Symbols Sheet G-1 are defined to mean the associated names. Acronyms or abbreviations are subject to change, and believed to be, but not assured to be, accurate and up-to-date as of date of contract documents.
- 1.2.11 DRAWING SYMBOLS AND STANDARDS: Except as otherwise indicated, graphic symbols and standards used on drawings are those symbols recognized in the construction industry for purposes indicated.
- 1.2.12 M/E DRAWINGS: Graphic symbols used on Mechanical/ Electrical drawings are generally aligned with symbols recommended by ASHRAE, supplemented by more specific symbols where appropriate as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to Architect for clarification before proceeding.
- 1.2.13 STANDARD REFERENCES: Any materials, equipment or workmanship specified by references to number, symbol, or title of any specific Federal, ASTM, Industry, Association or Government Agency Standard Specifications shall comply with all applicable provisions of such standard specifications, except as limited to type, class or grade, or modified in contract documents. Reference to "Standards" referred to in the contract documents, except as modified, shall have full force and effect as though printed in detail in specifications.

1.2.14 PUBLICATION DATES, except as otherwise indicated, where compliance with an industry standard, ASTM, association standard, or Federal Standard, shall meet the standard in effect as of date of Contract Documents.

1.2.15 ACCEPTABLE MANUFACTURERS where used in the Project Manual shall mean that the listed products and manufacturers shall meet specified and indicated requirements.

Article 2 - Owner

Addition: new text as follows (sub-subparagraph to 2.2.1):

2.2.1.1 "The Owner shall establish site property lines by staking or other means, shall establish a permanent bench mark, and provide copies of soil boring logs and soil report, if any, for the Contractor's convenience and information. None of the data therein relating to sub-surface soil and water conditions; size, elevation and location of existing underground services; existing underground obstructions or structures; etc., are guaranteed as being accurate or uniformly representative of actual conditions. The Owner assumes no responsibility for deductions, interpretations or conclusions drawn there from by the Contractor."

Article 3 - Contractor

Addition: new text as follows:

3.4.4 Materials supplied shall conform to industry and manufacturer's standards specified, in effect on the date of issuance of the specifications. Materials shall generally be shipped, received, stored, installed and protected in accordance with printed manufacturer's instructions as modified by the detailed provisions of the specifications. Copies of the printed manufacturer's or industry standards shall be maintained on file by the Contractor at his field office.

3.4.5 Not later than 72 hours from the Contract Date or letter of intent to award contract, the Contractor shall provide a list showing the name of the manufacturer proposed to be used for each of the products identified in the General Requirements of the Specifications (Division 1) and, where applicable, the name of the installing Subcontractor.

3.4.6 The Architect will promptly reply in writing to the Contractor stating whether the Owner or the Architect, after due investigation, has reasonable objection to any such proposal. If adequate data on any proposed manufacturer or installer is not available, the Architect may state that action will be deferred

until the Contractor provides further data. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection. Failure to object to a manufacturer shall not constitute a waiver of any of the requirements of the Contract Documents, and all products furnished by the listed manufacturer must conform to such requirements.

- 3.4.6.1 Should the Contractor desire after the Contract Award, to substitute for the benefit of the Owner another article, material or item of equipment for one or more specified by name, he shall make a request for such substitution in writing, to the Architect stating the benefit to the Owner and the credit or extra involved and he shall provide all required supporting data and samples. If such request is rejected, the Contractor shall perform the work in accordance with the Contract Documents. Such requests shall be submitted so as to allow a reasonable time for their consideration and shall not be justification for delay of the work.
- 3.4.6.2 If a substitution requires changes in the work or other trades or Contractors, or redesign or other substantial changes in the Contract Documents, the Contractor proposing the substitution shall pay any additional costs thereby incurred.
- 3.4.6.3 After Contract Award, no substitution of any material listed in the Contract Documents or Proposal will be permitted if the request is based on delivery dates, test requirements, or other causes, unless the Bidder proves that the original material was ordered or scheduled for tests within 30 days after the contract was let and due to unforeseen circumstances cannot be delivered at the promised time or tested in accordance with the specifications without materially delaying work.
- 3.4.6.4 by making requests for substitutions based on Clause 3.4.5.1 above, the Contractor:
- (a) Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
 - (b) Represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
 - (c) certifies that the cost data presented is complete and includes all related costs under this Contract but excludes costs under separate contracts, and excludes the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently became apparent; and
 - (d) will coordinate the installation of the accepted substitute, making such

changes as may be required for the Work to be complete in all respects.

3.5 Deletion: last sentence

Addition: new text as follows:

3.5.1 Proofs of conformance, as hereinafter defined, will constitute satisfactory evidence as to the kind, quality and performance values of the respective products for which such proofs are required by the Specifications. Neither delivery nor installation of the respective products shall be made until written acceptance by the Architect of the submitted proof of conformance is received by the Contractor, unless Architect gives written instruction to the contrary.

3.5.1.1 Affidavit - An affidavit is a notarized statement on the letterhead of the manufacturer and signed by a responsible agent of the manufacturer, certifying that the product is in conformance with the requirements of the specified regulatory agency or reference standard or performance values, as applicable; in the case of the latter, the performance values shall be listed. Each Affidavit shall be identified by name of Project, Architect's Project number, name of product, and Specification section, page and paragraphs for which the product is proposed.

3.5.1.2 Testing Laboratory Certificate - A Testing Laboratory Certificate is a notarized test report from a laboratory, bureau or agency acceptable to the Architect, signed by a responsible agency of that facility, certifying that the designated product has been tested within one year of the date of submittal, unless otherwise specified, and is in conformance with the reference standard of performance requirements specified, and listing the results of all tests required. The testing laboratory certificate shall accompany an Affidavit as defined in clause 3.5.2.1.

Addition: new text as follows:

3.9.2 The Contractors superintendent or his authorized representative shall remain in attendance at the project site and shall be present at all times when work of any kind is in progress, including overtime work.

3.13.1 Modification: Insert "the directions of the owner" into the paragraph to read in part as follows: "The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, the directions of the owner and the contract documents..."

Addition: new text as follows:

- 3.14.1.1 Unless specified otherwise, Work specified in each section of the specifications includes cutting, fitting, and patching for that trade section, including that required to accommodate the work of other trades.

Addition: new text as follows (paragraph to 3.15.1):

- 3.15.1.1 "The Contractor, each Subcontractor and all separate Contractors shall at all times keep the project free from their surplus and waste materials, and bulk rubbish and debris; combustible materials shall be removed daily or more often as may be required, non-combustible materials at least once a week. Such materials shall not be allowed to accumulate or disperse around the neighborhood. Further the Contractor is responsible for:
1. Positive implementation of the "General Safety Rules and Regulations for the Construction Industry", "State Construction Safety Commission, and appropriate City Ordinances as regards the scope of this paragraph.
 2. Maintenance of the site and premises in an orderly and clean condition at all times.
 3. Keeping all sidewalks, pavements, parking areas, floors and roofs free from any accumulations of snow, ice, dirt, rubbish and general refuse prior to "closing-in" of the building.
 4. Broom clean (exclusive of removal of bulk debris described above) floors in all interior spaces where work is in progress after the project has been "closed-in", with the participation and cooperation of all Subcontractors and separate Contractors employed on the work.
 5. Final cleaning of the entire building, including all interior finish materials, as specified in detail under Section 01700, Contract Closeout.

Addition: new text as follows (sub-subparagraph to 4.2.3):

- 4.2.3.1 The Architects presence does not imply concurrence or approval of the work. The Contractor shall call specific things to the Architect's attention if he wishes to know the Architects opinion.

Addition: new text as follows (sub-paragraph to 5.2.1):

- 5.2.1.1 The Contractor shall have primary responsibility for obtaining bids and preparing and awarding Subcontracts for all portions of the Work (except General Condition Items).

5.4.1 Deletion: sub-paragraph & sub-subparagraphs in its entirety

Addition: new text as follows:

5.4.1 Unless the Owner elects otherwise, all Subcontracts shall be between the Contractor and the appropriate Subcontractor, and shall provide that the Subcontractor consents to the assignment of the Subcontract to the Owner pursuant to Section 5.3 hereof, and agrees in the event such assignment becomes effective, to recognize the Owner as successor to the Contractor and to complete the Work under the Subcontract.

5.4.2 The Contractor shall cause all Subcontractors, laborers and vendors to agree to indemnify the Owner and hold it harmless from all claims for property damage and bodily injury that may arise from such Subcontractor's operations. Such provisions shall be in a form reasonably satisfactory to Owner.

5.4.3 The agreement between Contractor and the Subcontractors (and, where appropriate, between Subcontractors and Sub-Subcontractors) shall contain provisions that:

5.4.3.1 Preserve and protect the right of the owner and the Architect under this Agreement with respect to the Work to be performed under the Subcontract so that the subcontracting thereof will not prejudice such rights;

5.4.3.2 Require that such Work be performed in accordance with the requirements of these Contract Documents;

5.4.3.3 Require submission to Contractor of applications for payment under each Subcontract and Sub-Subcontract, in reasonable time to enable Contractor to apply for payment in accordance with General Conditions of the Construction Contract, all such applications to be in a form that fully complies with all requirements of the Michigan Construction Lien Act, the Michigan Builder's Trust Fund Act, any other requirements of law, the requirements of any financing agency and any requirements of Owner and Owner's title insurer to demonstrate the foregoing;

5.4.3.4 Require that all claims for additional costs or extension of time with respect to subcontracted portions of the Work shall be submitted to Contractor (via any Subcontractor or Sub-Subcontractor where appropriate) in sufficient time so that Contractor may comply in the manner provided, if any, in this Agreement for a like claim by Contractor upon the Owner;

5.4.3.5 Waive all rights the contracting parties may have against one another for damages

caused by fire or other perils covered by the property insurance described in General Conditions hereof;

5.4.4 Contractor hereby assigns to Owner, as security for Contractor's performance hereunder, all Subcontracts and all other contracts and agreements entered into in connection with the Project, and appoints Owner is attorney to enforce said contracts according to their terms. Such assignment shall be operative only in the event of default by, or termination of, Contractor under this Agreement.

5.4.2 Modification: change paragraph number to 5.4.5.

7.3.3 Addition: insert new item after 7.3.3.4 as follows: ".5 cost to be determined based on estimated cost of materials, equipment and labor for the work, plus the percentage thereof stated in the Contract Documents for supervision, overhead and profit."

Addition: new text as follows:

8.3.4 Should the progress of the Work or of the Project be delayed by any fault or neglect or act or failure to act of the Contractor or any of Contractor's agents, employees, or anyone for whose acts any of them may be liable, so as to cause additional cost, expense, liability or damage to the Owner or damages or additional costs or expenses for which the Owner may or shall become liable, the Contractor shall and does hereby agree to compensate the Owner for and indemnify him against such costs, expenses, damages and liability.

Addition: new paragraph as follows:

8.4 Liquidated Damages

8.4.1 If the Contractor fails to complete the work by the completion date agreed upon by the parties or by an authorized extension thereof, the Contractor will be charged damages due the Owner from the Contractor for its failure to complete the project within the specified time at the scheduled charges as specified per calendar day. Sums assessed as liquidated damages shall not be considered penalties but shall reflect the costs to the Owner for continuing supervision and administration of the project and other directly attributable costs.

SCHEDULE OF LIQUIDATED DAMAGES

<u>Original Contract Amount</u>	<u>Charges Per Calendar Day</u>
\$0-\$50,000	\$ 50.00
\$50,000-\$100,000	\$100.00
\$100,000-\$500,000	\$175.00
\$500,000-\$1,000,000	\$225.00
\$1,000,000-\$2,000,000	\$300.00
over-\$2,000,000	\$500.00

9.3.1 Modification: change existing text to read as follows: "At least 20 days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. The Contractor shall be responsible to ensure that Application for Payment is complete, including notarized signature. A Sworn Statement from Contractor and partial waivers of lien from Subcontractors and major materials Suppliers shall also accompany each payment request, to confirm and acknowledge disbursement of the preceding payment. The Sworn Statement shall be a record attesting to the fact that sub-constructors suppliers, materials, etc. have been paid or paid for, when considering materials, from the time of the last application for payment by the Contractor. Partial waivers of lien shall be properly completed and shall list the cumulative amounts of payments received by the date of the waiver. This requirement shall not be waived unless agreed upon in writing by both the Surety and Owner."

Addition: new text as follows (sub-subparagraph to 11.1.2)

11.1.2.1 The insurance required by sub-paragraph 11.1.1 shall be written and maintained without interruption from date of commencement of the work until date of final payment and termination of any coverage required to be maintained after final payment for not less than the following (or greater if required by law):

1. Workers' Compensation
 - (a) State: Michigan Statutory

- (b) Applicable Federal (e.g., Longshoremen, harbor work, Work at or outside U.S. Boundaries): Statutory
 - (c) Employer's Liability:
 - \$100,000 Each Accident
 - \$500,000 Policy Limit
 - \$100,000 Each Employee
 - (d) Benefits Required by Union labor Contracts: As applicable
2. Comprehensive General Liability (Including Premises-Operations; Independent Contractors' Protective; Products and Completed Operations; Broad Form Property Damage):
- (a) Bodily Injury:
 - \$1,000,000 Each Occurrence
 - \$2,000,000 Aggregate, Products & Completed Operations
 - (b) Property Damage:
 - \$1,000,000 Each Occurrence
 - \$2,000,000 Aggregate
 - (c) Products and Completed Operations Insurance shall be maintained for a minimum period of 1 year after final payment and Contractor shall continue to provide evidence of such coverage to Owner on an annual basis during the aforementioned period.
 - (d) Property Damage Liability Insurance shall include coverage for the following hazards:
 - X (Explosion)
 - C (Collapse)
 - U (Underground)
 - (e) Contractual Liability (Hold Harmless Coverage):
 - (1) Bodily Injury:
 - \$1,000,000 Each Occurrence
 - (2) Property Damage:
 - \$1,000,000 Each Occurrence
 - \$2,000,000 Aggregate

- (f) Personal Injury, with Employment Exclusion deleted:
\$1,000,000 Aggregate
 - (g) Fire Damage \$50,000
 - (h) Medical Payments \$5,000
3. Comprehensive Automobile Liability (owned, non-owned, and hired):
- (a) Bodily Injury:
\$1,000,000 Each Person
\$1,000,000 Each Accident
 - (b) Property Damage:
\$1,000,000 Each Occurrence
 - (c) Combined Single:
\$1,000,000 Limit

NOTE: The State of Michigan has a no-fault insurance requirement. The Contractor shall be certain coverage is provided which conforms to any specific stipulation in the law.

4. ADD Item 4. Additional Insured: Commercial General Liability and Motor Vehicle Liability Insurance, as described above, shall include an endorsement stating that the following shall be Additional Insured:
- a. SEMCO Energy
Anderson, Eckstein and Westrick, Inc.
5. ADD Item 5. Additional Insured: The contractor shall cause the commercial liability coverage required by the Contract Documents to include an endorsement stating that the following shall be Additional Insured:
- a. SEMCO Energy
Anderson, Eckstein and Westrick, Inc.
6. ADD Item 6. Owners and Contractors protective liability.
- (a) General Aggregate: \$2,000,000
 - (b) Each Occurrence: \$1,000,000
 - (c) Combined Single Limit: \$1,000,000
7. ADD Item 7. The Owners and Contractors Protective Liability Insurance Policy shall include as Additional Insured all persons listed as follows:
- a. SEMCO Energy
 - b. Anderson, Eckstein and Westrick, Inc.

- 11.1.2.2 Contractor shall procure and maintain builders risk insurance (Fire and Extended Coverage) on 100% completed value basis including the value of all materials furnished by parties other than the Contractors for installation in the project to cover all project structures and materials, supplies, equipment and fixtures including the installation cost thereof which are owned by the insured or for which the insured is legally liable. This policy is to have a zero (0) deductible for any and all claims made.

This policy will cover the property of insured a) while in transit at the risk of the insured, b) while on the construction site or awaiting installation, c) during construction installation or testing. This policy shall insure against all risk of direct physical damage or loss to the property insured hereunder and shall specially cover loss due to fire, wind, flood, collapse, extended coverage, vandalism and malicious mischief.

The Owner and Architect/Engineer and their consultants for this project shall be named on the policy as being also insured.

- 11.1.2.3 Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance:

(a) The Contractor shall either:

- (1) Require each of his subcontractors to procure and to maintain during the life of his subcontract, Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified for the Contractor herein, or
- (2) Insure the activities of his subcontractors in his policy as specified herein.

Umbrella Excess Liability:

- (a) Umbrella Excess Liability must be supplied in an amount not less than \$2,000,000 and be made to cover at least all risks described in the Comprehensive General Liability and Comprehensive Motor Vehicle Liability policies.

- 11.2.1 Modification: change the text to read as follows: "The Contractor shall obtain, maintain in force, and pay all cost incurred for, public liability insurance to protect the Owner & Architect/Engineer and their consultants for this project from claims

which may arise from operations under the Contract. This policy is to have a zero (0) deductible for any and all claims made and name Owner and Architect/Engineer and their consultants as insured parties hereunder. Certificates of this insurance must be filed with the Owner and the Architect/Engineer prior to commencing works and remains in force for the full duration of the project.

- 11.3.1 Modification: delete phrase "Unless otherwise provided, the Owner..." in the first sentence and substitute, "The Contractor..."
- 11.3.1 Modification: change text of last part of first sentence after the phrase, "...at the site on a replacement cost basis..." to following test, "...with a zero deductible for any and all claims made."
- 11.3.1 Modification: change text of last sentence to read as follows: "This insurance shall name, in addition to the contractor, subcontractors and sub-subcontractors, the Owner and Architect/Engineer and there consultants is insured parties hereunder."
- 11.3.1 Addition: After last sentence insert the following: "The form of policy for this coverage shall be Completed Value. If the Owner is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable costs properly attributable thereto."
- 11.3.1.2 Deletion: omit entire sub-subparagraph.
- 11.3.1.3 Deletion: omit entire sub-subparagraph.
- 11.3.3 Addition: to end of last sentence insert the following: "...unless through gross negligence of contractor."
- 11.3.4 Deletion: omit entire sub-subparagraph.
- 11.3.6 Modification: change the text to read as follows: "Before an exposure to loss may occur, the Contractor shall file with the Owner two certified copies of the policy or policies providing this Property Insurance coverage, each containing those endorsements specifically related to the Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least 30 days prior written prior written notice has been given to the Contractor."
- 11.3.7 Modification: at end of first sentence, substitute "Contractor" for "Owner."
- 11.3.8 Modification: at first reference to "Owner" in the first sentence, the word "this should be substituted for "Owner's."

11.3.8 Modification: in first sentence, substitute "Contractor" for "Owner" as fiduciary.

11.3.9 Modification: throughout text of subparagraph, substitute "Contractor" for "Owner" each time the latter appears.

11.3.10 Modification: throughout text of subparagraph, substitute "Contractor" for "Owner" each time the latter word appears.

11.4.1 Modification: change the text to read as follows: "The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising hereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to 100% of the total contract sum."

Addition: new text as follows (sub-subparagraph to 11.4.1):

11.4.1.1 The Contractor shall deliver the required bonds to the Owner not later than three days following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

Addition: new text as follows (sub-subparagraph to 11.4.1):

11.4.1.2 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

12.2.1 Modification: in the first line, after the words "shall correct it promptly", insert the words: "...commencing corrective action within seven days..."

12.2.2 Addition: insert new text before first sentence: The Contractor, as a condition precedent to final payment, shall execute a guarantee in writing, warranting all products provided by him or for which he may be required to accept responsibility in accordance with the terms of the Contract Documents, to be and to remain without defect and in accordance with the Contract Documents.

Addition: new text as follows (sub-subparagraph to 12.2.2):

12.2.2.1 Where special guarantee is specified, the Contractor, as a condition precedent to final payment, shall submit to the Architect the guarantee in triplicate on 8-1/2-inch by 11-inch paper in the following form:

A.E.W. Project Number

Contractor's Job Number

Date

Guaranteed Work

Specification Section Number Reference

Specification Page and Paragraphs Describing Guarantee

Length of Guarantee (Years)

Contractor

Subcontractor

The Undersigned herewith warrant that the Work to which this guarantee applies has been executed in conformance with the requirements of the Contract Documents, and guarantee the Work to perform as specified without failure for the stated period of time after Substantial Completion or as otherwise agreed to by the Owner.

This guarantee does not apply to failure or to failure to perform due to abuse or neglect by the Owner, or his successor in interest, or damage by vandalism.
SUBCONTRACTOR -

Signed _____

Title _____

Notary _____

Date _____

CONTRACTOR -

Signed _____

Title _____

Notary _____

Date _____

- 12.2.2.2 Responsibility for the securing, verifying, recording, transmitting to the Architect, and all other actions, regarding the specified special guarantees rests with the Contractor. The Architect will not accept transmittals of guarantees from parties other than the Contractor.

Addition: new text as follow (sub-subparagraph to 12.2.3):

- 12.2.3.1 Limits of non-conforming Work: When any such Work is found, the entire area of work involved shall be corrected unless the Contractor can completely define the limits. Additional testing, sampling, or inspecting needed to define non-conforming work shall be at the contractor's expense. He shall employ the Owner's independent testing laboratory, or a mutually satisfactory independent testing laboratory, if such services are required. All corrected work shall be re-tested at the Contractor's expense.

Addition: new text as follows: (sub-subparagraph to 12.2.4):

- 12.2.4.1 Restriction of Supplier's Identification: In areas generally accessible to the public. Omit all supplier's name plates and identification symbols from visible products.

- 14.2.1 Addition: new text as follows, sub-subparagraph after last item listed: ".5 should cause or give cause for legal proceeding seeking to have himself adjudged a bankrupt, or should the Contractor become insolvent, or if the contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors."

Addition: new article as follows:

Article 16

Equal Opportunity

- 16.1 The Contractor shall maintain policies of employment as follows:
- 16.1.1 The Contractor and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin or age. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, national origin or age. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other

forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

- 16.1.2 The Contractor and all Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf; state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national origin or age.

Addition: new article as follows:

Article 17

Special Conditions

17.1 Michigan Construction Lien Statute

- 17.1.1 Contractor must record the notice of commencement, on behalf of the Owner, with the Register of Deeds and shall post the notice in a conspicuous place on the site.

Addition: new article as follows:

Article 18

Abbreviations

18.1 Abbreviations

- 18.1.1 When the following abbreviations and symbols are used in the Contract Documents, or Subcontract documents, they shall have the meaning shown. Many of the abbreviations used throughout the Subcontract documents refer to associations, institutes, societies and other public bodies who publish standards which are readily available to the public. Whenever the initials representing such a body are shown, followed by a number or a combination of numbers and letters, they refer to a particular standard to which the Subcontractor shall conform. The number or combination of numerals and letters, following the abbreviation designates the standard. In all such cases, the Subcontractor shall conform to the edition or issue of the standard which is current at the Subcontract date, as revised or amended to the Subcontract date.

18.1.2 Abbreviations and Meanings for Organizations.

AIA	American Institute of Architects
AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
ASA	American Standard Association
ASH & AE	American Society of Heating & Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	American Woodwork Institute
AWSC	American Welding Society Code
CSI	Construction Specification Institute
FS	Federal Specifications
NAFM	National Association of Fan Manufacturers
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
UL	Underwriters Laboratories
USDC	U.S. Department of Commerce

18.1.3 Abbreviations and Meanings for Construction Terms.

Ad	access door	oc	on center
B	bottom layer reinf.	Od	outside diameter
	concrete	part	partition
brg	bearing	pol	polished
brkt	bracket		
cl	centerline	po	polyethylene
ci	cast iron	pl	plate
cc	center to center	psi	pounds per sq. in.
conc	concrete	psf	pounds per sq. foot
cont	continuous	rec	recessed
csk	countersunk	reinf	reinforced
crs	courses	rh	right hand
dh	double hung	rhr	right hand reverse
div	division	rm	room
dpc	dampproof course	rs	roof sump

SEMCO ENERGY EOC BUILD OUT
 AEW PROJECT #1584-0003

December 6, 2024

dwg	drawing	rwc	rain water conductor
ef	exhaust fan	rwl	rain water leader
elev	elevation	s.f.	square foot
ewc	electric water cooler	ss	stainless steel
exist	existing	std	standard
fin	finished, finishing	t&f	tongue and groove
ftg	footing	terr	terrazzo
fd	floor drain	typ	typical
flr/fl	floor	u/s	underside
ga	gauge	ul	upper layer reinf. concrete
Gi	galvanized iron		
gs	galvanized sheet	vct	vinyl composition tile
gsg	galvanized sheet gauge		
hor	horizontal	vb	vapor barrier
ins	inches	vert	vertical
id	inside diameter	wc	water closet
ksf	kips per square foot	wt	weight
lav	lavatory	wd	wood
lh	left hand		
lhr	left hand reverse	E-W	East to West in reinf. concrete
lpc	laminated plastic covering	N-S	North to South in reinf. concrete
mk	master keyed		
max	maximum	O/	diameter
met	metal	'	foot, feet
min	minimum		
mfgr	manufacturer	"	inch, inches
ms	manufacturers standard	#	pounds (behind numerals)
mo	masonry opening		
nrc	noise reduction coefficient		

END OF SECTION

SECTION 00851 - INDEX OF DRAWINGS

TITLE SHEET

The following drawings, dated December 6, 2024, are issued for SEMCO Energy Gas Company, SEMCO Energy Build Out, Port Huron, Michigan. Architect's Project Number 1584-0003

TITLE SHEET

<u>SHEET NO.</u>	<u>TITLE</u>
	COVER SHEET
A011	GENERAL PROJECT INFORMATION
A021	ADA
AD101	FIRST FLOOR DEMOLITION PLAN
A101	FLOOR PLAN
A111	REFLECTED CEILING PLAN
A301	BUILDING SECTIONS
A401	ENLARGED PLANS
A411	INTERIOR ELEVATIONS
A412	INTERIOR ELEVATIONS
A511	SECTION DETAILS
A601	DOOR SCHEDULE & DETAILS
A611	FLOOR FINISH PLAN & DETAILS
M011	MECHANICAL SPECIFICATIONS
MD101	HVAC DEMOLITION PLAN
MD102	HYDRONIC PIPING DEMOLITION PLAN
M101	HVAC PLAN
M102	HYDRONIC PIPING PLAN
P100	UNDERGROUND PLUMBING PLAN
P101	PLUMBING PLAN
P102	GAS LINE FLOOR PLAN
E100	ELECTRICAL GENERAL INFORMATION
ED101	FIRST FLOOR ELECTRICAL DEMOLITION PLAN
E101	FIRST FLOOR POWER PLAN
E102	FIRST FLOOR LIGHTING PLAN
E103	ELECTRICAL SITE PLAN
E200	ELECTRICAL DETAILS
E300	ONE-LINE DIAGRAM
E301	PANEL SCHEDULE

SEMCO ENERGY BUILD OUT
AEW PROJECT #1584-0003

DECEMBER 6, 2024

END OF SECTION 00851

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Contract description.
2. Work by Owner or other Work at the Site.
3. Owner-furnished products.
4. Contractor's use of Site and premises.
5. Work sequence.
6. Owner occupancy.
7. Permits.
8. Specification conventions.

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes is as identified in the bidding documents.
- B. Perform Work of Contract under fixed cost Contract with Owner according to Conditions of Contract.

1.3 WORK BY OWNER OR OTHERS

- A. Owner will award contracts, if required, for installation of security system and cameras, audio/visual and other low voltage system under a separate contract, unless called out in the Contract Document.
- B. If Owner-awarded contracts interfere with each other due to work being performed at the same time or at the same Site, Owner will determine the sequence of work under all contracts according to "Work Sequence" and "Contractor's Use of Site" Articles in this Section.
- C. Coordinate Work with utilities of Owner and public or private agencies.
- D. Work under this Contract includes:
 1. Work as indicated in the Contract Documents.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Limit use of Site and premises to allow:
 - 1. Owner occupancy.
 - 2. Work by Others.
 - 3. Use of Site and premises by the public.
- B. Construction Operations: Limited to areas indicated on Drawings.
 - 1. Noisy and Disruptive Operations (such as Use of Jack Hammers and Other Noisy Equipment): Coordinate and schedule such operations with Owner to minimize disruptions.
- C. Utility Outages and Shutdown:
 - 1. Coordinate and schedule electrical and other utility outages with Owner.
- D. Construction Plan: Before start of construction, post electronic file to Project website of construction plan regarding access to Work, use of Site, and utility outages for acceptance by Owner. After acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.
- E. Background Checks: All Contractor employees, subcontractors, and sub-subcontractors are subject to background check and approval of the XXX Safety Department prior to working on-site.

1.5 WORK SEQUENCE

- A. Construct Work in order to accommodate Owner's occupancy requirements during construction period. Coordinate construction schedule and operations with Owner:
- B. Sequencing of Construction Plan: Before start of construction, post electronic file to Project website of construction plan regarding phasing of demolition, renovation, and new Work for acceptance by Owner. After acceptance of plan, construction sequencing shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.6 OWNER OCCUPANCY

- A. Owner will occupy Premises during entire period of construction.

- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.7 SPECIFICATION CONVENTIONS

- A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 10 00

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SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Schedule of Values.
- B. Application for Payment.
- C. Change procedures.
- D. Defect assessment.

1.2 SCHEDULE OF VALUES

- A. Submit electronic file to Project website of schedule on AIA G703 - Continuation Sheet for G702.
- B. Submit Schedule of Values as electronic file to Project website within 15 days after date of Owner-Contractor Agreement.
- C. Format: Use Table of Contents of this Project Manual. Identify each line item with number and title of major Specification Section. Also identify Site mobilization, bonds and insurance, General Conditions, and General Contractor Overhead and Profit.
- D. Include separately from each line item, direct proportional amount of Contractor's overhead and profit.
- E. Revise schedule to list approved Change Orders with each Application for Payment.

1.3 APPLICATION FOR PAYMENT

- A. Submit electronic file to Project website of each Application for Payment on AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702.
- B. Content and Format: Use Schedule of Values for listing items in Application for Payment.
- C. Submit updated construction schedule with each Application for Payment.
- D. Payment Period: Submit at intervals stipulated in the Agreement.

- E. Submit submittals with transmittal letter as specified in Section 01 33 00 - Submittal Procedures.
- F. Submit three copies of waivers requested by Owner.
- G. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
 - 1. Current construction photographs specified in Section 01 33 00 - Submittal Procedures or requested by the Architect.
 - 2. Partial release of liens from major Subcontractors and vendors.
 - 3. Record Documents as specified in Section 01 70 00 - Execution and Closeout Requirements, for review by Owner, which will be returned to Contractor.
 - 4. Affidavits attesting to off-Site stored products.
 - 5. Construction Progress Schedule, revised and current as specified in Section 01 33 00 - Submittal Procedures.

1.4 CHANGE PROCEDURES

- A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Architect/Engineer of any error, inconsistency, omission, or apparent discrepancy.
- C. Requests for Interpretation (RFI) and Clarifications: Allot time in construction scheduling for liaison with Architect/Engineer; establish procedures for handling queries and clarifications.
 - 1. Use AIA G716 - Request for Information for requesting interpretations.
 - 2. Architect/Engineer may respond with a direct answer on the Request for Interpretation form, AIA G710 - Architect's Supplemental Instruction, or AIA G709 - Work Changes Proposal Request.
- D. Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on AIA G710.
- E. Architect/Engineer may issue AIA G709 including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change with stipulation of overtime work required and with the period of time during which the requested price will be considered valid. Contractor will prepare and submit estimate within 10 days.
- F. Contractor may propose changes by submitting a request for change to Architect/Engineer, describing proposed change and its full effect on the Work.

Include a statement describing reason for the change and the effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on the Work by separate or other Contractors.

- G. Document requested substitutions according to Section 012500 - Substitution Procedures.
- H. Stipulated Sum/Price Change Order: Based on AIA G709 and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Architect/Engineer.
- I. Unit Price Change Order: For Contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of that which are not predetermined, execute Work under Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- J. Construction Change Directive: Architect/Engineer may issue directive, on AIA G714 - Construction Change Directive signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.
- K. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect/Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.
- L. Maintain detailed records of Work done on time and material basis. Provide full information required for evaluation of proposed changes and to substantiate costs for changes in the Work.
- M. Document each quotation for change in Project Cost or Time with sufficient data to allow evaluation of quotation.
- N. Change Order Forms: AIA G701 - Change Order.
- O. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.
- P. Correlation of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
 - 2. Promptly revise Progress Schedules to reflect change in Contract Time, revise sub schedules to adjust times for other items of Work affected by the change, and resubmit.

3. Promptly enter changes in Record Documents.

1.5 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of Architect/Engineer, it is not practical to remove and replace the Work, Architect/Engineer will direct appropriate remedy or adjust payment.
- C. Authority of Architect/Engineer to assess defects and identify payment adjustments is final.
- D. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:
 1. Products wasted or disposed of in a manner that is not acceptable.
 2. Products determined as unacceptable before or after placement.
 3. Products not completely unloaded from transporting vehicle.
 4. Products placed beyond lines and levels of the required Work.
 5. Products remaining on hand after completion of the Work.
 6. Loading, hauling, and disposing of rejected products.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 20 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance.
- B. Product options.
- C. Product substitution procedures.

1.2 QUALITY ASSURANCE

- A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.
- B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.
- C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT OPTIONS

- A. See Section 01 60 00 - Product Requirements.

1.4 PRODUCT SUBSTITUTION PROCEDURES

- A. Architect/Engineer may consider requests for substitutions during bidding. Contractor to provide Substitution Request form in 01 25 01 and relevant supporting data. Requests must be submitted prior to the final deadline for questions during bidding. Architect/Engineer's decision on acceptance/rejection of products is final.
- B. Architect/Engineer may consider requests for substitutions within 15 days after date of Owner-Contractor Agreement. Contractor to provide Substitution Request form in 01 25 02 and relevant supporting data. Architect/Engineer's decision on acceptance/rejection of products is final.
- C. Substitutions may be considered if within 90 days of contract award a product becomes unavailable, through no fault of the contractor. Contractor to provide documentation from the product manufacturer that product is no longer

available. Failure to provide notification that a product is no longer available within 90 days of contract award shall result in the Architect selecting an alternative material at no additional cost.

- D. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:
1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.
 2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, and other pertinent characteristics.
 3. Reference to Article and Paragraph numbers in Specification Section.
 4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.
 5. Changes required in other Work.
 6. Availability of maintenance service and source of replacement parts as applicable.
 7. Certified test data to show compliance with performance characteristics specified.
 8. Samples when applicable or requested.
 9. Other information as necessary to assist Architect/Engineer's evaluation.
- E. A request constitutes a representation that Bidder or Contractor:
1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product, and provides the same features and options as the specified product.
 2. Will provide same warranty for substitution as for specified product.
 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
 6. Will reimburse Owner and Architect/Engineer for review or redesign services associated with reapproval by authorities having jurisdiction.
- F. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.
- G. Substitution Submittal Procedure:
1. Submit requests for substitutions on form 01 25 01 Request for Substitution Form.
 2. Submit electronic files to Project website of Request for Substitution for consideration. Limit each request to one proposed substitution.
 3. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 4. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

1.5 INSTALLER SUBSTITUTION PROCEDURES

- A. Architect/Engineer will consider requests for substitutions only within 15 days after date of Owner-Contractor Agreement.
- B. Document each request with:
 - 1. Installer's qualifications.
 - 2. Installer's experience in work similar to that specified.
 - 3. Other information as necessary to assist Architect/Engineer's evaluation.
- C. Substitution Submittal Procedure:
 - 1. Submit electronic files to Project website of Request for Substitution for consideration. Limit each request to one proposed substitution.
 - 2. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 25 00

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**SUBSTITUTION
REQUEST**
(During the Bidding Phase)

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____
Re: _____ A/E Project Number: _____
Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____
Signed by: _____
Firm: _____
Address: _____
Telephone: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 33 00.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 33 00.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SEMCO ENERGY EOC BUILD OUT
AEW PROJECT #1584-0003

DECEMBER 6, 2024

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**SUBSTITUTION
REQUEST**
(After the Bidding/Negotiating Phase)

Project: _____ Substitution Request Number: _____

From: _____

To: _____ Date: _____

A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Phone: _____

Address: _____

Trade Name: _____ Model No.: _____

Installer: _____ Phone: _____

Address: _____

History: New Product 1-4 years old 5-10 years old More than 10 years old

Differences between proposed substitution and specified product: _____

Point-by-point comparative data attached.

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed Substitution affects other parts of work: No Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$_____).

Proposed substitution changes Contract Time: No Yes [Add] [Deduct] _____ days.

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Coordination and Project conditions.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Preinstallation meetings.
- F. Closeout meeting.
- G. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later as identified by the owner.
- B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
 - 1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

- D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.
- E. In finished areas, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner's occupancy.
- G. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

- A. Architect/Engineer will schedule and preside over meeting after Notice of Award.
- B. Attendance Required: Architect/Engineer, Owner, and Contractor.
- C. Minimum Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
 - 5. Designation of personnel representing parties in Contract, and Architect/Engineer.
 - 6. Communication procedures.
 - 7. Procedures and processing of requests for interpretations, field decisions, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
 - 8. Scheduling.
 - 9. Critical Work sequencing.
- D. Contractor: Record minutes and distribute electronic copies to participants within two days after meeting, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1.4 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals.

- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, and Architect/Engineer, Owner, as appropriate to agenda topics for each meeting.
- D. Minimum Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittal schedule and status of submittals.
 - 6. Review of off-Site fabrication and delivery schedules.
 - 7. Maintenance of Progress Schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on Progress Schedule and coordination.
 - 13. Other business relating to Work.
- E. Contractor: Record minutes and distribute electronic copies to participants within two days after meeting, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1.5 PREINSTALLATION MEETINGS

- A. When required in individual Specification Sections, convene preinstallation meetings at Project Site before starting Work of specific Section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific Section.
- C. Notify Architect/Engineer four days in advance of meeting date.
- D. Prepare agenda and preside over meeting:
 - 1. Review conditions of installation, preparation, and installation procedures.
 - 2. Review coordination with related Work.
- E. Record minutes and distribute electronic copies to participants within two days after meeting, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1.6 CLOSEOUT MEETING

- A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.
- B. Attendance Required: Contractor, Architect/Engineer, Owner, and others appropriate to agenda.
- C. Notify Architect/Engineer ten days in advance of meeting date.
- D. Minimum Agenda:
 - 1. Start-up of facilities and systems.
 - 2. Operations and maintenance manuals.
 - 3. Testing, adjusting, and balancing.
 - 4. System demonstration and observation.
 - 5. Operation and maintenance instructions for Owner's personnel.
 - 6. Contractor's inspection of Work.
 - 7. Contractor's preparation of an initial "punch list."
 - 8. Procedure to request Architect/Engineer inspection to determine date of Substantial Completion.
 - 9. Completion time for correcting deficiencies.
 - 10. Inspections by authorities having jurisdiction.
 - 11. Certificate of Occupancy and transfer of insurance responsibilities.
 - 12. Partial release of retainage.
 - 13. Final cleaning.
 - 14. Preparation for final inspection.
 - 15. Closeout Submittals:
 - a. Project record documents.
 - b. Operating and maintenance documents.
 - c. Operating and maintenance materials.
 - d. Affidavits.
 - 16. Final Application for Payment.
 - 17. Contractor's demobilization of Site.
 - 18. Maintenance.
- E. Record minutes and distribute electronic copies to participants within five days after meeting, with copies to Architect/Engineer, Owner, and those affected by decisions made.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 ALTERATION PROCEDURES

- A. Designated areas of existing facilities will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.
 - 1. Perform Work not to interfere with operations of occupied areas.
 - 2. Keep utility and service outages to a minimum and perform only after written approval of Owner.
 - 3. Clean Owner-occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.
- B. Materials: As specified in product Sections; match existing products with new products for patching and extending Work.
- C. Employ skilled and experienced installer to perform alteration and renovation Work.
- D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 01 70 00 - Execution and Closeout Requirements
- E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- F. Remove debris and abandoned items from area and from concealed spaces.
- G. Prepare surface and remove surface finishes to permit installation of new Work and finishes.
- H. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.
- I. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to match adjacent condition, unless specified otherwise.
- J. Refinish existing visible surfaces to remain in renovated rooms and spaces, to renewed condition for each material, with neat transition to adjacent finishes.
- K. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

- L. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.
- M. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition to Architect/Engineer for review.
- N. Trim existing doors to clear new floor finish. Refinish trim to specified condition.
- O. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.
- P. Finish surfaces as specified in individual product Sections.

END OF SECTION 01 30 00

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SECTION 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. Bar chart schedules.
- D. Review and evaluation.
- E. Updating schedules.
- F. Distribution.

1.2 SUBMITTALS

- A. Within 10 days after date of Owner-Contractor Agreement, submit proposed preliminary network diagram defining planned operations for Work.
- B. Participate in review of preliminary and complete network diagrams jointly with Architect/Engineer.
- C. Submit updated network schedules with each Application for Payment.
- D. Post as electronic file to Project website.
- E. Submit network schedules under transmittal letter form specified in Section 01 33 00 - Submittal Procedures.
- F. Schedule Updates:
 - 1. Overall percent complete, projected and actual.
 - 2. Completion progress by listed activity and sub-activity, to within five working days prior to submittal.
 - 3. Changes in Work scope and activities modified since submittal.
 - 4. Delays in submittals or resubmittals, deliveries, or Work.
 - 5. Adjusted or modified sequences of Work.
 - 6. Other identifiable changes.
 - 7. Revised projections of progress and completion.

1.3 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel specializing in CPM scheduling with five years' minimum experience in scheduling construction work of complexity comparable to the Project, and having use of computer facilities capable of delivering detailed graphic printout within 48 hours of request.
- B. Contractor's Administrative Personnel: five years' minimum experience in using and monitoring CPM schedules on comparable Projects.

1.4 BAR CHART SCHEDULES

- A. Format: Bar chart Schedule, to include at least:
 - 1. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:
 - a. Subcontract Work.
 - b. Major equipment design, fabrication, factory testing, and delivery dates including required lead times.
 - c. Move-in and other preliminary activities.
 - d. Equipment and equipment system test and startup activities.
 - e. Project closeout and cleanup.
 - f. Work sequences, constraints, and milestones.
 - 2. Listings identified by Specification Section number.
 - 3. Identification of the following:
 - a. Horizontal time frame by year, month, and week.
 - b. Duration, early start, and completion for each activity and sub-activity.
 - c. Critical activities and Project float.
 - d. Sub-schedules to further define critical portions of Work.

1.5 REVIEW AND EVALUATION

- A. Participate in joint review and evaluation of schedules with Architect/Engineer at each submittal.
- B. Evaluate Project status to determine Work behind schedule and Work ahead of schedule.
- C. After review, revise schedules incorporating results of review, and resubmit within **10** days.

1.6 UPDATING SCHEDULES

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update schedules to depict current status of Work.

- C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- D. Upon approval of a Change Order, include the change in the next schedule submittal.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit sorts as required to support recommended changes.
- G. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect including effects of changes on schedules of separate Contractors.

1.7 DISTRIBUTION

- A. Following joint review, distribute copies of updated schedules to Contractor's Project site file, to Subcontractors, suppliers, Architect/Engineer, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 32 16

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SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Definitions.
- B. Submittal procedures.
- C. Construction progress schedules.
- D. Proposed product list.
- E. Product data.
- F. Use of electronic CAD files of Project Drawings.
- G. Shop Drawings.
- H. Samples.
- I. Other submittals.
- J. Design data.
- K. Test reports.
- L. Certificates.
- M. Manufacturer's instructions.
- N. Manufacturer's field reports.
- O. Erection Drawings.
- P. Construction photographs.
- Q. Contractor review.
- R. Architect/Engineer review.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect/Engineer's responsive action.

- B. Informational Submittals: Written and graphic information and physical Samples that do not require Architect/Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. Number submittals with a prefix of the specification number related to the submittal, a sequential number, and a revision number (i.e. 092216-001-001).
- B. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.
- C. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.
- D. Schedule submittals to expedite Project, and submit electronic submittals via email as PDF electronic files. Coordinate submission of related items.
- E. For each submittal for review, allow 15 working days excluding delivery time to and from Contractor.
- F. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.
- G. Allow space on submittals for Contractor and Architect/Engineer review stamps.
- H. When revised for resubmission, identify changes made since previous submission.
- I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- J. Submittals not requested will not be recognized nor processed.
- K. Incomplete Submittals: Architect/Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Architect/Engineer.

1.4 CONSTRUCTION PROGRESS SCHEDULES

- A. Comply with Section 01 32 16 - Construction Progress Schedule.

1.5 PROPOSED PRODUCT LIST

- A. Within 15 working days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

- A. Product Data: Action Submittal: Submit to Architect/Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Submit electronic submittals via email as PDF electronic files.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.7 ELECTRONIC CAD FILES OF PROJECT DRAWINGS

- A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.
- B. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:
 - 1. Use of files is solely at receiver's risk. Architect/Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Architect/Engineer of discrepancy and use information in hard-copy Drawings and Specifications.
 - 2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.

3. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
4. Receiver shall not hold Architect/Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
5. Receiver shall understand that even though Architect/Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
6. Receiver shall not hold Architect/Engineer responsible for such viruses or their consequences, and shall hold Architect/Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.
7. Receiver shall submit Electronic Documents Request Form, 01 33 01, indicating what documents are requested.

1.8 SHOP DRAWINGS

- A. Shop Drawings: Action Submittal: Submit to Architect/Engineer for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
 1. Include signed and sealed calculations to support design.
 2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. Submit electronic submittals via email as PDF electronic files.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.
- F. Shop drawings shall be drafted in a professional manner on a title block provided by the shop drawing producer. Markups, photocopies or PDF files of Construction Documents are not an acceptable shop drawing submittal.

1.9 SAMPLES

- A. Samples: Action Submittal: Submit to Architect/Engineer for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Samples for Selection as Specified in Product Sections:
 - 1. Submit to Architect/Engineer for aesthetic, color, and finish selection.
 - 2. Submit Samples of finishes, textures, and patterns for Architect/Engineer selection.
- C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.
- D. Include identification on each Sample, with full Project information.
- E. Submit number of Samples specified in individual Specification Sections; Architect/Engineer will retain one Sample.
- F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.
- G. Samples will not be used for testing purposes unless specifically stated in Specification Section.
- H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.10 OTHER SUBMITTALS

- A. Closeout Submittals: Comply with Section 01 70 00 - Execution and Closeout Requirements.
- B. Informational Submittal: Submit data for Architect/Engineer's knowledge as Contract administrator or for Owner.
- C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.11 TEST REPORTS

- A. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.
- B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.12 CERTIFICATES

- A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product but must be acceptable to Architect/Engineer.

1.13 MANUFACTURER'S INSTRUCTIONS

- A. Informational Submittal: Submit manufacturer's installation instructions for Architect/Engineer's knowledge as Contract administrator or for Owner.
- B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Architect/Engineer in quantities specified for Product Data.
- C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 MANUFACTURER'S FIELD REPORTS

- A. Informational Submittal: Submit reports for Architect/Engineer's knowledge as Contract administrator or for Owner.
- B. Submit report within 5 days of observation to Architect/Engineer for information.
- C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.15 ERECTION DRAWINGS

- A. Informational Submittal: Submit Drawings for Architect/Engineer's knowledge as Contract administrator or for Owner.
- B. Submit Drawings for information assessing conformance with information given and design concept expressed in Contract Documents.
- C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

1.16 CONTRACTOR REVIEW

- A. Review for compliance with Contract Documents and approve submittals before transmitting to Architect/Engineer.
- B. Contractor: Responsible for:
 - 1. Determination and verification of materials including manufacturer's catalog numbers.
 - 2. Determination and verification of field measurements and field construction criteria.
 - 3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
 - 4. Determination of accuracy and completeness of dimensions and quantities.
 - 5. Confirmation and coordination of dimensions and field conditions at Site.
 - 6. Construction means, techniques, sequences, and procedures.
 - 7. Safety precautions.
 - 8. Coordination and performance of Work of all trades.
- C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.
- D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Architect/Engineer.

1.17 ARCHITECT/ENGINEER REVIEW

- A. Do not make "mass submittals" to Architect/Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Architect/Engineer's review time stated above will be extended as necessary to perform proper review. Architect/Engineer will review "mass submittals" based on priority determined by Architect/Engineer after consultation with Owner and Contractor.
- B. Informational submittals and other similar data are for Architect/Engineer's information, do not require Architect/Engineer's responsive action, and will not be reviewed or returned with comment.
- C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.
- D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order, Architect's Supplemental Instruction or Construction Change Directive.
- E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

SEMCO ENERGY EOC BUILD OUT
AEW PROJECT #1584-0003

DECEMBER 6, 2024

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 33 00

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SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quality control.
- B. Tolerances.
- C. References.
- D. Labeling.
- E. Mockup requirements.
- F. Testing and inspection services.
- G. Manufacturers' field services.

1.2 QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- C. Perform Work using persons qualified to produce required and specified quality.
- D. Products, materials, and equipment may be subject to inspection by Architect/Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.
- E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

- B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current as of date for receiving Bids except where specific date is established by code.
- C. Obtain copies of standards and maintain on Site when required by product Specification Sections.
- D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

- A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.
- C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.

- B. Assemble and erect specified or indicated items with specified or indicated attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mockups shall be comparison standard for remaining Work.
- D. Where mockup has been accepted by Architect/Engineer and is specified in product Specification Sections to be removed, remove mockup and clear area when directed to do so by Architect/Engineer.

1.7 TESTING AND INSPECTION SERVICES

- A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.
 - 1. Before starting Work, submit testing laboratory name, address, and telephone number, and names of full-time Professional Engineer or specialist and responsible officer.
 - 2. Submit copy of report of laboratory facilities' inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.
- B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Architect/Engineer or authorities having jurisdiction.
 - 1. Laboratory: Authorized to operate in the project's jurisdiction.
 - 2. Laboratory Staff: Maintain full-time Professional Engineer on staff to review services.
 - 3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Architect/Engineer or Owner.
- D. Reports shall be submitted by independent firm to Architect/Engineer, Contractor, and authorities having jurisdiction, indicating observations and results of tests and compliance or noncompliance with Contract Documents.
 - 1. Submit final report indicating correction of Work previously reported as noncompliant.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Architect/Engineer and independent firm 48 hours before expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

- F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.
- G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Architect/Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
- H. Agency Responsibilities:
 - 1. Test Samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at Site. Cooperate with Architect/Engineer and Contractor in performance of services.
 - 3. Perform indicated sampling and testing of products according to specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Architect/Engineer and Contractor of observed irregularities or nonconformance of Work or products.
 - 6. Perform additional tests required by Architect/Engineer.
 - 7. Attend preconstruction meetings and progress meetings.
- I. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer, Contractor, and authorities having jurisdiction. When requested by Architect/Engineer, provide interpretation of test results. Include the following:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and Specification Section.
 - 6. Location in Project.
 - 7. Type of inspection or test.
 - 8. Date of test.
 - 9. Results of tests.
 - 10. Conformance with Contract Documents.
- J. Limits on Testing Authority:
 - 1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency or laboratory may not approve or accept any portion of the Work.
 - 3. Agency or laboratory may not assume duties of Contractor.
 - 4. Agency or laboratory has no authority to stop the Work.

1.8 MANUFACTURER'S FIELD SERVICES

- A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer is subject to approval of Architect/Engineer.
- C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
- D. Refer to Section 01 33 00 - Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 40 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary facilities under Construction Management Agreement.
- B. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary heating.
 - 4. Temporary cooling.
 - 5. Temporary ventilation.
 - 6. Communication services.
 - 7. Temporary water service.
 - 8. Temporary sanitary facilities.
- C. Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Project identification.
 - 6. Traffic regulation.
 - 7. Fire-prevention facilities.
- D. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Water control.
 - 5. Dust control.
 - 6. Erosion and sediment control.
 - 7. Noise control.
 - 8. Pest and rodent control.
 - 9. Pollution control.
- E. Removal of utilities, facilities, and controls.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 TEMPORARY ELECTRICITY

- A. Owner will pay cost of energy used. Exercise measures to conserve energy. Use Owner's existing power service.
- B. Complement existing power service capacity and characteristics as required for construction operations.
- C. Provide power outlets with branch wiring and distribution boxes located as required for construction operations. Provide suitable, flexible power cords as required for portable construction tools and equipment.
- D. Provide feeder switch at source distribution equipment.
- E. Permanent convenience receptacles may be used during construction.

1.4 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations to achieve minimum lighting level of 2 watts/sq. ft.
- B. Provide and maintain 0.25 watt/sq. ft. HID lighting to interior work areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, lamps, and the like, for specified lighting levels.
- D. Maintain lighting and provide routine repairs.
- E. Permanent building lighting may be used during construction.

1.5 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations. Provide separate metering and reimburse Owner for cost of energy used.
- B. Enclose building before activating temporary heat according to "Enclosures and Fencing" Article in this Section.

- C. Before operating permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.
- D. Maintain minimum ambient temperature of 50 degrees F in areas not occupied by the owner where construction is in progress unless indicated otherwise in individual product Sections.
- E. Maintain minimum ambient temperature of 68 degrees F in areas occupied by the owner where construction is in progress unless indicated otherwise in individual product Sections.

1.6 TEMPORARY COOLING

- A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations. Provide separate metering and reimburse Owner for cost of energy used.
- B. Enclose building before activating temporary cooling according to "Enclosures and Fencing" Article in this Section.
- C. Before operating permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.
- D. Limit maximum ambient temperature to 80 degrees F in areas where construction is in progress unless indicated otherwise in individual product Sections.

1.7 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Use existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.8 COMMUNICATION SERVICES

- A. Telephone Service: Provide, maintain, and pay for telephone service to field office at time of Project mobilization and until completion of Work.
- B. Facsimile Service: Provide, maintain, and pay for facsimile service including dedicated telephone line to field office at time of Project mobilization and until completion of Work.

- C. Internet Service: Provide, maintain, and pay for broadband Internet service to field office at time of Project mobilization. Provide desktop computer with Microsoft operating system and appropriate office function software, modem, and printer.

1.9 TEMPORARY WATER SERVICE

- A. Owner will pay cost of temporary water. Exercise measures to conserve energy. Use Owner's existing water system, extended and supplemented with temporary devices as needed to maintain specified conditions for construction operations.
- B. Extend branch piping with outlets located so that water is available by hoses with threaded connections. Provide temporary pipe insulation and heat tape to prevent freezing.

1.10 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.11 FIELD OFFICES AND SHEDS

- A. Designated existing spaces may be used for field offices. Coordinate locations with Owner.
- B. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to suit requirements in Section 01 60 00 - Product Requirements.
- C. Preparation: Fill and grade Sites for temporary structures sloped for drainage away from buildings.
- D. Installation:
 - 1. Install field office spaces ready for occupancy 15 days after date established by Owner-Contractor Agreement.
 - 2. Employee Residential Occupancy: Not allowed on Owner's property.
- E. Maintenance and Cleaning:
 - 1. Weekly janitorial services for field offices; periodic cleaning and maintenance for sheds and storage areas.
 - 2. Maintain walks free of mud, water, snow, and the like.
- F. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas to same or better condition as original condition.

1.12 VEHICULAR ACCESS

- A. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.
- B. Provide unimpeded access for emergency vehicles. Maintain 20-foot-wide driveways with turning space between and around combustible materials.
- C. Provide and maintain access to fire hydrants and control valves free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Use designated existing on-Site roads for construction traffic.

1.13 PARKING

- A. Arrange for temporary surface parking areas to accommodate construction personnel.
- B. Locate as approved by Owner.
- C. If Site space is not adequate, provide additional off-Site parking.
- D. Use of Owner designated areas of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.
- E. Use of Owner designated areas of existing parking facilities used by construction personnel is permitted.
- F. Do not allow heavy vehicles or construction equipment in parking areas.
- G. Do not allow vehicle parking on existing pavement.
- H. Permanent Pavements and Parking Facilities:
 - 1. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.
- I. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.
 - 2. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.
- J. Removal, Repair:
 - 1. Remove temporary materials and construction before Substantial Completion.

2. Remove underground Work and compacted materials to depth of 2 feet fill and grade Site as indicated.
3. Repair existing facilities damaged by use, to original condition.

K. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.14 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.
- C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.15 PROJECT IDENTIFICATION

- A. Project Identification Sign:
 1. **One** painted sign of construction, design, and content shown on Drawings, location designated.
 2. Content:
 - a. Project, title, and name of Owner.
 - b. Names and titles of authorities.
 - c. Names and titles of Architect/Engineer and Consultants.
 - d. Name of Prime Contractor.
 3. Graphic Design, Colors, and Style of Lettering: Designated by Architect/Engineer.
- B. Project Informational Signs:
 1. Painted informational signs of same colors and lettering as Project identification sign or standard products; size lettering for legibility at 100-foot distance.
 2. Provide sign at each field office and storage shed, and provide directional signs to direct traffic into and within Site. Relocate as Work progress requires.
 3. Provide municipal traffic agency directional traffic signs to and within Site.
 4. No other signs are allowed without Owner's permission except those required by law.
- C. Design sign and structure to withstand 60-mph wind velocity.
- D. Sign Painter: Experienced as professional sign painter for minimum of three years.

- E. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.
- F. Show content, layout, lettering, and color.
- G. Sign Materials:
 - 1. Structure and Framing: New wood structurally adequate.
 - 2. Sign Surfaces: Exterior grade plywood with medium-density overlay, minimum of $\frac{3}{4}$ inches thick, standard large sizes to minimize joints.
 - 3. Rough Hardware: Galvanized, aluminum, or brass.
 - 4. Paint and Primers: Exterior quality, two coats; sign background of as selected.
 - 5. Lettering: Exterior quality paint, contrasting colors as selected.
- H. Installation:
 - 1. Install Project identification sign within 15 days after date established by Owner-Contractor Agreement.
 - 2. Erect at Owner designated location.
 - 3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
 - 4. Install sign surface plumb and level, with butt joints. Anchor securely.
 - 5. Paint exposed surfaces of sign, supports, and framing.
- I. Maintenance: Maintain clean signs and supports; repair deterioration and damage.
- J. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.16 TRAFFIC REGULATION

- A. Signs, Signals, and Devices:
 - 1. Post-Mounted and Wall-Mounted Traffic Control and Informational Signs: As approved by authorities having jurisdiction.
 - 2. Traffic Cones, Drums, Flares, and Lights: As approved by authorities having jurisdiction.
 - 3. Flag Person Equipment: As required by authorities having jurisdiction.
- B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.
- C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
- D. Haul Routes:
 - 1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.
- E. Traffic Signs and Signals:

1. Provide signs at approaches to Site and on Site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
2. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.
3. Relocate signs and signals as Work progresses, to maintain effective traffic control.

F. Removal:

1. Remove equipment and devices when no longer required.
2. Repair damage caused by installation.
3. Remove post settings to depth of 2'-0".

1.17 FIRE-PREVENTION FACILITIES

- A. Prohibit smoking within buildings under construction and demolition. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
 1. Provide one fire extinguisher at each stairway on each floor of buildings under construction and demolition.
 2. Provide minimum of one fire extinguisher in every construction trailer and storage shed.
 3. Provide minimum of one fire extinguisher on roof during roofing operations using heat-producing equipment.

1.18 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of Site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.
- C. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain.

1. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
 2. Provide 6-foot-high barriers around drip line, with access for maintenance.
 3. Replace trees and plants damaged by construction operations.
- D. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.19 ENCLOSURES AND FENCING

- A. Construction: Commercial-grade chain-link fence.
- B. Provide 6-foot-high fence around construction Site, at locations coordinated with Owner; equip with vehicular and pedestrian gates with locks.
- C. Exterior Enclosures:
1. Provide temporary insulated weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.
- D. Interior Enclosures:
1. Provide temporary partitions and ceilings at locations requested by owner to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
 2. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces.
 - a. STC rating of 35 according to ASTM E 90.
 - b. Surface-Burning Characteristics: Maximum 25/450 flame-spread/smoke-developed index when tested according to ASTM E 84.
 - c. Fire-Rated Wall Construction: 2-hour rating.
 - 1) Tested Rating: Determined according to ASTM E 119.
 3. Paint surfaces exposed to view from Owner-occupied areas.

1.20 SECURITY

- A. Security Program:
1. Protect Work on existing premises and Owner's operations from theft, vandalism, and unauthorized entry.

2. Initiate program in coordination with Owner's existing security system at Project mobilization.
 3. Maintain program throughout construction period until Owner's acceptance precludes need for Contractor's security.
- B. Entry Control:
1. Restrict entrance of persons and vehicles to Project Site and existing facilities.
 2. Allow entrance only to authorized persons with proper identification.
 3. Maintain log of workers and visitors and make available to Owner on request.
 4. Coordinate access of Owner's personnel to Site in coordination with Owner's security forces.
- C. Personnel Identification:
1. Provide identification badge for each person authorized to enter premises.
 2. Badge to Include: Personal photograph, name, expiration date, and employer.
 3. Maintain list of accredited persons and submit copy to Owner on request.
 4. Require return of badges at expiration of employment on the Work.
- D. Restrictions:
1. Do not allow cameras on Site or photographs taken except by written approval of Owner.
 2. All Contractors, Subcontractors, and individuals requiring access to the site are subject to a background check and prior approval of the Owner.
 3. Do no work on days indicated in Owner-Contractor Agreement.
- 1.21 WATER CONTROL
- A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.
 - B. Protect Site from puddles or running water.
- 1.22 DUST CONTROL
- A. Execute Work by methods that minimize raising dust from construction operations.
 - B. Provide positive means to prevent airborne dust from dispersing into atmosphere and into Owner-occupied areas.
- 1.23 PEST AND RODENT CONTROL
- A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work or entering facility.

- B. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.24 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials before Final Application for Payment inspection.
- B. Remove underground installations to minimum depth of 2'-0".
- C. Clean and repair damage caused by installation or use of temporary Work.
- D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 01 50 00

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SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Equipment electrical characteristics and components.

1.2 PRODUCTS

- A. At minimum, comply with specified requirements and reference standards.
- B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.
- C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.
- D. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.
- E. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products according to manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

- C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products according to manufacturer's instructions.
- B. Store products with seals and labels intact and legible.
- C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.
- D. For exterior storage of fabricated products, place products on sloped supports aboveground.
- E. Provide off-Site storage and protection when Site does not permit on-Site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 01 25 00 - Substitution Procedures.

PART 2 - PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.
- B. Cord and Plug: Furnish minimum 6-foot long cord and plug including grounding connector for connection to electric wiring system. Cord of longer length may be specified in individual Specification Sections.

PART 3 - EXECUTION - Not Used

END OF SECTION 01 60 00

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SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Field engineering.
- B. Closeout procedures.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Testing, adjusting, and balancing.
- F. Project record documents.
- G. Operation and maintenance data.
- H. Manual for materials and finishes.
- I. Manual for equipment and systems.
- J. Spare parts and maintenance products.
- K. Product warranties and product bonds.
- L. Maintenance service.
- M. Examination.
- N. Preparation.
- O. Execution.
- P. Cutting and patching.
- Q. Protecting installed construction.
- R. Final cleaning.

1.2 CLOSEOUT PROCEDURES

- A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
 2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
 3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
 4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
 5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
 6. Make final change-over of locks and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.
 7. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
 8. Perform final cleaning according to this Section.
- B. Substantial Completion Inspection:
1. When Contractor considers Work to be substantially complete, submit to Architect/Engineer:
 - a. Written certificate that Work, or designated portion, is substantially complete.
 - b. List of items to be completed or corrected (initial punch list).
 2. Within seven days after receipt of request for Substantial Completion, Architect/Engineer will make inspection to determine whether Work or designated portion is substantially complete.
 3. Should Architect/Engineer determine that Work is not substantially complete:
 - a. Architect/Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
 - b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Architect/Engineer.
 - c. Architect/Engineer will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect/Engineer's inspection.

4. When Architect/Engineer finds that Work is substantially complete, Architect/Engineer will:
 - a. Prepare Certificate of Substantial Completion on AIA G704 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Architect/Engineer and Owner (final punch list).
 - b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
 5. After Work is substantially complete, Contractor shall:
 - a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
 - b. Complete Work listed for completion or correction within time period stipulated.
 6. Owner will occupy portions of building as specified in Section 01 10 00 - Summary.
- C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
1. When Contractor considers Work to be complete, submit written certification that:
 - a. Contract Documents have been reviewed.
 - b. Work has been examined for compliance with Contract Documents.
 - c. Work has been completed according to Contract Documents.
 - d. Work is completed and ready for final inspection.
 2. Submittals: Submit following:
 - a. Final punch list indicating all items have been completed or corrected.
 - b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
 - d. Accounting statement for final changes to Contract Sum.
 - e. Contractor's affidavit of payment of debts and claims on AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
 - f. Contractor affidavit of release of liens on AIA G706A - Contractor's Affidavit of Release of Liens.
 - g. Consent of surety to final payment on AIA G707 - Consent of Surety to Final Payment Form.
 3. Perform final cleaning for Contractor-soiled areas according to this Section.
- D. Final Completion Inspection:
1. Within seven days after receipt of request for final inspection, Architect/Engineer will make inspection to determine whether Work or designated portion is complete.
 2. Should Architect/Engineer consider Work to be incomplete or defective:

- a. Architect/Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
- b. Contractor shall remedy stated deficiencies and send second written request to Architect/Engineer that Work is complete.
- c. Architect/Engineer will reinspect Work.
- d. Redo and Inspection of Deficient Work: Repeated until Work passes Architect/Engineer's inspection.

1.3 STARTING OF SYSTEMS

- A. Coordinate schedule for startup of various equipment and systems.
- B. Notify Architect/Engineer seven days prior to startup of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.
- G. Submit a written report according to Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.

- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.5 TESTING, ADJUSTING, AND BALANCING

- A. Owner will appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, product data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates used.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
 - 1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
 - 2. Include locations of concealed elements of the Work.
 - 3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
 - 4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
 - 5. Identify and locate existing buried or concealed items encountered during Project.
 - 6. Measured depths of foundations in relation to finish floor datum.

7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 9. Field changes of dimension and detail.
 10. Details not on original Drawings.
- G. Submit marked-up paper copy documents to Architect/Engineer before Substantial Completion.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit in PDF composite electronic indexed file.
- B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.
- C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project, and subject matter of binder when multiple binders are required.
- D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - g. Safety precautions to be taken when operating and maintaining or working near equipment.

3. Part 3: Project documents and certificates, including the following:
 - a. Shop Drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Originals of warranties.

1.8 MANUAL FOR MATERIALS AND FINISHES

- A. For equipment or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- B. Submit one copy of completed volumes before Substantial Completion.
- C. Submit two sets of revised final volumes within ten days after final inspection.
- D. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- H. Additional Requirements: As specified in individual product Specification Sections.
- I. Include listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.9 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- B. Submit one copy of completed volumes before Substantial Completion.
- C. Submit two sets of final volumes within ten days after final inspection.
- D. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.

- E. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; by label machine.
- G. Include color-coded wiring diagrams as installed.
- H. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.
- I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- J. Include servicing and lubrication schedule and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.
- L. Include sequence of operation by controls manufacturer.
- M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Include control diagrams by controls manufacturer as installed.
- O. Include Contractor's coordination drawings with color-coded piping diagrams as installed.
- P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- R. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.
- S. Additional Requirements: As specified in individual product Specification Sections.
- T. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.
- B. Deliver to Project Site and place in location as directed by Owner; obtain receipt prior to final payment.

1.11 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.
- B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include table of contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.12 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in Specification Sections during warranty period.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 EXECUTION

- A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
 2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
 3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Architect/Engineer for final decision.
- E. Allow for expansion of materials and building movement.
- F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
 2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.
- G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
1. Refer questionable mounting heights choices to Architect/Engineer for final decision.
 2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.
- H. Adjust operating products and equipment to ensure smooth and unhindered operation.
- I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.
- 3.4 CUTTING AND PATCHING
- A. Employ skilled and experienced installers to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
1. Structural integrity of element.
 2. Integrity of weather-exposed or moisture-resistant elements.
 3. Efficiency, maintenance, or safety of element.
 4. Visual qualities of sight-exposed elements.
 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching to complete Work and to:
1. Fit the several parts together, to integrate with other Work.
 2. Uncover Work to install or correct ill-timed Work.
 3. Remove and replace defective and nonconforming Work.

4. Remove samples of installed Work for testing.
 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.
 - E. Cut masonry and concrete materials using masonry saw or core drill.
 - F. Restore Work with new products according to requirements of Contract Documents.
 - G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.
 - H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
 - I. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire-rated material according to Section 078400 – Firestopping, to full thickness of penetrated element.
 - J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
 - K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

- A. Execute final cleaning prior to final Project assessment.
 - 1. Employ experienced personnel or professional cleaning firm.
- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces.
- C. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.
- D. Replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean Site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION 01 70 00

SECTION 02 41 19 - SELECTIVE BUILDING DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 1. Demolishing designated building equipment and fixtures.
 2. Demolishing designated construction.
 3. Cutting and alterations for completion of the Work.
 4. Removing designated items for reuse and Owner's retention.
 5. Protecting items designated to remain.
 6. Removing demolished materials.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Demolition Schedule: Indicate overall schedule and interruptions required for utility and building services.
- C. Shop Drawings:
 1. Indicate demolition and removal sequence.
 2. Indicate location of items designated for reuse and Owner's retention.
 3. Indicate location and construction of temporary work.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.
- C. Operation and Maintenance Data: Submit description of system, inspection data, and parts lists.

1.4 QUALITY ASSURANCE

- A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.

- B. Conform to applicable code for procedures when hazardous or contaminated materials are discovered.
- C. Obtain required permits from authorities having jurisdiction.
- D. Perform Work in accordance with SEMCO Energy standard.
- E. Maintain one copy of each document on site.

1.5 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.6 SEQUENCING

- A. Section 01 10 00 - Summary: Requirements for sequencing.
- B. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

1.7 SCHEDULING

- A. Section 01 32 16 - Construction Progress Schedule: Requirements for scheduling.
- B. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owners operation and in adjoining spaces.
- C. Coordinate utility and building service interruptions with Owner.
 - 1. Do not disable or disrupt building fire or life safety systems without three days prior written notice to Owner.
 - 2. Schedule tie-ins to existing systems to minimize disruption.
 - 3. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.8 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

PART 2 - PRODUCTS

2.1 Not Used.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Notify affected utility companies before starting work and comply with their requirements.
- B. Mark location and termination of utilities.
- C. Erect, and maintain temporary barriers and security devices at locations indicated requested by owner, including warning signs and lights, and similar measures, for protection of the public, Owner, and existing improvements indicated to remain.
- D. Layout cuts in post tensioned concrete elements to avoid cutting concrete within 12 inches of any stressing tendon. Notify Architect/Engineer three days in advance of cutting post-tensioned concrete.
- E. Erect and maintain weatherproof closures for exterior openings.
- F. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.
- G. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.
- H. Provide appropriate temporary signage including signage for exit or building egress.
- I. Do not close or obstruct building egress path.
- J. Do not disable or disrupt building fire or life safety systems without **3** days prior written notice to Owner.

3.2 SALVAGE REQUIREMENTS

- A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.
- B. Tag components and equipment Owner designates for salvage.
- C. Protect designated salvage items from demolition operations until items can be removed.

- D. Carefully remove building components and equipment indicated to be salvaged.
- E. Disassemble as required to permit removal from building.
- F. Package small and loose parts to avoid loss.
- G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.
- H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.
- I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.3 DEMOLITION

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Maintain protected egress from and access to adjacent existing buildings at all times.
- C. Do not close or obstruct roadways or sidewalks without permits.
- D. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer.
- E. Disconnect and remove utilities within demolition areas.
- F. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.
- G. Demolish in orderly and careful manner. Protect existing improvements, and supporting structural members.
- H. Carefully remove building components indicated to be reused.
 - 1. Disassemble components as required to permit removal.
 - 2. Package small and loose parts to avoid loss.
 - 3. Mark components and packaged parts to permit reinstallation.
 - 4. Store components, protected from construction operations, until reinstalled.
- I. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

K. Remove temporary Work.

END OF SECTION 02 41 19

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SECTION 03 00 10 - CONCRETE

PART 1. GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this specification.

1.02 SECTION INCLUDES

- A. Work included in this section includes furnishing all labor, materials, equipment and incidentals required for complete installation of formwork, reinforcement, accessories, cast-in-place concrete, finishing and curing. This section pertains to building concrete work.
- B. Related work specified elsewhere:
 - 1. Section 030100 – Bonding Agents for Concrete
 - 2. Section 037500 – Concrete Rehabilitation
 - 3. Section 053113 – Steel Decking
 - 4. Section 055000 - Metal Fabrications

1.03 SUBMITTALS

- A. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement". Indicate reinforcement sizes, spacings, locations, and quantities, bending and cutting schedules, supporting and spacing devices.
- B. See Structural and/or Architectural drawings for General Notes and Special Conditions.
- C. Provide data on joint devices, attachment accessories, mix design for each type concrete, proportions of all ingredients, admixtures, slump range, expected strength and water cement ratio. Provide historical test data with each proposed mix design.

1.04 QUALITY ASSURANCES

- A. Building Code Requirements for Structural Concrete (ACI 318) and latest supplements thereto.
- B. Standard Practice for Selecting Proportions for Normal, Heavy Weight, and Mass Concrete (ACI 211.1).

- C. Hot Weather Concreting (ACI-305R).
- D. Cold Weather Concreting (ACI-306R).
- E. Guide for Measuring, Mixing, Transporting and Placing Concrete (ACI 304R).
- F. Guide to Curing Concrete (ACI 308R).
- G. Specifications for Structural Concrete (ACI 301).
- H. Guide for Concrete Floor and Slab Construction (ACI 302.1R).
- I. Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete (ASTM C618).
- J. Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type) - (ASTM D994).
- K. Guide to Formwork for Concrete (ACI 347).
- L. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice.
- M. Design and workmanship of all concrete shall be in accordance with referenced specifications and code listed above. Quality, tolerances, and level of performance of work shall be as specified therein. Contractor shall keep on file, in project office, current copies of all references listed above.

PART 2. PRODUCTS

2.01 FORM MATERIALS

- A. Form Material for Exposed Concrete: Plywood; 5/8" APA B-B plyform Class 1, exterior. Use plywood thickness sufficient to support concrete at temperature and rate of pour. Use only sound, undamaged sheets with clean, true edges. Furnish in largest sizes to minimize joints.
- B. Form Material for Unexposed Concrete: Plywood; 5/8" APA B-B-G-2, exposure 1, exterior, plywood graded per PS-1 standards for construction and industrial plywood. Use plywood thickness sufficient to support concrete at temperature and rate of pour. Use only sound, undamaged sheets with clean, true edges. Lumber shall be standard grade or better.
- C. In lieu of "A" above, the material specified under "B" may be used for exposed concrete if a 3/16" smooth one side, treated, pressed fiberboard liner is utilized.

- D. Lumber for light framing (less than 6" wide): standard grade and species. Framing (6" wider and from 2" to 4" thick): provide No. 1 grade in one of the following species:
 - 1. Douglas Fir (WWPA).
 - 2. Southern Pine (SPIB).
 - 3. Redwood (RIS).
- E. Prefabricated steel or metal shall be minimum 16 ga. as approved to produce surfaces equal to those specified for wood. Forms shall be matched, tight fitting, and stiffened to support weight of concrete.
- F. Metal Form Deck: Utilized to support exterior slabs; shall be S.D.I. approved and equal to Vulcraft. Spacing of slab reinforcing shall be adjusted if required to match corrugations of metal deck.
- G. Form Ties: Bolt and rod type so designed that upon removal of the form no metal shall be within 1-1/2" of the concrete surface and no holes larger than 1" in diameter. Concrete exposed to the exterior shall utilize galvanized ties.
- H. Waterstops
 - 1. Expansion joints: Purpose made polyvinyl chloride (PVC) or rubber profile and size as indicated on drawings or as required by field conditions, maximum possible lengths as manufactured by Williams, Greenstreak or approved.
 - 2. Construction joints: Inorganic clay material manufactured from Wyoming type, high swelling bentonite as indicated on drawings as manufactured by American Colloid Company or approved.
- I. Dovetail Anchor Slots: Galvanized steel, foam filled, release tape sealed slots, bond tab anchors as manufactured by Heckmann, Hohmann & Barnard, Inc. or approved.
- J. Form Release Agent: Colorless mineral oil which will not stain the concrete or impair natural bonding characteristics of coating intended for use on concrete.
- K. Formed Construction Joints for Slab-on-Grade: Galvanized steel, tongue and groove type profile with knockout holes to receive doweling, min. 26 gage unless noted otherwise. Size and profile as indicated on drawings or as required to fit field conditions.
- L. Slab Edge Joint Filler: ASTM D994, premolded asphaltic board, thickness as indicated or (if not indicated, 1/2" thick minimum).

- M. Vapor Barrier: Vapor/Intrusion Barrier/Fluid Applied Gas Barrier.
 - 1. Acceptable Manufacturers:
 - a. Land Science: Geo Seal System.
 - 1. Refer to Spec Section 025619.13 "Vapor Intrusion Barrier/Fluid Applied Gas Barrier.
- N. Nails, spikes, lag bolts, through bolts, anchorages: Size as required, of sufficient strength and character to maintain formwork in place while placing concrete.

2.02 REINFORCEMENT MATERIALS

- A. Reinforcing Bars: ASTM A 615 Grade 60 deformed.
- B. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- C. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).
- D. Inert fiber reinforcement: Polypropylene fiber meeting ASTM-C1116; Fibermesh, Forta Corporation, or other Architect approved U.L. Listed. Add to plant mixed concrete at a rate of 1.5 lbs. per cubic yard of mix.

2.03 CONCRETE MATERIALS

- A. Cement; controlling specification for Portland Cement, ASTM C150, Type I-Normal or Type II.
- B. Aggregates shall conform to ASTM C-33. Maximum size of aggregate shall not be larger than 1/5 of narrowest dimension between forms of member for which concrete is to be used, nor larger than 3/4 of minimum clear spacing between reinforcing bars, nor larger than 1/3 of slab depth.
- C. Lightweight aggregates shall conform to ASTM C 330.
- D. Water: Clean and potable.
- E. Air Entrainment Admixture: ASTM C260, as manufactured by Master Builders, Euclid, or W.R. Grace.

- F. Chemical Admixtures: ASTM C494; Type 'A' - water reducing; Type 'B' - retarding, Type 'C' - accelerating, Type 'D' - water reducing and regarding, Type 'E' - water reducing and accelerating, Type 'F' - water reducing high range; Type 'G' - water reducing high range and retarding. Calcium chloride or admixtures containing more than .05 percent chloride ions by weight of admixture shall not be used. Each admixture shall not contribute more than 5 ppm by weight, of chloride ions to the total concrete constituent. Use admixtures in strict compliance with manufacturer's directions.
- G. Fly Ash: ASTM C618, Type 'C' or 'F'.
- H. Bonding Agent: Refer to Spec Section 03300 "Bonding Agents for Concrete".
- I. Non-Shrink Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents. Capable of developing a minimum compressive strength of 7000 psi at 28 days.
- J. Adhesive Anchoring: Injectable adhesive or self-contained capsule as manufactured by:
 - 1. 'Hilti' HIT System, or Architect approved/reviewed equal.

2.04 CURING COMPOUNDS & SEALERS

- A. Curing Compound/Sealer: Liquid curing compound, water base, concrete curing-sealing compound, VOC (volatile organic content) compliant, containing fugitive dye that does not leave residue (resin, varnish, wax, etc.). Fugitive dye must disappear in 7 days, as manufactured by:
 - 1. Sonneborn Building Products, Kure-N-Seal W.
 - 2. Dayton Superior Corporation, Safe Cure & Seal (J-18).
 - 3. Burke by EDOCO Spartan-Cote WB Cure Seal Hardener.
 - 4. MasterKure 100W, Master Builders, Inc.
 - 5. Vocomp-20, W.R. Meadows.
- B. Absorptive Mats: Burlap cloth, commercial quality suitable for purpose. Constructed of jute or kenaf, weighing approximately 9 oz. per square yard, complying with AASHTO M182, Class 2.
- C. Moisture retaining cover, complying with ASTM C171; one of the following: waterproof paper, polyethylene film, or polyethylene coated burlap.
- D. Crack Repair Material: Floor slabs - 2 part, 100% solid epoxy adhesive in formulation recommended by manufacturer for application, as manufactured by:

1. W.R. Meadows Reziweld 1000 or Architect approved/reviewed equal.
- E. Concrete Densifier/Hardener/Sealants:
Liquid applied, lithium silicate based concrete hardener/sealer.
Manufacturers to include:
1. Dayton Superior "Pentra-Hard Densifier"
 2. WR Meadows "Liqi-Hard Ultra
 3. Laticrete (L+M) "L+M Lion Hard"
 4. Prosoco "Consolideck LS Premium Concrete Sealer, Hardener and Denisfier.
 5. Sika "Sikaflorr-956 LD
 6. SureCrete "SureCrete LD 1800 Lithium Densifier and Cement Hardener"

2.05 CONCRETE MIX

- A. Mix concrete in accordance with ACI 304 and deliver concrete in accordance with ASTM C94.
- B. Quality working stresses for the design of this project shall be based on specific minimum 28-day compressive strength of concrete or on specified minimum compressive strength at earlier age at which concrete may be expected to receive full load. Provide concrete of the following properties:
1. Exterior concrete; i.e. entry slabs, ramps, etc.- 4,000 psi. 28-day compressive strength; water-cement ratio, 0.40 maximum (air entrained).
 2. Interior slab on ground – 4,000 psi. 28-day compressive strength; water- cement ratio, 0.44 maximum (non-air entrained).
 3. Footings, walls, supported slabs and all other concrete – 3,000 psi. 28-day compressive strength; water-cement ratio, 0.51 maximum (non-air-entrained), 0.46 maximum (air entrained).
- C. Slump Limits: Proportion and design mixes to result in concrete slump at the point of placement as follows:
1. Ramps and Sloping Surfaces: Not more than 3".
 2. Reinforced Foundation Systems: Not less than 1" and not more than 4".
 3. All Other Concrete: Not less than 1" & not more than 4".
 4. Concrete containing high-range water-reducing admixture (superplasticizer). Not more than 8 inches after adding admixture to site-verified 2-3 inch slump concrete.
 5. Site added water to increase slump is strictly prohibited.

- D. Proportions of aggregate to cement shall be such as to produce a mixture which will work readily into corners, angles of forms, and around reinforcement without permitting materials to segregate. Excess free water shall not collect on concrete surface.
- E. Fly ash shall not exceed 25% of cement content by weight. No fly ash shall be used in slabs.
- F. Select admixture proportions for normal weight concrete in accordance with ACI 301, Method 1 and in strict accordance with manufacturer's instructions.
- G. Air Entraining Agent: Use in all exterior concrete exposed to weather; i.e. exposed foundation walls, supported slabs, ramps, etc. Air entrainment shall be accomplished by use of approved additives used in accordance with manufacturer's instructions. Limit air to 4% minimum to 7% maximum.
- H. Adjustment to concrete mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather or other circumstances warrant, as accepted by the Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

PART 3. EXECUTION

3.01 FORMWORK ERECTION

- A. Erect formwork, shoring and bracing to achieve design requirements. Fabricate forms for easy removal without hammering or prying against exposed concrete surfaces.
- B. Provide bracing to ensure stability of formwork.
- C. Apply form release agent to formwork in accordance with manufacturer's instructions, prior to placing for accessories and reinforcement.
- D. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent.
- E. Clean forms as erection proceeds, to remove foreign matter.
- F. Footings and foundations shall be formed, notched and/or sleeved as indicated to provide for installation of mechanical, electrical or plumbing piping/conduit.
- G. Forms shall conform to shape, lines and dimensions of members as called for,

substantially and sufficiently tight to prevent leakage of concrete.

- H. Forms shall be properly braced, and tied together so as to maintain position and shape. Forms for exposed concrete shall be braced so as to provide dimensions called for, and have taped joints.
- I. Construction joints, whether indicated on drawings or not, shall be made or located so as to least impair strength of the structure. Where joint is to be made, the surface of the concrete shall be thoroughly cleaned and all latency removed. In addition, vertical joints shall be keyed.

3.02 INSERTS, EMBEDDED COMPONENTS, AND OPENINGS

- A. Provide formed openings where required for work to be embedded in and passing through concrete members.
- B. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors and other inserts.
- C. Install concrete accessories straight, level, and plumb.

3.03 REINFORCEMENT PLACEMENT

- A. Place reinforcement, supported and secured against displacement.
- B. Ensure reinforcing is clean, free of loose scale, dirt, or other foreign coatings.
- C. Provide for continuity of reinforcing around corners in footings and walls. Lap corner bars 30 bar diameters.
- D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.04 PLACING CONCRETE

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.
- B. Install vapor intrusion barrier/fluid applied gas barrier under interior slab-on-grade.
 - 1. Installation shall be in accordance with manufacturer's instructions.
 - a. Refer to Spec Section 025619.13 "Vapor Intrusion Barrier/Fluid Applied Gas Barrier" for additional information.

- C. Separate exterior slabs-on-grade from vertical surfaces with ½ inch thick joint filler, extended full thickness of slab. Also, provide filler strips at supported slabs and vertical surfaces.
- D. Place concrete continuously between predetermined control and construction joints. Do not break or interrupt successive pours such that cold joints occur. Where applicable, construction joints shall occur at control joint locations, unless noted otherwise.
- E. Concrete slabs on grade shall be constructed of thickness indicated. If thickness is not indicated, provide a minimum thickness of 4". Minimum thickness at pipes embedded in concrete shall not be less than three times o.d. of the pipe. All buried piping shall have been tested before placement of concrete.
- F. Provide interior control joints where called for on drawing as detailed. When interior construction joints occur, they shall also be considered as control joints. Provide sawed groove similar to a control joint at all construction joints.
- G. Concrete shall be conveyed from the mixer to place of final deposit by methods which will prevent separation and loss of material.
- H. All equipment used for transporting equipment shall be cleaned of all debris. Ice shall be removed from all places to be occupied by concrete forms, and masonry fillers shall be thoroughly wetted except where air temperatures are below 40 degrees F.
- I. Equipment for chuting, pumping, pneumatically conveying concrete, shall be such size and design as to insure practically continuous flow of concrete at delivery and without separation of materials.
- J. Concrete shall be deposited as soon as practicable in its final position to avoid segregation due to re-handling, flowing. Concreting shall be carried on at such rate that concrete is at all times plastic and flow readily into space between bars. No concrete that has partially hardened or has been contaminated by foreign materials shall be deposited on work, nor shall re-tempered concrete be used.
- K. Concreting, once started, shall be carried on as a continuous operation until placing of panel or section is completed. Top surface shall be generally level.
- L. All concrete shall be thoroughly compacted by suitable means during operation of placing and shall be thoroughly worked around reinforcement, embedded fixtures, and into corners of forms. Vibrator shall not be used to flow concrete.

- M. Where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack with non-shrink grout or chemical adhesive. Follow manufacturer's recommendations for installation.
- N. Screed floors slabs-on-grade and concrete base for toppings level, maintaining surface flatness of maximum 1/8 inch in 10 ft.
- O. Construct all concrete site work items to shape, size, thickness and elevations shown. Concrete supported slabs shall be 4" thick on 1" form deck with reinforcing as indicated, unless otherwise shown. Side form all work. Slope surfaces of supported slabs, 1/4" per foot to low side or as directed by Architect/Engineer.
- P. Provide 1/2" bituminous expansion joint filler along all joints where supported slabs abut other walks, building walls, etc.
- Q. Protecting and sealing: Protect concrete supported slabs, ramps, platforms, slabs, etc., from pedestrian traffic for three days after pouring. Concrete shall be cured using two layers of burlap kept wet for minimum of 5 days; or at Contractor's option, he may use sprayed-on compound according to manufacturer's recommendations as approved by Architect. Curing method used shall not discolor original color of concrete, nor shall white liquid curing compound be used.
- R. Provide concrete pads, bases, foundations, etc., as indicated and/or required by mechanical, electrical or other equipment supplier. Set anchor bolts for machine and equipment to templates or measurements provided.

3.05 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Remove formwork progressively and in accordance with code requirements.

3.06 FLOOR FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.
- B. Uniformly spread, screed, and float concrete.
- C. Wood float surfaces which will receive quarry tile or ceramic tile with full bed setting system.
- D. Steel trowel surfaces which will receive carpeting, resilient flooring, seamless

flooring, epoxy terrazzo. Scarify floors to receive all thin set quarry or ceramic tile. Steel trowel corridor slabs (3 passes) and finish to ACI 302.1R, Class 5 floor.

- E. Maintain surface flatness, with maximum variation of 1/8 inch in 10 ft. Corridor slabs to have overall FF=40, local FF=20.
- F. In areas with floor drain, maintain floor level at walls and pitch surfaces uniformly to drains.
- G. Apply concrete hardener on all floor surfaces not receiving resilient flooring tile, hard tile, carpet, epoxy flooring, etc. Apply in accordance with manufacturer's instructions.
- H. Floor shall be finished without excessive floating. Delay troweling until concrete is sufficiently hard to prevent water working to surface. Bring finish to smooth level surface with minimum troweling possible.
- I. Finishes, other than floors, exposed on exterior or interior shall be formed true, free from marks, irregularities. Remove any loose material, grind all projections, fill any honeycombing or holes, finish smooth. Use carborundum stone to hand rub and provide smooth, even surface where directed.
- J. Thoroughly clean and prepare concrete floors scheduled to receive a densifier/hardener/sealer. Apply in strict accordance with manufacturer's instructions.

3.07 CURING

- A. Place absorptive matting and dampen as required.
- B. Immediately after placement, protect concrete from premature drying.
- C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- D. Provisions shall be made for maintaining concrete in moist condition for at least five (5) days after placement, except high early concrete which shall be cured for at least two (2) days.
- E. Cold Weather Requirements:
 - 1. General: Except as modified herein, all work shall be in accordance with ACI 306R.
 - 2. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near freezing weather. No frozen materials or materials containing ice shall be used.

3. All concrete materials, all reinforcement, forms, fillers, ground with which concrete is to come in contact shall be free from frost. Whenever temperature of surrounding air is below 40° F., all concrete placed in forms shall have a temperature of between 70° F., 80°F. Adequate means shall be provided for maintaining temperature of not less than 70° F. for 3 days, 50° F. for 5 days, except high-early concrete shall have temperature maintained at not less than 70° F. for 2 days, 50° F. for 3 days, or for as much more time as necessary to insure proper curing. Housing, covering, other protection used in connection with curing shall remain in place at least 24 hours after artificial heating is discontinued. No dependence shall be placed on salt or other chemicals for prevention of freezing.

F. Weather Conditions:

1. In hot weather, sprinkle and cover all concrete for at least 24 hours longer than specified for normal curing periods. In hot weather work shall be in accordance with ACI 305R.
2. In weather when temperature falls below freezing, and in any event between December 1 and April 1, no concrete shall be poured without adequate frost protection.

3.08 CONCRETE FINISHING

- A. Provide concrete surfaces to be left exposed, concrete walls, columns, etc., with smooth rubbed finish not later than one day after form removal.
 1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 2. Provide 3/4" x 3/4" beveled edges at corners of exposed concrete

3.09 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by an independent firm selected by the Owner and retained by the Construction Manager, in accordance with Division 1.
- B. The Contractor shall notify the Architect/Engineer and the Testing Lab at least five (5) days prior to the commencement of concrete operations.
- C. See Division 1 for inspection and testing allowances.
- D. Specimens shall be molded and cured as per ASTM C31. Three specimens per test, not less than one test for each day's pour, each 50 yards concrete poured,

each building unit, or each strength concrete. Specimens shall be laboratory cured.

- E. Specimens shall be tested in accordance with ASTM C39. One specimen shall be tested at 7 days, two at 28 days.
- F. When average strength of laboratory control cylinders fall below required compressive strength, Architect shall have right to order change in proportions and water content for remainder of structure. Architect shall have right to require tests as per ACI Building Code; Chapter 20 where load tests show concrete does not conform with drawings or specifications. Deficiency shall be corrected without additional cost to Owner.
- G. A PDF copy of test reports at 7 days, 28 days, shall be sent directly to the Architect by the Testing Laboratory, with all required information shown.
- H. Slump tests per ASTM C-172 and C-143, minimum of one test for each set of cylinders, or more as conditions warrant. Deliveries exceeding specified slump shall be rejected.

3.10 DEFECTIVE CONCRETE

- A. Modify or replace concrete not conforming to required lines, details and elevations, as directed by the Architect/Engineer.
- B. Failure of concrete topping to bond to substrate (as evidenced by a hollow sound when tapped), or disintegration or other failure of topping to perform as a floor finish, will be considered failure of materials and workmanship. Repair or replace toppings in areas of such failures, as directed.

END OF SECTION 030010

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SECTION 03 01 00 – BONDING AGENTS FOR CONCRETE

PART 1. GENERAL

1.1 SUMMARY

- A. This specification describes the use of a bonding bridge between new portland-cement mortar or concrete and hardened portland-cement mortar or concrete.

1.2 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall have in existence a recognized quality assurance program and be ISO 9001 Certified, a program of training, certifying and technically supporting a nationally-organized Approved Contractor Program with a re-certification program of its participants for a minimum of 5 years.
- B. Contractor qualifications: Contractor shall be an Approved Contractor of the manufacturer of the specified product, who has completed a program of instruction in the use of the specified coating material, and provides a certification from the manufacturer attesting to its Approved Contractor status.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer, or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.3 DELIVERY, STORAGE AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.4 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified coating.

1.5 SUBMITTALS

- A. Submit PDF copy of manufacturer's literature, to include: Product Data Sheet, System Data Sheet, Application Guide, and appropriate Material Safety Data Sheets (MSDS).
- B. Submit copy of Certificate of Approved Contractor status by manufacturer.

1.6 WARRANTY

- A. Provide a written warranty from the manufacturer against defects of materials for a period of five (5) years, beginning with date of substantial completion of the project.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Sika Armatec 110 EpoCem, as manufactured by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071 is considered to conform to the requirements of this specification.

2.2 MATERIALS

- A. Epoxy resin/portland cement adhesive shall be Sika Armatec 110 EpoCem.
 - 1. Component "A" shall be an epoxy resin/water emulsion containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
 - 2. Component "B" shall be primarily a water solution of a polyamine.
 - 3. Component "C" shall be a blend of selected portland cements and sands.
 - 4. The material shall not contain asbestos.

2.3 PERFORMANCE CRITERIA

- A. Properties of the mixed epoxy resin/portland cement adhesive.
 - 1. Pot Life: 90 minutes @ 73°F.
 - 2. Contact Time:
 - 95°F (35°C) 6 hours
 - 68°F (20°C) 12 hours
 - 50°F (10°C) 16 hours 40°F (5°C) 24 hours
 - 3. Color: Dark gray

- B. Properties of the cured epoxy resin/portland cement adhesive.
 - 1. Compressive Strength (ASTM C-109)
 - a. 3 day: 4500 psi (31.0 MPa)
 - b. 7 day: 6500 psi (44.8 MPa)
 - c. 28 day: 8500 psi (58.6 MPa)
 - 2. Splitting Tensile Strength (ASTM C-496)
 - a. 28 days: 600 psi (4.1 MPa)
 - 3. Flexural Strength (ASTM C-348)
 - a. 1250 psi (8.6 MPa)
 - 4. Bond Strength ASTM C-882 at 14 days
 - a. Wet on Wet, 0-hr. open time: 2800 psi (19.3 MPa)
 - b. 24-hr. open time: 2600 psi (17.9 MPa)
 - 5. Bond of Steel Reinforcement to Concrete (Pullout Test)
 - a. Sika Armatec 110 coated: 625 psi (4.3 MPa)
 - b. Epoxy coated: 508 psi (3.5 MPa)
 - c. Plain Reinforcement: 573 psi (3.95 MPa)
 - 6. The epoxy resin/portland cement adhesive shall not produce a vapor barrier.
 - 7. Material must be proven to prevent corrosion of reinforcing steel when tested under the procedures as set forth by the Federal Highway Administration Program Report No. FHWA/RD86/193. Proof shall be in the form of an independent testing laboratory corrosion report showing prevention of corrosion of the reinforcing steel.

Note: Tests above were performed with material and curing conditions at 73°F and 45-55% relative humidity.

PART 3 - EXECUTION

3.1 MIXING AND APPLICATION

- A. Mixing the epoxy resin: Shake contents of Components "A" and Component "B". Completely empty both components into a clean, dry mixing pail. Mix thoroughly for 30 seconds using a jiffy paddle with a low-speed (400-600 rpm) drill. Slowly add the entire contents of Component "C"

while continuing to mix for 3 minutes until uniform with no lumps. Mix only that quantity that can be applied within its pot life.

- B. Placement procedure for Bonding bridge:
 - 1. Apply to prepared surface with a stiff-bristle brush, broom or “hopper-type” spray equipment.
 - a. For hand-applied mortars-Place fresh, plastic concrete/mortar while the bonding bridge adhesive is “wet” or within open times indicated in section 2.03.A.2.
 - b. For machine-applied mortars-Apply while the bonding bridge adhesive is “wet” or within the open times indicated in section 2.03.A.2.

- C. Placement procedures for anti-corrosion coating:
 - 1. Apply to prepared steel surface with a stiff-bristle brush, or “hopper type” spray equipment at 20 mils minimum thickness. Properly coat the underside of the totally exposed steel. Allow to dry (approx 2-3 hours) then apply a second coat at 20 mils minimum thickness. Allow drying again before placing repair mortar.

*During the anti-corrosion coating method, after applying the second coat Sika Armatec 110 EpoCem, a mortar can be applied to “wet” Sika Armatec 110 EpoCem or within open times indicated in section 2.03.A.2 to achieve the benefit of bonding bridge.

- D. Adhere to all limitations and cautions for the epoxy resin/portland cement adhesive in the manufacturer’s current printed literature.

3.2 CLEANING

- A. The uncured epoxy resin/portland cement adhesive can be cleaned from tools with water. The cured epoxy resin/portland cement adhesive can only be removed mechanically.

- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION 03 01 00

SECTION 06 10 00 - CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of the carpentry work is shown on the Drawings.

1.03 QUALITY ASSURANCE:

- A. Lumber Standard: Comply with U.S. Department of Commerce Product Voluntary Standards PS 1-07, "Structural Plywood", PS 2-04 Performance Standard for "Wood based structural use panels" and PS 20-05 American Softwood Lumber Standard, except as otherwise indicated.
- B. Factory mark each piece of lumber and plywood with type, grade, mill, and grading agency: West Coast Lumber Assoc. (WBLC) or Western Wood Products Association (WWPA).

1.04 SUBMITTALS:

- A. Wood Treatment Data:
 - 1. Submit treatment manufacturer's instructions for proper use of each type of treated material.
 - a. Pressure Treatment: For each type specified, include certification by treating plant stating chemicals and process used, net amount of preservative retained, and conformance with applicable standards.
 - b. For water-borne preservatives, include statement that moisture content of treated materials was reduced to a maximum of 15% prior to shipment to project site.

B. Product Data:

1. Submit manufacturer's specifications and other data for each carpentry anchorage, fastening, and miscellaneous material. Provide material certificates for all lumber and plywood. Transmit a copy of each instruction to the Installer.

1.05 PRODUCT HANDLING:

- A. Delivery and Storage: Keep materials dry during delivery and storage. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood and provide air circulation within stacks.

1.06 JOB CONDITIONS:

- A. Coordination: Fit carpentry work to other work, scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow proper attachment of other work.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. Lumber - General:

1. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20-05, for the moisture content specified for each use. Use dressed lumber, surfaced four sides (SFS) seasoned with 19% maximum moisture content at time of dressing.

B. Framing Lumber (2" through 4" thick):

1. For light framing (less than 6" wide), provide Construction Grade Douglas Fir as graded by the West Coast Lumber Bureau (WCLB) or equivalent species and grade with minimum fiber stress rating (bending) of 1000 psi (Fb), and modulus of elasticity of 1,500,000 psi.
2. For structural framing (6" and wider and from 2" to 4" thick) provide dense No. 1 Grade Douglas Fir as graded by the West Coast Lumber Bureau (WCLB) or equivalent species and grade with minimum fiber stress rating (bending) of 1500 psi (Fb), and modulus of elasticity of 1,700,000 psi.

C. Boards (less than 2" thick):

1. Produce lumber of 19% maximum moisture content (S-DRY) and of the following species and grade.
 - a. Redwood Construction Common (RIS).
 - b. Southern Pine No. 2 Boards (SPIB).
 - c. Or any species graded construction Boards (WCLB or WWPA).

D. Plywood:

1. Provide only Douglas Fir Plywood in accordance with grading requirements of the APA – The Engineered Wood Association as follows:
 - a. Treated non-combustible AC standard with exterior glue.

E. Anchorage and fastening Materials:

1. Select proper type, size, material, and finish for each application. Comply with the following:
 - a. Nails and Staples: FS FF-N-105.
 - b. Wood Screws: FS FF-S-111.
 - c. Bolts and Studs: FS FF-B-575.
 - d. Nuts: FS FF-N-836.
 - e. Washers: FS FF-W-92.
 - f. Lag Screws or Lag Bolts: FS FF-B-561.
 - g. Masonry Anchoring Devices: For expansion shields, nails, and drive screws, comply with FS FF-S-325.
 - h. Toggle Bolts: FS FF-B-588.
 - i. Bar or Strap Anchors: ASTM A 575 carbon steel bars.

2.02 WOOD TREATMENT:

- A. Preservation Treatment: Where lumber or plywood is indicated as "Treated" or is specified herein to be treated, comply with the applicable requirements of the American Wood Preservers Association (AWPA) AWPA P23-08, ASTM D-1625 and Federal Specification TT-W-50.
- B. Pressure-treat above-ground items with water-borne preservatives complying with AWPA P5-09, ASTM D-1760, and Federal Specification TT-W-571. After treatment, kiln-dry to a maximum moisture content of 19%. Treat indicated items and the following, except where fire retardant treated.
 - 1. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
- C. Fire Retardant Treated:
 - 1. Wood blocking and similar items installed within the building shall be pressure impregnation with retardant chemicals to achieve a flame spread rating of not more than 25 when tested in accordance with UL Test 723, ASTM E 84, or NFPA Test 355.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed and notify the Construction Manager, in writing, of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 INSTALLATION:

A. General:

- 1. Discard units of material with defects which might impair the quality of the work, and units which are too small to fabricate the work with minimum joints or the optimum joint arrangement.
- 2. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
- 3. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required. Provide washers under bolt heads

and nuts in contact with wood. Nail plywood in accordance with the recommendations of APA-The Engineered Wood Association.

4. Use common wire nails, except as otherwise shown or specified herein. Use finishing nails for exposed work. Do not wax or lubricate fasteners that depend on friction for holding power. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required. Do not drive threaded friction type fasteners; turn into place. Tighten bolts and lag screws at installation and re-tighten as required for tight connections prior to closing in or at completion of work.

B. Wood Grounds, Nailers, Blocking and Sleepers:

1. Provide wherever shown and where required for screening or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
2. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to form work before concrete placement.
3. Provide permanent grounds of dressed, pressure preservative treated key-bevelled lumber not less than 1-1/2" wide and of the thickness required to bring face of ground to exact thickness of finished material involved. Remove temporary grounds when no longer required.

C. Wood Furring:

1. Install plumb and level with closure strips at all edges and openings. Shim with wood as required for tolerance of finished work.

D. Wood Framing:

1. Provide framing members of sizes and on spacings shown and frame openings as shown, or if not shown, comply with recommendations of "The Wood Frame Construction Manual" 2001 Ed. of the

American Wood Council. Do not splice structural members between supports.

2. Anchor and nail as shown, and comply with the "Recommended Nailing Schedule - Table I of the Manual for Housing Framing: and other recommendations of the N.F.P.A.

E. Installation of Plywood:

1. Comply with recommendations of the Engineered Wood Association (APA) for the installation of plywood.

END OF SECTION 06 10 00

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof curbs cants and perimeter nailers.
2. Blocking in wall and roof openings.
3. Wood furring and grounds.
4. Concealed wood blocking for support of toilet and bath accessories wall cabinets, and wood trim.
5. Telephone and electrical panel backboards.
6. Preservative treatment of wood.

B. Related Requirements:

1. Section 04 20 00-Unit Masonry: Masonry openings to receive wood blocking.
2. Section 08 41 13 – Aluminum Framed Entrances and Storefronts: Door openings to receive wood blocking.
Section 08 51 13 – Aluminum Windows: Window openings to receive wood blocking.

1.2 REFERENCE STANDARDS

A. American National Standards Institute:

1. ANSI A208.1 - Mat-Formed Wood Particleboard.

B. American Wood Protection Association:

1. AWWA M4 - Standard for the Care of Preservative-Treated Wood Products.
2. AWWA U1 - Use Category System: User Specification for Treated Wood.

C. ASTM International:

1. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
2. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
4. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

D. Southern Pine Inspection Bureau:

1. SPIB - Standard Grading Rules for Southern Pine Lumber.

E. U.S. Department of Commerce National Institute of Standards and Technology:

1. DOC PS 1 - Construction and Industrial Plywood.
2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
3. DOC PS 20 - American Softwood Lumber Standard.

F. West Coast Lumber Inspection Bureau:

1. WCLIB - Standard Grading Rules for West Coast Lumber.

G. Western Wood Products Association:

1. WWPA 2011 Western Lumber Grade Rules, including supplements.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit technical data and application instructions on wood-preservative and fire-retardant treatment materials.

1.4 QUALITY ASSURANCE

A. Perform Work according to following:

1. Lumber Grading Agency: Certified by DOC PS 20.
2. Wood Structural Panel Grading Agency: Certified by APA - The Engineered Wood Association.
3. Lumber: DOC PS 20.

4. Wood Structural Panels: DOC PS 1 or DOC PS 2.
- B. Surface-Burning Characteristics:
1. Fire-Retardant-Treated Materials: Maximum 25/450 flame-spread/smoke-developed index when tested according to ASTM E84.
- C. Apply label from agency approved by authority having jurisdiction to identify each preservative-treated and fire-retardant-treated material.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lumber Grading Rules: SPIB.
- B. Miscellaneous Framing: Stress Group A, pressure-preservative treated.
- C. Plywood: APA- exterior rated sheathing, Grade C-D; Exposure Durability 1; unsanded.

2.2 FACTORY WOOD TREATMENT

- A. Fire-Retardant Treatment: Chemically treated and pressure impregnated, having flame spread of 25 or less when tested according to ASTM E 84 and showing no evidence of significant progressive combustion when test is continued for an additional 20-minute period, interior type.
- B. Moisture Content after Treatment: Kiln dried (KDAT).
 1. Lumber: Maximum 19 percent.
 2. Structural Panels: Maximum 15 percent.

2.3 ACCESSORIES

- A. Fasteners and Anchors:
 1. Fasteners: ASTM A153 hot-dip galvanized steel for high-humidity and treated wood locations, unfinished steel elsewhere.
 2. Nails and Staples: ASTM F1667.

3. Anchors: Toggle bolt type for anchorage to hollow masonry, expansion shield and lag bolt type for anchorage to solid masonry or concrete, bolt or ballistic fastener for anchorages to steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that substrate conditions are ready to receive blocking, curbing, and framing.

3.2 PREPARATION

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Coordinate placement of blocking, curbing, and framing items.

3.3 INSTALLATION

- A. Set members level and plumb, in correct position.
- B. Place horizontal members, crown side up.
- C. Construct curb members of solid wood sections.
- D. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- E. Coordinate curb installation with installation of decking and support of deck openings, and parapet construction.
- F. Space framing and furring 16 inches O.C.
- G. Secure sheathing to framing members with ends over firm bearing and staggered.
- H. Install telephone and electrical panel backboards with plywood sheathing material where required. Size backboards 12 inches beyond size of electrical and telephone panel.

END OF SECTION 06 10 53

SECTION 06 61 16 - SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Cast plastic fabrications countertops as indicated on Drawings.
- B. Related Requirements:
 - 1. Section 12 30 00 – Plastic Laminate Casework.
 - 2. Section 07 90 00 - Joint Protection: Perimeter sealant to adjacent construction.
 - 3. Section 22 42 00 - Plumbing Fixtures: Plumbing drains and fixture trim.

1.2 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on specified component products, electrical characteristics, and connection requirements.
- C. Shop Drawings: Indicate dimensions, thicknesses, required clearances, tolerances, materials, colors, finishes, fabrication details, field jointing, adjacent construction, design load parameters, methods of support, integration of plumbing components, and anchorages.
- D. Samples: Submit two samples 2"x2" representative of vanity top, illustrating color, texture, and finish.
- E. Qualifications Statements:
 - 1. Submit qualifications for manufacturer, fabricator, and licensed professional.

1.3 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for closeout procedures.
- B. Operation and Maintenance Data: Submit list of approved cleaning materials and procedures required; list substances harmful to

component materials include instructions for stain removal, surface and gloss restoration.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.
- B. Extra Stock Materials:
 - 1. Furnish 2 containers of polishing cream.

1.5 QUALITY ASSURANCE

- A. Allowable tolerances:
 - 1. Variation in component size: + 1/8" (3 mm).
 - 2. Location of openings: + 1/8" (3 mm) from indicated location.

1.6 MOCKUPS

- A. Section 01 40 00 - Quality Requirements: Requirements for mockups.
- B. Size: Construct mockup, including one of each type of unit.
- C. Incorporate accepted mockup as part of Work.

1.7 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

1.8 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.
- B. Furnish 10 year manufacturer's warranty for each type of unit.

1.9 MAINTENANCE

- A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

- B. Furnish 2 containers of polishing cream.

PART 2 - PRODUCTS

2.1 PLASTIC FABRICATIONS

- A. Basis of Design: Corian Solid Surface
- B. Manufacturers:
 - 1. Corian (Basis of Design)
 - 2. Newmar
 - 3. Gibraltar
 - 4. Avonite
 - 5. Prism as manufactured by InPro Corp.
 - 6. Substitutions: Section 016000 - Product Requirements
- C. SS-1: Corian Solid Surface Stonique
- D. SS-2: Corian Solid Surface Carrara Lino

2.2 FABRICATION

- A. Fabricate components by mold to achieve shape and configuration.
- B. Gel coat exposed finish surfaces smooth and polish to [gloss] [flat] [low] sheen.
- C. Radius corners and edges.
- D. Cure components prior to shipment

2.3 FINISHES

- A. Color: Corian Stonique
- B. Matte with a gloss rating of 5-20

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that joint preparation and affected dimensions are acceptable.

3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Provide anchoring devices for installation and embedding.
- C. Provide templates and rough-in measurements.

3.3 INSTALLATION

- A. Align Work plumb and level.
- B. Install according to manufacturer's printed instructions.
- C. Rigidly anchor to substrate to prevent misalignment.
- D. Seal to adjacent construction as specified in Section 079000 - Joint Protection.

3.4 TOLERANCES

- A. Section 014000 - Quality Requirements: Requirements for tolerances.
- B. Maximum Variation from Indicated Dimension: 1/8 inch .
- C. Maximum Offset from Indicated Position: 1/8 inch).

3.5 CLEANING

- A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.
- B. Clean and polish fabrication surfaces.

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END OF SECTION 06 61 16

SECTION 07 20 00 - INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of thermal insulation work is shown on the drawings.
- B. The applications of thermal insulation specified in this section include the following:
 - 1. Cavity wall.
 - 2. Board-type building insulation.
 - 3. Blanket-type building insulation.
- C. Related Work Specified Elsewhere:
 - 1. Division 15, Mechanical: Insulation for ducts, heating, air conditioning, ventilating, and plumbing work shall be furnished and installed by the respective Mechanical Contractor.
 - 2. Division 16, Electrical: Insulation for electrical work shall be furnished and installed by Electrical Contractor.

1.03 QUALITY ASSURANCE:

- A. Thermal Conductivity: The thickness shown are for the thermal conductivity (k-value at 75%) specified for each material. Provide adjusted thicknesses as directed for the equivalent use of material having a different thermal conductivity.
- B. Fire Ratings: Comply with the fire-resistance and flammability ratings indicated, and comply with governing regulations as interpreted by authorities including:
 - 1. UL requirements for "Roof Deck Constructions" which are rated "Fire-Acceptable".

1.04 SUBMITTALS:

A. Product Data:

- a. Submit manufacturer's specifications and installation instructions for each type of insulation required. Include data substantiating that materials comply with specified requirements.

B. Shop Drawings:

- a. Submit shop drawings for tapered roof area. Show all slopes, thickness, perimeter and roof sump conditions.

1.05 PRODUCT HANDLING:

- A. Protection from Deterioration: Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation. Protect plastic insulation from exposure to sunlight.

- B. Fire Hazard: Do not deliver plastic insulating materials to the project site ahead of installation time. Protect at all times against ignition. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Mineral/Glass Fiber Blanket/Batt Insulation:

- 1. Unfaced Mineral Fiber Blanket/Batt Insulation: Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C665 for type described below with thermosetting resins to comply with ASTM C665 for Type 1 (blankets without membrane facing); and as follows:
 - a. Mineral Fiber Type: Fibers manufactured from glass.
 - b. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.
- B. Miscellaneous Insulation: Shall be inorganic (nonasbestos) mineral wool insulation without facing, for the purpose of filling and stuffing openings in walls around pipes, structural components, windows, conduits, expansion joints to eliminate noise transfer and to insulate. Use to seal top of interior walls, except fire rated walls, between masonry and roof deck, where indicated. Use at expansion joints as detailed.
- C. Insulation shall have a flame spread rating of 15 or less, and a smoke development rating of 0; per ASTM E84.

2.02 AUXILIARY INSULATING MATERIALS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated, securely in position indicated with self-locking washer in place; and complying with the following requirements:

1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
2. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches in diameter, length to suit depth of insulation indicated.
3. Insulation-Retaining Washers: Self-locking washers formed from 0.016 inch thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
 - a. Where spindles will be exposed to human contact after installation, protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.
4. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates.
5. Products: Subject to compliance with requirements, provide one of the following:
 - a. Adhesively attached, spindle type anchors
 - i. TACTOO Insul-Hangers; AGM Industries, Inc. Canton, MA
 - ii. Spindle Type Gemco Hangers; Gemco, Danville, IL
 - b. Insulation - Retaining Washers
 - i. RC150; AGM Industries Inc, Canton, MA
 - ii. R150; Gemco, Danville, IL
 - c. Adhesive
 - i. TACTOO Adhesive; AGM Industries, Inc. Canton, MA
 - ii. Tuff Bond Hanger Adhesive; Gemco, Danville, IL

PART 3 - EXECUTION

3.01 INSPECTION:

- A. The Installer must examine the substrate and conditions under which the insulation work is to be performed, and notify the Construction Manager in writing of unsatisfactory conditions. Do not proceed with the insulation work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSULATION:

A. General:

1. Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.
2. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.
3. Apply a single layer of insulation of the required thickness unless otherwise shown or required to make up the total thickness.

B. Perimeter Insulation:

1. On vertical surfaces, set units in adhesives applied in accordance with manufacturer's instructions. Use type adhesive recommended by manufacturer of insulation.

C. General Building Insulation:

1. Apply insulation units to the substrate by the method indicated, complying with the manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage, to provide permanent placement

and support of units.

2. Set vapor barrier faced units with vapor barrier to warm side of construction, except as otherwise shown. Do not obstruct ventilation spaces, except for

D. firestopping.

- a. Tape joints and ruptures in vapor barriers, using adhesive tape of type recommended by insulation manufacturer, and seal each continuous area of insulation to surrounding construction so as to ensure vapor-tight installation of the units.

- E. Stuff loose mineral fiber insulation into miscellaneous voids and cavity spaces as indicated. Compact to approximately 40% of normal maximum volume (to a density of approximately 2.5 lbs. per cu. ft.).

END OF SECTION 07 20 00

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SECTION 08 12 00 - HOLLOW METAL WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of hollow metal work is shown on the drawings and schedules.
- B. This section includes hollow metal doors and pressed steel frames for doors and related openings.

1.03 QUALITY ASSURANCE:

- A. Provide doors and frames complying with ANSI A258.8-1998 (SDI-100) "Recommended Specifications for Standard Steel Doors and Frames" and as herein specified.
- B. Fire-rated door assemblies shall be Underwriter Laboratory.: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows", and have been tested, listed, and labeled in accordance with ASTM E 152 "Standard Methods of Fire Tests for Door Assemblies". All metal labels to be riveted to door and frames mylar labels not acceptable.

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications for fabrication and installation, including data substantiating that products comply with requirements.
- B. Shop Drawings: Submit shop drawings for the fabrication and installation of hollow metal work. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections.

- 1. Provide a schedule of doors and frames using same

reference numbers for details and openings as those on the contract drawings.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage.
- B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided the finish items are equal in all respects to new work and acceptable to the Architect; otherwise remove and replace damaged items as directed.
- C. Store doors and frames at the building site under cover. Place units on at least 4" high wood sills or on floors in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters which could create a humidity chamber. If the cardboard wrappers on doors become wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. ASTM A653/A653M – Standard Specification for sheet steel, zinc coated (galvanized) or zinc-iron alloy-coated (galvannealed) by the hot dip process (A60).
- B. ASTM A924 – Specification for general requirements for steel sheet metallic coated by the hot dip process (A60).
- C. ASTM A 1009/A1008M – Standard specification for steel sheet, cold rolled, carbon, high strength low-alloy, high strength low alloy with improved formability, solution hardened, and bake hardenable.
- D. Supports and Anchors: Fabricate of not less than 16 gage sheet metal. Galvanize after fabrication units to be built into exterior walls, complying with ASTM A 153, Class B.
- E. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

- F. Shop-Applied Paint: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as base for specified finish paints on steel surfaces.

2.02 FABRICATION, GENERAL:

- A. Fabricate hollow metal units to be rigid, neat in appearance, and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment to assure proper assembly at the project site. Weld exposed joints continuously; grind, dress, and make smooth, flush, and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
- B. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.
- C. Finish Hardware Preparation:
 - 1. Prepare hollow metal units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling, and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A 115 series specifications for door and frame preparation for hardware.
 - 2. Reinforce hollow metal units to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
 - 3. Locate finish hardware as shown on final shop drawings, or if not shown, in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute.
- D. Shop Painting:
 - 1. Clean, treat and paint exposed surfaces of fabricated hollow metal units, including galvanized surfaces.
 - 2. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of paint.

3. Apply pretreatment to cleaned metal surfaces, using cold phosphate solution (SSPC-PT-2), hot phosphate solution (SSPC-PT4) or basic zinc chromate-vinyl butyral solution (SSPC-PT3).
4. Apply shop coat or prime paint within time limits recommended by pretreatment manufacturer. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 2.0 mils, comply with ANSI A250.18.

E. Manufacturer: Provide hollow metal work by one of the following:

1. Ceco Door Products
2. Amweld Building Products
3. Steelcraft (Allegion)
4. Or approved equal

2.03 DOORS:

A. General:

1. Provide flush design doors, 1-3/4" thick, seamless hollow construction, unless otherwise indicated. Bevel both vertical edges 1/8" in 2".
2. Insulated doors: Interior core of doors to be foamed in place, closed cell, polyurethane foam chemically bonded to door face sheets. Voids in foam will not exceed 1/2" in any direction. Compressive strength of polyurethane to be minimum of 20 PSI. Foam density not less than 1-8 PCF. Polystyrene core doors not acceptable. Doors to have R factor of not less than 14.81 U factor of .068.

B. Interior Doors:

1. Fabricate interior doors of two outer, cold-rolled, stretcher-leveled steel sheets not less than 14 gage. Construct doors with smooth, flush surfaces, without visible joints or seams on exposed faces or stile edges except around glazed or louvered panel inserts.
2. Reinforce inside of doors with vertical, hot-rolled, not less than 22 gage steel sections. Space vertical reinforcing 6" o.c. and extend full door height. Spot weld at not more than 5" o.c. to both face sheets.
 - a. Continuous truss-form inner core of 28 gage sheet metal reinforcing may be provided as inner reinforcement in lieu of above. Spot-weld truss-form reinforcement 3" o.c. vertically and horizontally over entire surface of both sides.

3. Reinforce tops and bottoms of doors with 14 gage, horizontal steel channels, welded continuously to outer sheets.
- C. Finish Hardware Reinforcement: Reinforce doors for required finish hardware as follows:
1. Hinges: Steel plate 3/16" thick x 1-1/2" wide x 6" longer than hinge, secured by not less than 6 spot-welds.
 2. Mortise Locksets and Dead Bolts: 14 gage steel sheet, secured with not less than two spot-welds.
 3. Cylinder Locks: 12 gage steel sheet, secured with not less than two spot-welds.
 4. Flush Bolts: 12 gage steel sheet, secured with not less than two spot-welds.
 5. Surface-Applied Closers: 12 gage steel sheet, secured with not less than six spot-welds.
 6. Plush Plates and Bars: 16 gage steel sheet (except when through bolts are shown or specified), secured with not less than two spot-welds.
 7. Surface Panic Devices: 14 gage sheet steel (except when through bolts are shown or specified), secured with not less than two spot-welds.

2.04 FRAMES:

- A. Provide hollow metal frames for doors, side-lights, borrowed lights, and other openings of sizes and profiles as indicated.
- B. Fabricate frames of full-welded unit construction with corners mitered, reinforced, continuously welded full depth and width of frame, unless otherwise indicated.
 1. Knock-down type frames are not acceptable.
- C. Form frames of galvanized steel sheets for exterior and either cold or hot-rolled sheet steel for interior.
 1. Gage: Not less than 14, for exterior openings up to and including 4'-0" wide.
 2. Gage: Not less than 14, for interior openings up to and including 4'-0" wide.
 3. For openings over 4'-0" wide: Not less than 12 gauge.
- D. Finish Hardware Reinforcement: Reinforce frames for required finish hardware as follows:

1. Hinges and Pivots: Steel plate 3/16" thick x 1-1/2" wide x 6" longer than hinge, secured by not less than six spot-welds.
 2. Strike Plate Clips: Steel plate 3/16" thick x 1-1/2" wide x 3" long.
 3. Surface-Applied Closers: 12 gage steel sheet, secured with not less than six spot-welds.
 4. Concealed Closers: Removable steel access plate, 12 gage internal reinforcement of size and shape required, and enclosing housing to keep closer pocket free of mortar or other materials.
- E. Head Reinforcing: Where installed in masonry, leave vertical mullions in frames open at top for grouting.
- F. Jamb Anchors: Furnish jamb anchors as required to secure frames to adjacent construction, formed of not less than 18 gage galvanized steel.
1. Masonry Construction: Adjustable, flat, corrugated or perforated T-shaped to suit frame size, with leg not less than 2" wide by 10" long. Furnish at least three anchors per jamb up to 7'-6" height; four anchors up to 8'-0" jamb height; one additional anchor for each 24" or fraction thereof over 8'-0" height.
 2. Metal Stud Partitions: Insert type with notched clip to engage metal stud, welded to back of frames. Provide at least four anchors for each jamb for frames up to 7'-6" in height; five anchors up to 8'-0" jamb height; one additional anchor each 24" or fraction thereof over 8'-0" height.
 3. In-Place Concrete or Masonry: Anchor frame jambs with minimum 3/8" concealed bolts into expansion shields or inserts at 6" from top and bottom and 26" .c., unless otherwise shown. Reinforce frames at anchor locations. Apply removable stop to cover anchor bolts unless otherwise indicated.
- G. Floor Anchors: Provide floor anchors for each jamb and mullion which extends to floor, formed of not less than 14 gage galvanized steel sheet as follows:
1. Monolithic Concrete Slabs: Clip type anchors with two holes to receive fasteners, welded to bottom of jambs and mullions.
- H. Head Anchors: Provide two anchors at head of frames exceeding 42" wide for frames mounted in steel stud walls.
- I. Head Strut Supports: Provide 3/8" x 2" vertical steel struts extending from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend

top of struts to provide flush contact for securing to supporting construction above. Provide adjustable bolted anchorage to frame jamb members.

- J. Structural Reinforcing Members: Provide as part of frame assembly, where indicated at mullions, transoms, or other locations which are to be built into frame.
- K. Head Reinforcing: For frames over 4'-0" wide in masonry wall openings, provide continuous steel channel or angle stiffener not less than 12 gage for full width of opening welded to back of frame at head.
- L. Spreader Bars: Provide removable spreader bar across bottom of frames, tack welded to jambs and mullions.
- M. Rubber Door Silencers: Except on weatherstripped doors, drill stops to receive three silencers on single-door frames and four silencers on double door frames. Install plastic plugs to keep holes clear during construction.
- N. Plaster Guards: Provide 26 gage steel plaster guards or dust cover boxes, welded to frame at back of finish hardware cutouts where mortar or other materials might obstruct hardware installation.

2.05 STOPS AND MOLDINGS:

- A. Provide stops around glazed panels in hollow metal units and in frames to receive doors where indicated.
- B. Form fixed stops integral with frame, unless otherwise indicated.
- C. Provide removable stops and molds where indicated or required, formed of not less than 20 gage steel sheets matching steel on frames. Secure with countersunk machine screws spaced uniformly not more than 12 o.c.. Form corners with butted hairline joints.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine substrate and conditions under which hollow metal work is to be installed and must notify the General Contractor, in writing, of any conditions detrimental to proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.02 INSTALLATION:

- A. Install hollow metal units and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Setting Masonry Anchorage Devices:
 - 1. Provide masonry anchorage devices where required for securing hollow metal frames to in-place concrete or masonry construction.
 - 2. Set anchorage devices opposite each anchor location, in accordance with details on final shop drawings and anchorage device manufacturer's instructions. Leave drilled holes rough, not reamed, and free from dust and debris.
 - 3. Floor anchors may be set with powder-actuated fasteners instead of masonry anchorage devices and machine screws, if so indicated on final shop drawings.
- C. Placing Frames:
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After all construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
 - 2. Protective Coating: In masonry walls, protect inside (concealed) faces of door frames using fibered asphalt emulsion coating. Apply approximately 1/8" thick over shop primer and allow to dry before handling.
 - 3. In masonry construction, building-in of anchors and grouting of frames is included in Section 04300 "Masonry Work" of these specifications.
 - 4. At in-place concrete or masonry construction, set frames and secure in place with machine screws and masonry anchorage devices.
 - 5. Place frames at fire-rated openings in accordance with NFPA Standard No. 80.
 - 6. Make field splices in frames as detailed on final shop drawings, welded and finished to match factory work.
 - 7. Remove spreader bars only after frames or bucks have been properly set and secured.
- D. Door Installation:
 - 1. Fit hollow metal doors accurately in their respective frames with the following clearances:
 - a. Jambs and Head: 3/32".
 - b. Meeting Edges, Pairs of Doors: 1/8".

- c. Bottom: 1/4" at threshold or carpet.
 - d. Bottom: 1/4" to threshold or tile
 - e. Bottom: 1/8" to bottom of head or transom panel.
- 2. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.
 - 3. Finish Hardware installation is specified in Section 08710.

3.03 ADJUST AND CLEAN:

- A. Final Adjustments: Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper operating conditions. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.
- B. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

END OF SECTION 08 12 00

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SECTION 08 32 13 – INTERIOR SUSPENDED SLIDING GLASS DOORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of glazed aluminum framed sliding doors and frames shown on the drawings.

1.03 QUALITY ASSURANCE:

- A. Coordinate with Action Submittal requirement for delegated design shop drawing submittal.
- B. Installer: Firm with not less than five (5) years of successful experience in installing similar work to required work.

1.04 SUBMITTALS:

- A. Product Data:
 - 1. Submit manufacturer's product specifications, including documentation to compliance with requirements and instructions for handling, storing, installing, cleaning and protecting each type of glass and glazing materials.
- B. Samples:
 - 1. Submit two (2) samples of each type of glass and glazing material required, except for single-pane clear glass (including annealed and tempered). Submit 12" square glass samples and 12" lengths of installed (mocked-up) glazing materials.
 - a. Submit insulating glass samples with completed edge-seal construction, but hermetic seal need not be maintained.
- C. Warranties:
 - 1. Warranty on Laminated Glass: Provide written warranty signed by laminator (manufacturer) and countersigned by Contractor/Installer agreeing to within five (5) years after date of acceptance, replace

glass units with defective lamination, defined to include evidence of delamination, changes in required strengths, transmittances, color, transparency, and other required performance.

1.05 PRODUCT HANDLING:

- A. Comply with manufacturer's instructions for shipping, handling, storing, and protecting door and materials. Exercise exceptional care to prevent edge damage to glass, and damage/deterioration to coatings on glass.

1.06 JOB CONDITIONS:

- A. Pre-Installation Meeting: Comply with General Requirements for pre-installation meeting of installer and other trades affected by door installation.

PART 2 - PRODUCTS

2.01 Basis of Design: Suspended Sliding Door

Manufacturer:

- 1. The Sliding Door Company LL
- 2. Approved equal

2.02 GLAZING SEALANTS, COMPOUNDS AND GASKETS:

A. Framing, General:

- 1. Material: Aluminum extrusions, 6063 alloy.
- 2. Finish:
 - a. Clear Anodized Aluminum: AAMA 611, Class II.
 - b. Powder Coating: Black
 - c. [Simulated Wood (heat treated): [Wenge][Walnut]pattern.]

B. Columns: 4 by 4 inches, 0.100 inch minimum thickness.

C. Top Tracks: 0.195 inch minimum thickness, with number of channels required for door operation indicated.

D. Bottom Wheel Guide:

- 1. Steel, 0.117 inch minimum metal thickness.
- 2. Installation: Surface-mounted
- 3. Finish: Silver Powder Coated Steel

E. Doors:

- 1. Stiles and Rails:
 - a. Stile 3 inch wide, Rail 2.5 inch wide, 0.051 inch minimum thickness.

F. Glass: Category II Safety Glazing per CPSC 16 CFR 1201.

1. Monolithic Clear Tempered Glass: 5 mm thick, ASTM C1048, Kind FT.

2.3 HARDWARE

A. Handles:

1. Standard Handle Brushed Silver-Aluminum
2. Square Designer Handle Black 12" ht.

B. Upper Roller Carriages: Vinyl rollers with steel bearings.

C. Bottom Wheel Carriages: Vinyl rollers with steel bearings.

D. Locks and Latches:

1. Sliding Door Mortise Latch ADA- Black

E. Door Stop: For head, as indicated on shop drawings.

2.5 ACCESSORIES

A. Silicone Adhesive Clear, construction grade silicone adhesive.

B. Fasteners: As indicated in Shop Drawings

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Verify that openings and substrates are acceptable for installation of Work of this Section

3.03 INSTALLATION

- A. General and Standards: Install systems according to Shop Drawings and manufacturer's installation instructions.

3.04 ADJUSTING, CLEANING AND PROTECTING:

- A. Adjust doors for smooth operations
- B. Comply with manufacturer's written recommendations for cleaning and maintenance.
- C. Clean aluminum and glass surfaces immediately after installing sliding doors.
- D. Protect surfaces from impact and from contact with contaminating substances resulting from other construction operations. Typically, this product is last trade in.
- E. Clean immediately before Substantial Completion.

3.05 Closeout Requirements:

- A. Deliver executed Warranty

END OF SECTION 08 80 00

SECTION 08 71 00 – FINISH HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Work included:

1. Furnish hardware required to complete the work as shown on the drawings and as specified herein;
2. Furnish trim attachments and fastenings, specified or otherwise required, for proper and complete installation.
3. Furnish all items of Finish Hardware specified, scheduled, shown or required herein except those items specifically excluded from this section of the specification.
4. These documents supersede all previous hardware specifications and shall be followed without substitution.

B. Related work:

1. Division 1 – General Requirements
2. Division 6 – Rough Carpentry
3. Division 6– Finish Carpentry: Installation of Finish Hardware
4. Division 8 – Steel Doors and Frames
5. Division 8 – Wood Doors
6. Division 8 – Special Doors
7. Division 8 – All Glass Entrances and Storefronts
8. Division 8 – Aluminum Framed Entrances and Storefronts
9. Division 16 – Electrical
10. Division 16 – Smoke Detection Systems
11. Division 16 – Security Access Systems

C. Specific Omissions: Hardware for the following is specified or indicated elsewhere,

unless specifically listed in the hardware sets:

1. Cabinet Hardware.
2. Signs, except as noted.
3. Folding partitions, except cylinders where detailed.
4. Sliding aluminum doors
5. Chain link and wire mesh doors and gates
6. Access doors and panels
7. Overhead and Coiling doors

1.2 REFERENCES

- A. National Fire Protection Associations (NFPA):
 - 1. NFPA 101-2015, "Life Safety Code"
 - 2. NFPA 80-2013, "Installation of Fire Doors and Windows"
 - B. Michigan Building Code -2015
 - C. American National Standards Institute (ANSI):
 - 1. ANSI A 156 Standards series.
 - 2. ICC/ANSI A117.1-2015 Accessible and Usable Buildings and Facilities
- 1.3 DEFINITIONS
- A. "Finish Hardware": Items required for swinging, sliding and folding doors, except special types of unique and non-matching hardware specified under door and frame Sections of these Specifications.

1.4 SYSTEM DESCRIPTION

- A. Design requirements:
 - 1. Review of hardware requirements:
 - a. Thoroughly review finish hardware schedule, comparing it with the floor plan, door schedule, and door details to verify hardware requirements, quantities, door swings, finishes, and sizes.
 - b. If an inconsistency or error in the proposed construction documents is suspected, the hardware supplier is to bring it immediately to the attention of the Architect. If the quantity of items is questioned, for bidding purposes, assume the higher quantity is required and price accordingly.
 - c. Architect's review of Submittals is for design concept only, and does not relieve the Contractor of the responsibility to furnish sufficient material and functions required for a complete and code-worthy installation. Determination of all quantities is the responsibility of the Contractor.
 - d. Where existing frames remain, survey existing opening and verify that existing hinge, strike, other hardware preps are consistent with what is specified. Notify architect immediately if any inconsistencies are found. Patch, fill and repair the existing door preps as required, and prep the frames to accept new hardware items. Where inconsistencies with hinge sizes and locations exist, provide compatible items that will fit the existing frames.

B. Performance requirements:

1. Furnish finish hardware complying with the requirements of laws, codes, ordinances and guidelines of governmental authorities having jurisdiction:
 - a. NFPA 101, "Life Safety Code", 2015 edition
 - b. NFPA 80, "Installation of Fire Doors and Windows", 2018 edition
 - c. Michigan Building Code -2015
 - d. ICC/ANSI A117.1-2015 Accessible and Usable Buildings and

Facilities

1.5 Submittals:

A. Hardware Schedule

1. Submit number of Hardware Schedules as directed in Division 1.
2. Follow guidelines established in Door & Hardware Institute Handbook (DHI) Sequence and Format for the Hardware Schedule unless noted otherwise.
3. Schedule will include the following:
 - a. Door Index including opening numbers and the assigned Finish Hardware set.
 - b. Preface sheet listing category only and manufacturer's names of items being furnished as follows:

CATEGORY	SPECIFIED	SCHEDULED
Hinges	Manufacturer A	Manufacturer B
Lock sets	Manufacturer X	Manufacturer X
Kick Plates	Open	Manufacturer Z

- c. Hardware Locations: Refer to DHI Article 3.1 B.2 Locations.
- d. Opening Description: Single or pair, number, room locations, hand, active leaf, degree of swing, size, door material, frame material, and UL listing.
- e. Hardware Description: Quantity, category, product number, fasteners, and finish.
- f. Headings that refer to the specified Hardware Set Numbers.
- g. Scheduling Sequence shown in Hardware Sets.
- h. Product data of each hardware item, and shop drawings where required, for special conditions and specialty hardware.
- i. Electrified Hardware system operation description.
- j. "Vertical" scheduling format only. "Horizontal" schedules will be returned "Not Approved."

- k. Typed Copy.
 - l. Double-Spacing.
 - m. 8 1/2 x 11 inch sheets
 - n. U.S. Standard Finish symbols or BHMA Finish symbols.
- B. Product Data:
- 1. Submit, in booklet form Manufacturers Catalog cut sheets of scheduled hardware.
 - 2. Submit product data with hardware schedule.
- C. Samples:
- 1. Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware; if requested by the architect; submit one sample, if required, of each type of exposed hardware unit, finished as required and tagged with full description for coordination with schedule.
 - 2. Samples will be returned to the supplier. Units, which are acceptable and remain undamaged through submittal, review and field comparison procedures, may, after final check of operation, be used in the work, within limitations of keying coordination requirements.
- D. Submit to General Contractor/Construction Manager, the factory order acknowledgement numbers for the various hardware items to be used on the project. The factory order acknowledgement numbers shall help to facilitate and expedite any service that may be required on a particular hardware item. General Contractor/Construction Manager shall keep these order acknowledgement numbers on file in the construction trailer.
- E. Electrified Hardware Drawings:
- 1. Submit Riser & Wire Diagram drawings RPISB112224 showing relationship of all electrical hardware components to door and frame. These drawings shall be included with the submittals and are required to be modified for "as built" and included with the close out documents.
 - a. Include elevation & wiring drawing showing point to point wire hook up for all components. Indicate number and gage of wires required for each item.

1.6 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained

and experienced in the necessary crafts and who are completely familiar with the requirements and the methods needed for proper performance of the work of this Section.

- B. Supplier qualifications:
 - 1. A recognized architectural finish hardware supplier with its' parent company located within 250 miles of the project site.
 - 2. Continuously in business of finish hardware supply for not less than 5 years.
- C. Provide the service of a certified AHC (Architectural Hardware Consultant) to:
 - 1. Be available for consultation with the Architect at no additional cost to the Owner during progress of construction, and:
 - a. Inspect installation of all finish hardware items;
 - b. Make all minor adjustments required; and
 - c. Report to the Architect on completeness of the installation.
 - 2. The hardware consultant may be an employee of the supplier.
- D. Installer qualifications: Employ a competent hardware installer with at least five (5) years experience installing commercial grade hardware similar to that proposed for the Work.
- E. Source limitations: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements. Products listed within these documents shall be used without substitution.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01620.
- B. Product identification:
 - 1. Tag and mark each item separately in manufacturers unopened package, identifying it by product number and architectural opening number, as listed in the approved Finish Hardware Schedule.
 - 2. Include instructions, templates, and fasteners needed for installation.
- C. Deliver individually packaged hardware items on a vehicle operated by a direct employee of the Hardware Supplier. Contractor shall immediately, and in the presence of the Hardware Supplier, inventory

the contents of the delivery.

- D. Hardware supplier: Furnish finish hardware items directly to the factory or mill for factory-installation, where required.

1.8 PROJECT CONDITIONS

- A. Provide a secure, well lit, dry storage area for the sole purpose of storing finish hardware. Prohibit access to all jobsite personnel, except those employed by the installing contractor.

1.9 WARRANTY

- A. Manufacturer's warranty:
 - 1. Standard manufacturer's warranties apply for products listed in Part 2 products.
 - 2. Refer to Division 1 for further warranty requirements.
- B. During the warranty period, replace defective work, including labor, materials and other costs incidental to the work. Replace work found to be defective as defined in the General Conditions.
- C. Failures due to defective materials or workmanship to include, but not to be limited to:
 - 1. Failures in operation of any operating component;
 - 2. Defects which contribute to unsightly appearance, potential safety hazard, or potential untimely failure of the products furnished under this Section.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each finish hardware item is indicated in the Finish Hardware Schedule at the end of this Section.
- B. Product designations:
 - 1. One or more manufacturers are listed for each hardware type required. Product listed is for basis of design. Only products listed in part 2 product descriptions will be allowed for substitution.
- C. ANSI/BHMA designations:

1. Used to describe hardware items, or to define quality or function. Provide products complying with these standards in addition to additional requirements of this Section.
- D. Hand of door: Drawings show direction of slide, swing ("hand") of door leafs.
- E. Hardware: Use hardware manufactured to conform to published templates and, generally, prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

2.2 MATERIALS

- A. Base metals:
 1. Manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially-recognized) quality than that specified for applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated.
 2. Do not furnish "optional" materials for those indicated, except as otherwise specified.
- B. Fasteners:
 1. Furnish Phillips flat-head screws with each hardware item, unless otherwise indicated.
 2. Exposed screws: Match finish of hardware (even where noted to be "prepared for paint").
 3. Use concealed fasteners for hardware units which are exposed when door is closed, except where no standard units of type specified are available with concealed fasteners.
 4. Do not use thru-bolts where bolt head or nut on opposite face would be exposed.
 5. Where adequate reinforcement is not feasible, thru-bolting would

only be acceptable if through sleeves, or if sex-screw fasteners are used.

- D. Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

2.3 MANUFACTURED UNITS, GENERAL

A. Reference standards:

- 1. Comply with BHMA/ANSI A156 current series for each product type.

B. Hardware finishes:

- 1. Materials and Finishes Standard: Comply with ANSI A156.18 Finish designations used in schedules are listed, therein.
- 2. Provide matching finishes for hardware units at each door, unless otherwise indicated.
- 3. Match the color and texture of hardware items to manufacturer's standard finish for the latchset, lockset, or push-pull unit.
- 4. Provide quality of finish, including thickness of plating or coating, composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than that specified or described by referenced standards.

C. Hardware for fire-rated openings:

- 1. Comply with NFPA 80
- 2. Tested and listed by Underwriters Laboratory (UL), or Factory Mutual (FM) for type, size and use of door, and complying with requirements of door and door frame label.
- 3. Provide UL or FM label on door indicating "Fire door to be equipped with fire-exit hardware".
- 4. Provide UL or FM label on exit device indicating "Fire Exit Hardware".

2.4 PRODUCTS

A. Hinges:

- 1. Butt Hinges:
 - a. ANSI A156.1 - for commercial quality.
 - b. Provide only template-produced units.
 - c. All butt hinges to be ball bearing-5 knuckle type Standard or Heavy Weight as specified.
 - d. Hinges at exterior doors shall be of non-ferrous material.

- e. All hinges shall be provided Non-removable (NRP)
 - f. Size and number of hinges as specified; otherwise according to hinge manufacturer's recommendation for door size and weight.
 - g. Acceptable products: PBB, PDQ, SDC
- B. Lock Cylinders and Keying:
- 1. General:
 - a. Supplier shall meet with Owner and Architect to finalize keying direction and furnish a complete key schedule. The key schedule shall include keysets, marks and key schedule corresponding to each opening.
 - 2. Cylinders:
 - a. Type: Mortise or rim-type as required by function of locking device.
 - b. Provide screw on cams or tail piece as required.
 - c. Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.
 - d. Provide solid machined cylinder rings with tension spring to resist wrenching of cylinder. Length, finish and size as required.
 - e. Provide cylinder(s) and core(s) as required by function for each locking device.
 - 3. System:
 - a. Provide temporary brass construction cores for each cylinder provided.
 - b. Provide combined SFIC final cores keyed to the owners master key system.
 - 4. Keying:
 - a. Deliver keys and final cores to the hardware installation Contractor for final installation, when directed by the Owner.
 - b. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
 - c. Key material: Nickel silver
 - d. Key quantity:
 - (1) Two (2) change keys for each lock; Two (2) core keys total.
- C. Locksets:
- 1. Cylindrical Locks
 - a. Comply with ANSI A156.2 –Series 4000, Grade 1 criteria for cylindrical locks
 - b. Function: Mechanical and Electric functions Indicated in the

hardware sets.

i. Electrical lock requirements: Motor Driven 24VDC, Field Selectable

NFS-Fail Safe / FSC-Fail Secure Trim with RX request to exit switch.

c. Provide appropriate fasteners for lock and strike.

d. Locks shall be built in the USA.

e. Trim: BSN, SFIC prep, equal to PDQ.

f. Acceptable products: PDQ GT, Sargent 11 line

2. Mortise Locks

a. Comply with ANSI A156.13 - 1987, Grade 1 criteria for mortise locks

b. Function: Mechanical and Electric functions Indicated in the hardware sets.

i. Electrical lock requirements: Motor Driven 24VDC, Field Selectable

NFS-Fail Safe / FSC-Fail Secure Trim with RX request to exit switch.

c. Trim: Stainless Steel / Boston lever-type, equal to PDQ.

d. Locks shall be built in the USA.

e. Lockset case shall to be non-handed and have three-piece latches.

f. Acceptable products: PDQ MR series, Sargent 8200

D. Door closers:

1. General:

a. ANSI A156.4 - 1986 Grade 1 criteria.

b. All closers shall be the products of one manufacturer.

2. Description:

a. Full rack-and-pinion type

b. Cast Iron Body.

c. Hydraulic fluid: non-gumming and non-freezing.

d. Closer body: non-handed, multi-size spring power.

e. With three non-critical V valves and hex key adjustment to independently

regulate sweep latch speed and backcheck.

f. Provide mounting brackets necessary to clear sound seals and weatherstrip.

g. Enclose in a full, molded cover.

h. Provide drop plates or special brackets for proper mounting.

i. Pressure Relief Valves will not be accepted on Door Closers.

j. Provide Barrier Free power setting as required by ANSI A117.1

k. Where SCS is specified, furnish a Stainless-Steel swivel snubber.

Stationary snubbers, rubber grommets and studs will not be accepted.

3. Acceptable products: PDQ 7000, IDC 44CI, LCN 4041XP

E. Stops:

1. General:

- a. ANSI A156.16 - 1989 Grade 1 criteria.
- b. Provide stops where scheduled, wall or floor, as opening conditions dictate, utilizing wall stops wherever possible.

2. Description:

- a. Wall stops: Cast brass, bronze or stainless steel. Concave wall stop to have stainless steel washer imbedded in rubber stop.
- b. Floor stops: Cast Stainless, brass or bronze, and plated as required.
- c. Make selection of floor stop height based upon floor conditions and door undercut.
- d. Overhead stops: Surface or concealed-mounted overhead

stops where

scheduled. Size track and arm to door width. Provide thru-bolts when used on fire-rated or hollow core wood doors.

3. Acceptable products: PDQ, Hiawatha, Don Jo

F. Kick plates, mop plates and armor plates:

1. General: ANSI A156.16 - 1989 criteria.

2. Description:

- a. Minimum .050" thick
- b. Dimensions:
 - (1) Width: 2" less than door width to which they are to be applied.
 - (2) Kick plate height: 10"

3. Mounting:

- a. Install kick plates and armor plates flush to bottom edge of door.
- b. Notch armor plates for lock or exit device trim or active case.

4. Acceptable manufacturers: Hiawatha, PDQ, Don Jo

G. Access Control Equipment:

1. General:

- a. All access control system components, control modules, card readers and peripherals are to be furnished by Access Control Vender.
- b. Access Control Door Hardware & Equipment specified in this

- section is to be furnished by hardware distributor under this section 087100 and installed by carpenter contractor under section 087100.
- c. Line voltage, circuits, cable and installation of power supplies for card readers, controllers and access control peripherals to be installed under Security Section.
2. Access Control Components:
 - a. Comply with ANSI A156.5, Grade 1 for hardware products supplied.
 - b. All products to be UL or WHI listed.
 - c. Type: 24 V with required amp rating for load as required.
 - d. Furnish access control equipment listed in hardware sets.
 - I. Power Supplies: Furnish SDC600 series as specified.
 - II. Door Contact: SDC MC-4 Door Contacts Indicated in the hardware sets.
 - III. Power Transfers: SDC PTM-10 Indicated in the hardware sets.
 - IV. Electric Strike: SDC 55 (A-D) LM Indicated in the hardware sets.
 - c. Furnish access control equipment listed in hardware sets.

Power Supplies
may be consolidated upon final access control layout and circuits have been
determined. Furnished power supplies allowing for 1 amp @
24VDC at each
electrified hardware opening.
 3. Acceptable products:
 - a. Acceptable products SDC, PDQ, IDC
- H. Sliding Door System:
1. General:
 - a. Provide CCSF-2-998-W-CA Kit door hardware system as specified.
 - b. Provide Barn Door Set BD1815 as specified.
 2. Description:
 - a. Include all necessary track, hangers, guides, and plates for a complete system.
 - b. Provide pulls / locks as specified for each door leaf.
 - c. Size each system to opening width.
 - d. Provide system based on door / panel leaves.
 3. Mounting:
 - a. Mount as required as prescribed by manufacturer, for a complete system.
 4. Acceptable manufacturer: KN Crowder, Don Jo

- I. Miscellaneous Hardware Equipment and Material:
 1. General:
 - a. Provide items and types as specified.

2.5 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.6 HARDWARE FINISHES

- A. General:
 1. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible and except as otherwise indicated.
 2. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening.
 3. In general, match items to the manufacturer's standard finish for the latch and lock set (or push/pull units if no latch/lock sets) for color and texture.
 4. Provide finishes matching those established by BHMA or, if none established, match the Architect's sample.
 5. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than that specified for the applicable units of hardware by referenced standards.
 6. Finish designations used in schedules and elsewhere listed in ANSI A156.18 "Materials and Finishes Standard", including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
- B. Provide the following hardware finishes, unless otherwise scheduled: Dull Chrome, Stainless Steel, and Aluminum color pallet.
- C. Base material: Manufacturer's standard high-carbon steel, brass, or bronze.

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 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.3 INSTALLATION

- A. General:
 - 1. Install each item in its proper location firmly anchored into position, level and plumb, and in accordance with the manufacturer's recommendations.
 - 2. Hanging, hardware heights, locations, and degree of opening swing are indicated in the Drawings and Finish Hardware Schedule.
 - 3. Mount finish hardware units:
 - a. At recommended heights and locations as shown in approved finish hardware schedule, complying with requirements of the A.D.A., and pertinent provisions of the Building Code.
 - b. To function at proper degree of opening of doors as indicated on approved finish hardware schedule.
 - c. By manufacturer's template.
 - d. Prior to final finishing of the door. Remove hardware to allow finishing of door, and permanently reinstall hardware upon completion of finishing operation.
 - 3. Reinforce, where necessary, the substrate to assure proper attachment.
 - 4. Drill and countersink units which are not factory-prepared for anchorage fasteners.
 - 5. Space fasteners and anchors in accordance with industry standards.

- B. Installing closers:

1. Mount closers per manufacturer's template and secure the Architect's approval of the closer installation.
 2. The Contractor will be required to replace doors onto which closers are improperly mounted at no additional cost to the Owner. Repair or patching of such doors will not be acceptable.
- C. Installing Stops: Install all wall stops into reinforced wall or stud. Projection type wall stops should be mounted 80" from finish floor, with sloped portion of the stop facing up / flat side down. Install floor stops out of the way foot traffic at a height high enough to accommodate any ramp or uneven floor condition.
- D. Installing thresholds at exterior doors: Set in full bed of butyl-rubber, or polyisobutylene mastic sealant.
- E. Installing weatherstrip: Install weatherstrip prior to installing closers, OH Stops or panic hardware. Template closers and panic devices from weatherstrip and install all closer / OH Stop shoe brackets and panic device strikes onto the weatherstrip without notching or cutting the weatherstrip.

3.4 FIELD QUALITY CONTROL

- A. Inspection of final hardware installation: The Contractor, hardware suppliers, and Architectural Hardware Consultant (AHC) shall thoroughly check the quality of the installation and the functionality of each unit of finish hardware at all openings in the Work. The Hardware Supplier shall forward a detailed written report of all operational or installation deficiencies to the Architect and Contractor.

3.5 CLEANING AND ADJUSTING

- A. Check and adjust each item of hardware and each door upon completion of final installation. Verify proper function and replace units which cannot be made to operate freely and smoothly, as intended for the application.
- B. Clean adjacent surfaces soiled by hardware installation.

3.6 FINISH HARDWARE SCHEDULE

Hardware Set 1 – Electric Lock [Access Control] + Closer Stop

3 ea.	Butt Hinge 35STBB 4545 NRP	26D	PDQ
1 ea.	Electric Lock GT 199 BSN REX -SF7	26D	PDQ
1 ea.	Closer 7101 BC SCS Stop (push side mount)	689	PDQ
1 ea.	Kickplate 90 10 x 2" LDW B4E	32D	Don Jo
1 ea.	Power Transfer PTM-10	32D	SDC
1 ea.	Power Supply 602RF	----	SDC
1 ea.	Door Contact MC-4	----	SDC
1 set	Riser & Wire Drawings RPISB112224	----	RPI
1 ea.	Access Control Module & Card Reader by Security Vender	----	Sec Vend
Note:	Access control module, card reader and peripherals furnished by Security Vender, Coordinated by GC/CM.		

Hardware Set 2 – Privacy Set w/ Indicator [Lock / Unlock] + Closer

3 ea.	Butt Hinge 35STBB 4545 NRP	26D	PDQ
1 ea.	Privacy Set w/ Indicator MR 279 BJSJ	32D	PDQ
1 ea.	Closer 7101 BC RA Regular Arm (pull side mount)	689	PDQ
1 ea.	Kickplate 90 10 x 2" LDW B4E	32D	Don Jo
1 ea.	Wall Stop 1407	26D	Don Jo

Hardware Set 3 – Sliding Face Mount w/ Barn Door Pulls [Always Unlocked]

1 set	Sliding door system CCSF-2-998-W-CA 1DR Kit x req'd width CA		KNC
1 set	Barn Door Sliding Door Hardware Set BD1815	32D	Don Jo

Hardware Set 4 – Electric Lock [Access Control] + Closer

3 ea.	Butt Hinge 35STBB 4545 NRP	26D	PDQ
1 ea.	Electric Lock GT 199 BSN REX -SF7	26D	PDQ
1 ea.	Closer 7101 BC EDA (push side mount)	689	PDQ
1 ea.	Kickplate 90 10 x 2" LDW B4E	32D	Don Jo
1 ea.	Wall Stop 1407	26D	Don Jo
1 ea.	Power Transfer PTM-10	32D	SDC
1 ea.	Power Supply 602RF	----	SDC
1 ea.	Door Contact MC-4	----	SDC
1 set	Riser & Wire Drawings RPISB112224	----	RPI
1 ea.	Access Control Module & Card Reader by Security Vender	----	Sec Vend
Note:	Access control module, card reader and peripherals furnished by Security Vender, Coordinated by GC/CM.		

Hardware Set 5 – Privacy Storeroom Lockset w/ Indicator & Electric Strike

[Access Control] + Closer

3 ea.	Butt Hinge 35STBB 4545 NRP	26D	PDQ
1 ea.	Privacy Storeroom Lockset w/ Indicator MR 241 BJSJ -SF7	32D	PDQ
1 ea.	Closer 7101BC RA Regular Arm (pull side mount)	689	PDQ
1 ea.	Kickplate 98 10 x 2" LDW	32D	Don Jo
1 ea.	Wall Stop 1407	26D	Don Jo
1 ea.	Electric Strike w/ Status Switch 55-D LM 24VDC	32D	SDC
1 ea.	Power Supply 602RF	----	SDC
1 ea.	Door Contact MC-4	----	SDC
1 set	Riser & Wire Drawings RPISB112224	----	RPI
1 ea.	Access Control Module & Card Reader by Security Vender	----	Sec Vend
Note:	Access control module, card reader and peripherals furnished by Security Vender, Coordinated by GC/CM.		

Hardware Set 6 – Electric Lock [Access Control] + Closer

3 ea.	Butt Hinge 35STBB 4545 NRP	26D	PDQ
1 ea.	Electric Lock GT 199 BSN REX -SF7	26D	PDQ
1 ea.	Closer 7101BC RA Regular Arm (pull side mount)	689	PDQ
1 ea.	Kickplate 90 10 x 2" LDW B4E	32D	Don Jo
1 ea.	Wall Stop 1407	26D	Don Jo
1 ea.	Power Transfer PTM-10	32D	SDC
1 ea.	Power Supply 602RF	----	SDC
1 ea.	Door Contact MC-4	----	SDC
1 set	Riser & Wire Drawings RPISB112224	----	RPI
1 ea.	Access Control Module & Card Reader by Security Vender	----	Sec Vend
Note:	Access control module, card reader and peripherals furnished by Security Vender, Coordinated by GC/CM.		

Hardware Set 7 – Office Lock [Lock / Unlock]

3 ea.	Butt Hinge 35STBB 4545 NRP	26D	PDQ
1 ea.	Office Lock GT 182 BSN -SF7	26D	PDQ
1 ea.	Wall Stop 1407	26D	Don Jo

Hardware Set 8 – Existing Door & Frame, Add Access Control

Verify existing opening and notify architect immediately if that which exists differs from what is specified below. Remove Existing Lock. Select Cylindrical or Mortise Lock, as required to replace existing lock. Prepare and install the following required items to the existing opening:

SEMCO ENERGY EOC BUILD OUT
AEW PROJECT #1584-0003

DECEMBER 6, 2024

1 ea.	Storeroom Lock GT 115 BSN -SF7 or MR 115 BJEW -SF7 26D/32D		
	PDQ		
1 ea.	Electric Strike w/ Status Switch 55-ABC LM 24VDC	32D	SDC
1 ea.	Power Supply 602RF	----	SDC
1 ea.	Door Contact MC-4	----	SDC
1 set	Riser & Wire Drawings RPISB112224	----	RPI
1 ea.	Access Control Module & Card Reader by Security Vender	----	Sec Vend
Note:	Access control module, card reader and peripherals furnished by Security Vender, Coordinated by GC/CM.		

* Balance of Existing Hardware to Remain.

END OF SECTION 08 71 00

SECTION 08 80 00 - GLASS AND GLAZING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of glass and glazing work is shown on the drawings.
- B. The required applications of glass and glazing include (but are not necessarily limited to) the following:
 - 1. Glazing interior openings.
 - 2. Glazing interior doors.
 - 3. Glazing aluminum windows.
 - 4. Glazed aluminum doors.
- C. Related Work Specified Elsewhere:
 - 1. Aluminum Windows: Section 08520.
 - 2. Fire Rated Glass: Section 08810.

1.03 QUALITY ASSURANCE:

- A. Prime Glass Standard: Comply with FS DD-G-451.
- B. Heat-Treated Glass Standard: Comply with the following as applicable.
 - 1. Consumer Product Safety Commission 16 CFR 1201.
 - 2. Industry Standards ANSI Z97.1.
- C. Insulating Glass Seal Standard: Comply with proposed standard ASTM E6-P-3, Test Methods P1 and P2.
- D. Manufacturers: Provide each type of glass and primary sealant/gasket from a single manufacturer with not less than 5 years of successful experience in the production of materials similar to those required.
- E. Installer (Glazier): Firm with not less than five (5) years of successful experience in glazing work similar to required work.

1.04 SUBMITTALS:

A. Product Data:

1. Submit manufacturer's product specifications, including documentation to compliance with requirements and instructions for handling, storing, installing, cleaning and protecting each type of glass and glazing materials.

B. Samples:

1. Submit two (2) samples of each type of glass and glazing material required, except for single-pane clear glass (including annealed and tempered). Submit 12" square glass samples and 12" lengths of installed (mocked-up) glazing materials.
 - a. Submit insulating glass samples with completed edge-seal construction, but hermetic seal need not be maintained.

C. Warranties:

1. Warranty on Insulating Glass Units: Provide written warranty signed by fabricator (manufacturer) and countersigned by Contractor/Installer agreeing to within 10 years from date of substantial completion replace glass units with defective hermetic seal of air spaces (but not including that due to glass breakage); defined to include intrusion of dirt or moisture, internal condensation or fogging at temperature above -20 degrees F., deterioration of protected internal glass coatings resulting from seal failure, and other visual evidence of seal failure or performance; provide the manufacturer's printed and submitted instructions for handling, protecting, and maintaining units that have been adhered to during the warranty period.
2. Warranty on Laminated Glass: Provide written warranty signed by laminator (manufacturer) and countersigned by Contractor/Installer agreeing to within five (5) years after date of acceptance, replace glass units with defective lamination, defined to include evidence of delamination, changes in required strengths, transmittances, color, transparency, and other required performance.

1.05 PRODUCT HANDLING:

- A. Comply with manufacturer's instructions for shipping, handling, storing, and protecting glass and glazing materials. Exercise exceptional care to prevent edge damage to glass, and damage/deterioration to coatings on glass.

1.06 JOB CONDITIONS:

- A. Pre-Installation Meeting: Comply with General Requirements for pre-installation meeting of Glazier and other trades affected by glass installation.
- B. Weather: Do not proceed with glazing under adverse weather conditions. Install liquid sealants when temperatures are within lower or middle third of temperature range recommended by manufacturer.

PART 2 - PRODUCTS

2.01 GLASS

- A. Non-processed Glass:
 - 1. Clear Float/Plate: Type I, Class 1, Quality q3.
 - 2. Tinted Glass: Manufacturer's standard bronze tint plate.
 - 3. Laminating Film: Except as otherwise indicated, provide clear transparent permanent film of polyvinyl butyryl (PVB), not less than 30 mils thick, as adhesive plastic interlayer for laminating sheets of glass of a composition which has successfully withstood a minimum of 20 years exposure to sunlight and severe weather/temperature changes.
- B. Processed Glass:
 - 1. Tempered Glass: Heat treat to strengthen glass in bending to not less than 4.5 times annealed strength.
 - 2. Tong Marks: Wherever the glazing system shown for the installation of tempered glass will not conceal the tong marks inherent from normal tempering processes, provide tempered glass produced by special process which eliminates tong marks.
- C. Insulating Glass:
 - a. Fabricate and label units to match units which have been tested and certified by the Insulating Glass Certification Council in accordance with proposed standard ASTM E6-P3, Test Methods, P1 and P2 (as sponsored by the Sealed Insulating Glass Manufacturers Association); and passed tests for glass seal classification "A".
 - b. Fabricate units with a permanent, hermetically sealed dry air or glass filled space of the width indicated between sheets of glass as indicated. Provide an edge seal consisting of twin primary sealant beads of silicone positioned and retained by a tubular aluminum or

galvanized steel spacer-bar frame with soldered/welded sealed corners, and filled with desiccant with breather ports into sealed space; with secondary edge sealant completely encapsulating outer face of spacer bar and sealed to the opposing sheets of glass. Provide silicone elastomeric sealant as secondary edge seal.

- (1) Extend secondary sealant to provide minimum of 1/16" thick elastomeric coating on edges of glass sheets in each insulating glass unit (to form a protective edge cushion).
 - (2) Width: Except as otherwise indicated, fabricate units with 1/2" wide air spaces.
 - (3) Fill air spaces by fabricator's standard process, using either gas or dry air with a maximum dew point of -20 degrees F. Exercise extreme care to exclude dirt and other foreign substances.
- c. Label each unit to show compliance with required standards and regulations, and to list generically each component including elements of edge seal. Indicate which face of unit is for exposed to exterior of weather. Provide removable label except where regulations require a permanent label.
- (1) Label interior-exposed edge of spacer bar with fabricator's name and date of completing hermetic seal.
- d. Provide the following types:
- (1) At all exterior locations - 1" Clear:
Exterior Glass: 1/4" laminated ("Solexia" transparent by PPG).
Interior Glass: 1/2" air space
1/4" laminated clear plate

D. Design Thickness:

1. Verify all glass thicknesses will comply with performance requirements.

E. Manufacturer of Glass: One of the following:

1. Old Castle Building Envelope
2. Saint-Gobain, North America
3. Pilkington North America, Inc.
4. PPG Industries, Inc.
5. Guardian Industries, North America
6. Viracon, Inc.

F. Edges:

1. Polish edges wherever exposed to view.

G. Coatings:

1. Provide low emissivity (low-E) pyrolytic coating (on #3 surface of insulated units).

2.02 GLAZING SEALANTS, COMPOUNDS AND GASKETS:

- A. Colors: Provide black or other natural color where no other color is available. Where material is not exposed to view, provide manufacturer's standard color which has the best overall performance characteristics for application shown.
- B. Hardnesses shown and specified are intended to indicate general range necessary for overall performance. Consult manufacturer's technical representative to determine actual hardness recommended for conditions of installation and use. Architect will furnish information concerning anticipated glass movement related to actual glazing channel width and installation temperature upon request. Except as otherwise indicated or recommended, provide glazing materials within the following ranges of hardness (Shore A, fully cured, at 75 degrees F.):
 1. 15 to 35 for elastomeric compounds and tapes used with rigid stops and frames for large glass sizes (in excess of 100 united inches). Provide material sufficiently hard to withstand exposure (if any) to abrasion and vandalism.
 2. 25 to 50 for rubber-like curing compounds used with rigid stops and frames for medium and small glass sizes (less than 100 united inches). Provide materials sufficiently hard to withstand impact where used on moving sash and doors.
 3. 35 to 60 for molded gaskets used with rigid stops and frames, depending upon strength needed for applications or insertion of units and open profile of gasket.
 4. 70 to 80 for structural gaskets (not supported by stops).
 5. Non-Elastomeric Compounds: (Shore A not applicable) 2 to 12 mm penetration for 5.0 seconds of penetrometer needle on nominally cured compound (ASTM D 2451).
- C. Compatibility: Before purchase of specified glazing materials, investigate compatibility with channel surfaces, joint fillers, and other materials in glazing channel. Provide only materials (manufacturer's recommended variation of specified materials) which are known to be fully compatible with actual installation condition, as shown by manufacturer's published data or certification.
- D. Provide size and shape of gaskets and preformed glazing units as shown, or if not shown, as recommended by manufacturer, either in published

data or upon consultation with technical representative.

- E. Nonporous Bond Silicone Rubber Glazing Sealant"
 - 1. One-part acid-type silicone rubber elastomeric sealant, complying with FS TT-S-001543, Class A, non-sag, recommended by manufacturer for non-porous exterior joint surfaces and for glazing.
 - 2. Products/Manufacturers: Provide one of the following:
 - a. 781 Building Sealant; Dow Corning Corporation
 - b. Silicone Construction 1200 Sealant; General Electric Company
 - c. Rhodorsil Sealant 3B; Rhodia Inc. Chemical Division

- F. Preformed Butyl Rubber Glazing Sealant:
 - 1. Preformed ribbon or tape (coiled with release paper) of polymerized butyl (or mixture of butyl and poly-isobutylene) with inert fillers (pigments), solvent-based with minimum 95% solids, non-sag consistency, tack-free time of 24 hours or less, paintable, non-staining, pre-shimming to prevent stretch (as required by Glazier to facilitate proper application and glass installation).
 - 2. Product/Manufacturer:
 - a. Polyshim Tape: Tremco, Inc.
 - 3. Use for exterior glazing of all glass in aluminum framing unless noted otherwise and in all interior glazing.

2.03 MISCELLANEOUS GLAZING MATERIALS:

- A. Channel Cleaner: Use type compound recommended by sealant manufacturer for channel surfaces to be cleaned.

- B. Channel Primer/Sealer: Provide type of primer or sealer recommended by sealant manufacturer for application of sealant to channel surfaces.

- C. Setting Blocks: Neoprene or other resilient blocks of 70 to 90 Shore A durometer hardness, tested for compatibility with specified glazing sealants.

- D. Spacers: Neoprene or other resilient blocks of 40 to 50 Shore A durometer hardness, adhesively backed on one face only, tested for compatibility with specified glazing sealants.

- E. Compressible Filler Rod: Closed-cell or waterproof-jacketed foam of polyethylene, butyl rubber, neoprene, polyurethane, or vinyl tested for compatibility with specified glazing sealants of 5 to 10 psi compression strength(25% deflection) as recommended by sealant manufacturers for

use in glazing channel to prevent sealant exudation from channel.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Glazier must examine framing and substrate work to receive glass and glazing materials and conditions under which glass is to be installed, and notify the Construction Manager, in writing, of conditions detrimental to proper completion of the work. Do not proceed with glazing until unsatisfactory conditions have been corrected in a manner acceptable to Glazier.

3.02 PERFORMANCE REQUIREMENTS:

- A. Watertight and airtight installation of each piece of glass is required, except as otherwise shown. Each installation must withstand normal temperature changes wind loading, and impact loading (for operating sash and doors) without failure, including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.
- B. Protect glass from edge damage during handling, installation and operation of building systems/equipment. Glass breakage during warranty period is a form of faulty material or workmanship (resulting from edge damage) unless known to result from vandalism or other causes not related to materials and workmanship.
- C. Glazing channel dimensions as shown are intended to provide for necessary minimum bite on glass, minimum edge clearance, and adequate sealant thickness with reasonable tolerances. Glazier is responsible for correct glass size for each opening within tolerances and necessary dimensions established.

3.03 INSTALLATION

- A. General and Standards:
 - 1. Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are shown or specified, and except where manufacturers' technical representatives direct otherwise.

2. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, drawn, and bow oriented in the same direction as other pieces.
 3. Inspect each piece of glass immediately before installation and eliminate pieces which have observable edge damage or face imperfections.
 4. Do not attempt to cut, seam, nip or abrade glass which is tempered, heat strengthened, or coated.
 5. Cut and install colored (tinted) and heat absorbing glass as recommended in "Technical Services Report No. 104" (latest edition) by PPG Industries, or similar report by other glass manufacturer.
 6. Comply with applicable publications by Flat Glass Marketing Association, except as shown and specified otherwise, and except as specifically recommended otherwise by the manufacturers of the glass and glazing materials.
- B. Preparation of Substrate:
1. Clean the glazing channel or other framing member to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to the substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.
 2. Apply primer or sealer to joint surfaces where recommended by sealant manufacturer.
- C. Sealant/Compound Glazing:
1. Install setting blocks of proper size in sill rabbet, locate at one-fourth of glass width measured from each jamb. Set blocks in thin course of the heel bead compound if heel bead is to be installed.
 2. Provide spacers inside and out, and of proper size and spacing for glass sizes larger than 50 united inches, except where pre-shimmed tape or gaskets are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with butyl rubber sealant tape use thickness 1/32" less than final compressed thickness of tape.
 3. Voids and Filler Rods: Prevent exudation of sealant or compound by forming voids or installing filler rods in channels at heel of jambs and heads (do not leave voids in sill channels), except as otherwise indicated. In general, voids or filler rods are required for insulating glass and for laminated glass larger than 75 united inches, and for other glass more than 9/32" thick or larger than 120 united inches.
 4. Force sealants into channel to eliminate air pockets and voids (other than expansion voids), and to ensure complete "wetting" and bond

- of sealant to glass and channel surfaces.
5. Tool exposed surfaces of glazing sealants and compounds to provide a substantial "wash" away from glass.
 6. When installing processed glass, exercise extraordinary care to avoid contact of glazing materials with processed surfaces, except where concealed in glazing channel. Use masking tape to ensure limitation of compounds to channel area.
 7. Clean and trim excess glazing materials from glass and stops or frames promptly after installation, and eliminate stains and discolorations.
- D. Gaskets and Tapes:
1. Miter cut and bond ends together at corners where gaskets are used for channel glazing so that gaskets will not pull away from corners and result in voids or leaks in glazing system.
 2. Install pressurized tapes and gaskets to protrude slightly out of channel so as to eliminate dirt and moisture pockets. Trim to straight line as required.

3.04 CURE AND PROTECTION:

- A. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength, and surface durability.
- B. Glazier shall advise the Construction Manager of procedures required for protection of glass and glazing sealants and compounds during construction period so that they will be without deterioration or damage (other than normal weathering) at time of Owner's acceptance.
1. Furnish specific instruction to the Construction Manager on precautions and provisions required to prevent glass damage resulting from the alkaline wash from green concrete surfaces and similar sources of possible damage.
 2. Protect exterior glass from breakage immediately upon installation by attachment of crossed streamers to framing held away from glass. Do not apply markers directly on surfaces of glass. Except as otherwise indicated, remove applied labels from glass surfaces immediately after glass installation.
 3. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during the construction period, including pieces damaged through natural causes, accidents and vandalism.

3.05 CLEANING GLASS:

- A. Maintain glass in a reasonably clean condition during construction so that it will not be damaged by corrosive or erosive action and will not contribute (by wash-off) to deterioration of glazing materials and other work.
 - 1. Clean glass in accordance with manufacturer's recommendations. Do not use abrasive materials. On glass, do not use broken razor blades for cleaning.
- B. Wash and polish glass on both faces not more than 4 days prior to Owner's acceptance of the work in each area. Comply with glass manufacturer's recommendations.

END OF SECTION 08 80 00

SECTION - 08 87 33 DECORATIVE WINDOW FILMS

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. Section 08 41 13 – Aluminum Framed Store Front
- B. Section 08 80 00 – Glass and Glazing.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D1044 – Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion.
 - 2. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. American National Standards Institute (ANSI):
 - 1. ANSI/NFRC 100 – Procedure for Determining Fenestration Product U-factors.
 - 2. ANSI/NFRC 200 – Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
- C. International Window Film Association (IWFA):
 - 1. Architectural Visual Inspection Standard for Applied Window Film.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Typical installation methods.
- C. Verification Samples: 4 by 6 inches (102 by 152 mm) minimum sample of glazing film.
- D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

- E. Sustainability Submittals: Refer to Division 01 for requirements regarding VOC limits, recycled content, regional materials, and required documentation.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum ten years successful documented experience.
- B. Installer Qualifications:
 - 1. Installer: Glazing film shall be applied by installers with a minimum of five years successful experience installing products of the same type and scope as specified.
 - 2. Provide documentation that the installer is certified by glazing film manufacturer to perform the work specified.
 - 3. Provide references of three projects where the installer has applied film of similar nature and size.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
- D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
 - 1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
 - 2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
 - 3. Retain mock-up during construction as a standard for comparison with completed work.
 - 4. Do not alter or remove mock-up until work is completed or removal is authorized.

1.5 PRE-INSTALLATION CONFERENCE

- A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.

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 recommended limits.
- B. Surface temperature: Do not apply glazing film when surface temperature is less than 40 degrees Fahrenheit
- C. Prior to installation, the glass and frames shall be inspected for surface contamination, damage, or other defects that may adversely affect the performance of the glazing film

1.8 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Madico Incorporated which is located at: 9251 Belcher Road North; Pinellas Park, FL, 33782; ASD Toll Free: 888-887-2022; Tel: 727-327-2544; Email: [windowfilm@madico.com](mailto>windowfilm@madico.com); Web: www.madico.com.
- B. Or approved equal.
 - 1. Substitutions: Section 01 60 00 - Product Requirements

2.2 PERFORMANCE REQUIREMENTS

- A. Abrasion Resistance: Film must have a surface coating that is resistant to abrasion such that, less than 5 percent increase of transmitted light

haze will result in accordance with ASTM D1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

2.3 SOLAR CONTROL FILMS

A. Madico Reflective Series:

1. Basis of Design: Optivision Reflective 5 DA SR as manufactured by Madico, Inc.
 - a. Film Type: Transparent, polyester, micro-thin film bonded to glass for solar control and to reflect radiant heat from the sun.
 - b. Performance attributes for film applied to 1/4 inch (6 mm) thick clear glass tested in accordance with ANSI/NFRC 100 and ANSI/NFRC 200:
 - 1) Visible light transmittance: 8 percent.
 - 2) Visible light reflected: 55 percent.
 - 3) Glare reduction: 91 percent.
 - 4) Ultraviolet light transmittance: Less than 1 percent.
 - 5) U-Value: 0.94.
 - 6) Solar energy transmittance: 9 percent.
 - 7) Solar energy reflected: 45 percent.
 - 8) Solar energy absorbed: 46 percent.
 - 9) Shading Coefficient (SC): 0.25.
 - 10) Solar Heat Gain Coefficient (SHGC): 0.22.
 - 11) Emissivity: 0.69.
 - c. Physical Properties:
 - 1) Thickness: 0.0015 inch (0.038 mm).
 - 2) Color: Reflective Grey Tone Shade.
 - 3) Construction: Multi-ply laminate.
 - 4) Adhesive Type: Detackified acrylic.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
 1. Examine glass and frames. Verify that existing conditions are adequate for proper application and performance of film.
 2. Verify glass is not cracked, chipped, broken, or damaged.
 3. Verify that frames are securely anchored and free of defects.

- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Comply with manufacturers recommendations for surface preparation.
- B. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.
- C. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.
- D. Protect adjacent surfaces.

3.3 GLAZING FILM APPLICATION

- A. Field apply glazing film to the following items in accordance with manufacturer's instructions:
 - 1. Steel framed glazed doors, sidelights, transoms, and windows.
 - 2. Aluminum framed glazed doors, sidelights, transoms, and windows.
 - 3. Aluminum curtain wall framing system.
 - 4. Other curtain wall framing system.
 - 5. Manufactured aluminum windows.
- B. Do not apply glazing film when surface temperature is less than 40 degrees F (4 degrees C).
 - 1. Do not proceed until unsatisfactory conditions have been addressed.
- C. General Film Installation:
 - 1. Install in accordance with manufacturers written instructions and approved shop drawings.
 - 2. Accurately cut film with straight edges to required sizes allowing 1/16 to 1/8 inch (2 to 3 mm) gap at perimeter of glazed panel.
 - 3. Remove release liner immediately prior to adhering film to glass.
 - 4. Apply mounting solution to film and glass.
 - 5. Apply film to glass and removed air bubbles, wrinkles, and other defects using a squeegee. Three to five complete passes are required to completely remove mounting solution from between film and glass.

3.4 FIELD QUALITY CONTROL

- A. Inspect installation. Verify that it is complete and complies with requirements and manufacturer's instructions to provide specified anti-intrusion requirements. Correct deficiencies.
- B. After installation, view film from a distance of 10 feet (3 meters) against a light colored background. Ensure appearance is uniform without streaks, bands, thin spots, and pinholes in accordance with the IWFA Architectural Visual Inspection Standard for Applied Window Film.
- C. If installed film does not meet these requirements remove and replace with new film.

3.5 CLEANING AND PROTECTION

- A. Clean glass following installation. Remove excess sealants and other glazing materials from adjacent finished surfaces.
- B. Remove labels and protective covers.

END OF SECTION 08 87 33

SECTION 09 25 00 - GYPSUM DRYWALL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

- A. Extent of each type of gypsum drywall construction required is indicated on Drawings.
- B. This Section includes the following types of gypsum board construction:
 - 1. Gypsum board screw-attached to wood framing and furring members.
 - 2. Surface mount stainless steel corner guard.

1.3 DEFINITIONS:

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this section or other referenced standards.

1.4 SUBMITTALS:

- A. Product data from manufacturers for each type of product specified.

1.5 QUALITY ASSURANCE:

- A. Fire-Resistance Ratings: Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.
 - 1. Provide fire-resistance-rated assemblies identical to those indicated by reference to GA File No's. in GA-600 "Fire Resistance Design Manual" or to design designations in U.L. "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction.

- B. Single Source Responsibility: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.
- C. All gypsum board drywall and associated materials shall be manufactured domestically in the United States, by a United States Company and shall conform to ASTM Standards listed herein. Gypsum board drywall and associated materials shall not be imported, rebranded or distributed from another country.

1.6 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.7 PROJECT CONDITIONS:

- A. Environmental Conditions, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
- B. Minimum Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously thereafter until drying is complete.
- C. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

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

1. Steel Framing and Furring:
 - a. Clark Dietrich Framing.
 - b. Jaimes Industries, Inc.
 - c. Marino/Ware, Division of Ware Industries

2. Gypsum Boards and Related Products:
 - a. Gold Bond Building Products Div., National Gypsum Co.
 - b. Georgia Pacific
 - c. Certainteed
 - d. United States Gypsum

2.2 GYPSUM BOARD:

- A. General: Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end joints.
 3. Thickness: Provide gypsum board in thicknesses indicated, or if not otherwise indicated, in either 1/2 inch or 5/8 inch thicknesses to comply with ASTM C 840 for application system and support spacing indicated.

- B. Gypsum Wallboard: ASTM C1396, and as follows:
 1. Type: Regular, unless otherwise indicated.
 2. Type: Foil-backed where indicated.
 3. Type: Type X for fire-resistance-rated assemblies.
 4. Edges: Tapered.
 5. Thickness: 5/8 inch.
 6. Products: Subject to compliance with requirements, provide one of the following products where Type X gypsum wallboard is indicated:
 - a. "Fire-Shield G"; Gold Bond Building Products Div., National Gypsum Co.
 - b. "SHEETROCK Brand FIRECODE 'C' Gypsum Panels"; United States Gypsum Co.
 - c. Type X gypsum board – Certainteed
 - d. Tough Rock Fireguard X gypsum board – Georgia Pacific

- C. Gypsum Backing Board for Multi-Layer Applications: ASTM C1396 or, where backing board is not available from manufacturer, gypsum wallboard, ASTM C1396, and as follows:
1. Type: Regular, unless otherwise indicated.
 2. Type: Foil-backed where indicated.
 3. Type: Type X for fire-resistance-rated assemblies.
 4. Edges: Manufacturer's standard.
 5. Thickness: 5/8 inch.
- D. Water-Resistant Gypsum Backing Board: ASTM C1396, and as follows:
1. Type: Regular, unless otherwise indicated.
 2. Type: Type X for fire-resistance-rated assemblies.
 3. Thickness: 5/8 inch, unless otherwise indicated.
 4. STC rated assemblies: For STC rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by independent testing agency.
 5. Manufacturers:
 - a. Gold Bond-Sound Break XP gypsum board – National Gypsum Company
 - b. Silent FX gypsum board – Certainteed
 - c. Tough Rock Sound Deadening Board – Georgia Pacific
 6. Install per manufacturers specifications with acoustical sealant meeting ASTM C919 and firestopping meeting ASTM E90. Install acoustic sealant at perimeter of boards and around all penetrations. Install putty pads at all receptacles and switch locations. Install fireproofing and fire sealant around all fire rated partitions.
- E. Foil Backed Gypsum Board:
1. Type II aluminum foil vapor retarder laminated to back surface.
 2. Thickness: 5/8" unless noted otherwise on drawings.
 3. Permanence: <0.1 perms
 4. Manufacturers:

- a. Gold Bond foil back gypsum board.
 - b. Other Architect approved manufacturer.
5. Install per ASTM 840 and GA-216.

2.3 TRIM ACCESSORIES:

- A. Cornerbead and Edge Trim for Interior Installation: Provide corner beads, edge trim and control joints which comply with ASTM C 1047 and requirements indicated below:
1. Material: Formed metal, plastic or metal combined with paper, with metal complying with the following requirement:
 - a. Sheet steel zinc-coated by hot-dip process.
 2. Edge trim shapes indicated below by reference to designations of Fig. 1 in ASTM C 1047:
 - a. "LC" Bead, unless otherwise indicated.
 - b. "L" Bead where indicated.
 - c. "U" Bead where indicated.
 3. One-Piece Control Joint: Formed with vee-shaped slot per Fig. 1 in ASTM C 1047, with slot opening covered with removable strip.
- B. Metal Cornerbead and Edge Trim for Exterior Ceilings: Comply with the following requirements:
1. Edge trim complying with ASTM C 1047, formed from rolled zinc, shape "LC" Bead per Fig. 1, unless otherwise indicated.
- C. All exterior gypsum corners shall have a cover guard. Provide surface mount stainless steel corner guard 3-1/2" x 3-1/2", 90° in type 304, satin finish, 16 gauge, cement on as mfr. by Inpro 1-800-222-5556

2.4 GYPSUM BOARD JOINT TREATMENT MATERIALS:

- A. General: Provide materials complying with ASTM C 475, ASTM C 840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.
- B. Joint Tape: Paper reinforcing tape, unless otherwise indicated.
1. Use pressure sensitive or staple-attached open-weave glass fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.

- C. Setting-Type Joint Compounds: Factory-prepackaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
 - 1. Where setting-type joint compounds are indicated for use as taping and topping compounds, use formulation for each which develops greatest bond strength and crack resistance and is compatible with other joint compounds applied over it.
 - 2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
 - 3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer for this purpose.
- D. Drying-Type Joint Compounds: Factory-prepackaged vinyl-based products complying with the following requirements for formulation and intended use.
 - 1. Ready-Mix Formulation: Factory-premixed product.
 - 2. All-purpose compound formulated for use as both taping and topping compound.

2.5 MISCELLANEOUS MATERIALS:

- A. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.
- B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum boards.
- C. Spot Grout: ASTM C 475, setting-type joint compound of type recommended for spot grouting hollow metal door frames.
- D. Fastening Adhesive for Wood: ASTM C 557.
- E. Gypsum Board Screws: ASTM C 1002.
- F. Gypsum Board Nails: ASTM C 514.
- G. Concealed Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable sealant complying with requirement specified in Division-7 Section 07920 "Sealants & Caulking".

- H. Sound Attenuation Blankets: Unfaced mineral fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C665 for Type I with class 0 flame spread and smoke developed per ASTM E84 and as follows:
 - 1. Mineral Fiber Type: Fibers manufactured from mineral wool.
 - 2. Use in all partitions.
 - 3. Equal to Owens Corning thermafiber sound attenuation fire blankets (SAFB) - 2.5 lbs/cu. ft. (unless noted otherwise).

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.

3.3 INSTALLATION OF STEEL FRAMING, GENERAL:

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer, or if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement, at locations indicated below to comply with details shown on Drawings:

1. Where edges of suspended ceilings abut building structure horizontally at ceiling perimeters or penetration of structural elements.
 2. Where partition and wall framing abuts overhead structure.
 - a. Provide slip or cushioned type joints as detailed to attain lateral support and avoid axial loading.
 - D. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.
- 3.4 INSTALLATION OF STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS:
- A. Secure hangers to structural support by connecting directly to structure where possible, otherwise connect to cast-in concrete inserts or other anchorage devices or fasteners as indicated.
 1. Do not attach hangers to metal deck tabs.
 2. Do not attach hangers to metal roof deck.
 - B. Do not connect or suspend steel framing from ducts, pipes or conduit.
 - C. Keep hangers and braces 2 inches clear of ducts, pipes and conduits.
 - D. Sway-brace suspended steel framing with hangers used for support.
 - E. Install suspended steel framing components in sizes and at spacings indicated but not less than that required by referenced steel framing installation standard.
 1. Wire Hangers: 0.1620 inch diameter (8 gage), 4 ft. on center.
 2. Carrying Channels (Main Runners): 1-1/2 inch, 4 ft. on center.
 3. Rigid Furring Channels (Furring Members): 16 inches on center.
 4. Rigid Furring Channels (Furring Members): 24 inches on center.
 - F. Installation Tolerances: Install steel framing components for suspended ceilings so that cross furring members or grid suspension members are level to within 1/8 inch in 12 ft. as measured both lengthwise on each member and transversely between parallel members.
 - G. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

3.5 INSTALLATION OF STEEL FRAMING FOR WALLS AND PARTITIONS:

- A. Install runners (tracks) at floors, ceilings and structural walls and columns where gypsum drywall stud system abuts other construction.
 - 1. Where studs are installed directly against exterior walls, install asphalt felt strips between studs and wall.
- B. Installation Tolerances: Install each steel framing and furring member so that fastening surface do not vary more than 1/8 inch from plane of faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
- D. Terminate partition framing at suspended ceilings only where specifically indicated.
- E. Install steel studs and furring in sizes and at spacings indicated but not less than that required by referenced steel framing installation standard.
 - 1. For single layer construction: 16 inches on center.
- F. Install steel studs so that flanges point in the same direction and gypsum boards can be installed in the direction opposite to that of the flange.
- G. Frame door openings to comply with details indicated, with GA-219 and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - 1. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- H. Frame openings other than door openings to comply with details indicated, or if none indicated, in same manner as required for door

openings; and install framing below sills of openings to match framing required above door heads.

3.6 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL:

- A. Install abuse resistant gypsum board (VH1) typical where indicated on drawings.
- B. Gypsum Board Application and Finishing Standard: Install and finish gypsum board to comply with ASTM C 840.
- C. Install sound attenuation blankets prior to gypsum board unless readily installed after board has been installed.
- D. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
- E. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24 inches.
- F. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.
- G. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.
- H. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
- I. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.
- J. Attach gypsum board to supplementary framing and blocking provided

for additional support at openings and cutouts.

- K. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors over 32 inches wide. Apply spot grout at each jamb anchor clip just before inserting board into frame.
- L. Form control joints and expansion joints at locations indicated, with space between edges of boards, prepared to receive trim accessories.
- M. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are braced internally.
 - 1. Except where concealed application is indicated or required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area, and may be limited to not less than 75 percent of full coverage.
 - 2. Fit gypsum board around ducts, pipes, and conduits.
- N. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2 inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.
- O. At all drywall partitions, seal construction at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.
- P. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.7 METHODS OF GYPSUM BOARD APPLICATION:

- A. Single-Layer Application: Install gypsum wallboard as follows:
 - 1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
 - 2. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.
 - 3. On partitions/walls 8'-1" or less in height apply gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.

- B. Double-Layer Application: Install gypsum backing board for base layer and gypsum wallboard for face layer.
 - 1. On ceilings apply base layer prior to application of base layer on walls/partitions; apply face layers in same sequence. Offset joints between layers at least 10 inches. Apply base layers at right angles to supports unless otherwise indicated.
 - 2. On partitions/walls apply base layer and face layers vertically (parallel to framing) with joints of base layer over supports and face layer joints offset at least 10 inches with base layer joints.
- C. Acoustical Tile Base: Where drywall is base for adhesively applied acoustical tile, install gypsum backing board.
 - 1. Provide either V-joint type backing board or tape and finish joints to produce a flat surface.
- D. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:
 - 1. Fasten with screws.
- E. Double-Layer Fastening Methods: Apply base layer of gypsum board and face layer to base layer as follows:
 - 1. Fasten both base layers and face layers separately to supports with screws.
- F. Direct-Bonding to Substrate: Where gypsum board is indicated to be directly adhered to a substrate (other than studs, joists, furring members or base layer of gypsum board), comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum board until fastening adhesive has set.

3.8 INSTALLATION OF DRYWALL TRIM ACCESSORIES:

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
- B. Install corner beads at external corners.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is

indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.

1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
 2. Install "L" bead where edge trim can only be installed after gypsum board is installed.
 3. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
- D. Install plastic edge trim where indicated on wall panels at juncture with ceilings.
- E. Install control joints at locations indicated, or if not indicated, at spacings and locations required by referenced gypsum board application and finish standard, and approved by the Architect for visual effect.

3.9 FINISHING OF DRYWALL:

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.
- B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.
- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Finish interior gypsum wallboard to level indicated below and according to ASTM C840 by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat:
1. Provide a Level 5 gypsum board finish at all gypsum board locations, unless noted otherwise.
- E. Base for Acoustical Tile: Where gypsum board is indicated as a base for adhesively-applied acoustical tile, install tape and 2- coat compound treatment, without sanding.

- F. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

3.0 PROTECTION:

- A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

3.10 EXAMINATION:

- B. Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.11 PREPARATION:

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.

3.3 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL:

- A. Gypsum Board Application and Finishing Standard: Install and finish gypsum board to comply with ASTM C 840.
- B. Install sound attenuation blankets prior to gypsum board unless readily installed after board has been installed.
- C. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
- D. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24 inches.
- E. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible.

- F. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.
- G. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
- H. Attach gypsum board to wood studs so that leading edge or end of each board is attached to open (unsupported) edge of stud first.
- I. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
- J. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors over 32 inches wide. Apply spot grout at each jamb anchor clip just before inserting board into frame.
- K. Form control joints and expansion joints at locations indicated, with space between edges of boards, prepared to receive trim accessories.
- L. Cover both faces of wood stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are braced internally.
 - 1. Except where concealed application is indicated or required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area, and may be limited to not less than 75 percent of full coverage.
 - 2. Fit gypsum board around ducts, pipes, and conduits.
- M. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4 inch to 1/2 inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.
- N. At all drywall partitions, seal construction at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.

- O. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.4 METHODS OF GYPSUM BOARD APPLICATION:

- A. Single-Layer Application: Install gypsum wallboard as follows:
 - 1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
 - 2. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.
 - 3. On partitions/walls 8'-1" or less in height apply gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.
- B. Double-Layer Application: Install gypsum backing board for base layer and gypsum wallboard for face layer.
 - 1. On ceilings apply base layer prior to application of base layer on walls/partitions; apply face layers in same sequence. Offset joints between layers at least 10 inches. Apply base layers at right angles to supports unless otherwise indicated.
 - 2. On partitions/walls apply base layer and face layers vertically (parallel to framing) with joints of base layer over supports and face layer joints offset at least 10 inches with base layer joints.
- C. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:
 - 1. Fasten with screws.
- D. Double-Layer Fastening Methods: Apply base layer of gypsum board and face layer to base layer as follows:
 - 1. Fasten both base layers and face layers separately to supports with screws.
- E. Direct-Bonding to Substrate: Where gypsum board is indicated to be directly adhered to a substrate (other than studs, joists, furring members or base layer of gypsum board), comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum board until fastening adhesive has set.

3.5 INSTALLATION OF DRYWALL TRIM ACCESSORIES:

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
- B. Install corner beads at external corners.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.
 - 1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
 - 2. Install "L" bead where edge trim can only be installed after gypsum board is installed.
 - 3. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
- D. Install plastic edge trim where indicated on wall panels at juncture with ceilings.
- E. Install control joints at locations indicated, or if not indicated, at spacings and locations required by referenced gypsum board application and finish standard, and approved by the Architect for visual effect.
- F. Install corner guards with a bead of Inpro PL Premium Heavy Duty Adhesive in a zig zag pattern over the back of each wing of the corner guard. Position corner guard on the wall and apply pressure until a tight fit is achieved. Remove protective plastic covering at completion of project.

3.6 FINISHING OF DRYWALL:

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.
- B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.

- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Finish interior gypsum to level indicated below and according to ASTM C840
 - 1. Provide level 4 gypsum board finish unless noted otherwise.
- E. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

3.7 PROTECTION:

- A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 25 00

SECTION 09 30 00 – TILE WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

A. The extent of tile work is shown on drawings and in schedules.

1.03 QUALITY ASSURANCE:

A. Qualifications of Installers:

1. For installation of porcelain ceramic tile, use only thoroughly trained and experienced personnel completely familiar with specified products, manufacturer's recommended methods of installation and requirements established for this work.

B. Codes and Standards:

1. Comply with recommendations of "Handbook for Ceramic Tile Installation" published by Tile Council of America, 2017 edition.
2. Comply with ANSI and ASTM Standards listed within this Section.

C. Proprietary Materials: Handle, store, mix and apply proprietary setting and grouting materials in compliance with manufacturer's instructions.

1.04 SUBMITTALS:

A. Product Data:

1. For information only, submit two (2) copies of manufacturer's technical information and install instructions for all materials required, except bulk materials. Include certifications and other data as may be required to

show compliance with these specifications. Transmit a copy of each instruction to the Installer.

2. Accompany materials list with two (2) copies of manufacturer's current recommended method of installation for each item. These recommendations, after review by Contractor and Architect/Engineer, shall form basis for acceptance or rejection of installed work.

B. Samples:

1. Submit three (3) samples of each type and color of tile required, not less than 12" square on plywood or hardboard backing and grouted. Submit samples of trim and 6" long sample of the marble threshold(s). Review will be for color, pattern and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

1.05 DELIVERY AND STORAGE:

- A. Deliver packaged materials and store in original containers with seals unbroken and labels intact until time of use, in accordance with manufacturer's instructions.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. Porcelain Ceramic Tile (CT-1)

1. Shall meet requirements of TCA 137.1 and the requirements of this section.
2. Porcelain ceramic tile for floors and walls shall be:
 - a. Beaver Tile
 1. Style: Sequence
 2. Color: Current
 3. Finish: Matte
 4. Size: 12" x 24"
 5. Create 3" wall base from full size files

B. Porcelain Ceramic Tile (CT-2)

1. Shall meet requirements of TCA 137.1 and the requirements of this section.
2. Porcelain ceramic tile for walls shall be:
 - a. Beaver Tile
 1. Style: Emotive
 2. Color: Pride Blue
 3. Finish: Glossy
 4. Size: 3" x 12"

C. Porcelain Ceramic Tile (CT-3)

1. Shall meet requirements of TCA 137.1 and the requirements of this section.
2. Drinking Fountain Wall Tile shall be:

A. Beaver Tile

1. Style: Canne 3D
2. Color: Ecrú (Vertical)
3. Finish: Glossy
4. Size: 24" x 48"
5. Provide with all required trim.

D. Marble Thresholds: Marble thresholds shall be 1/2" inch high with chamfered edges of a uniform, fine to medium grained white stone with gray veining and conform to ASTM C503 with a minimum abrasion resistance of ten (10) per ASTM C1353 or ASTM C241 and with a honed finish.

E. Finish/Edge Protection Profiles

1. Floor Transition

- a. Schluter Reno-U: Profile with trapezoid perforated anchoring leg, with a 25% (approx.) sloped surface, in stainless steel type 304 (V2A)

2.02 SETTING MATERIALS

A. MEDIUM SET MORTAR – for floor installation unless noted otherwise.

1. Description: Factory prepared mortar and latex additive; complying with ANSI A118.4 and ISO standards C2TES1P1. Medium bed thickness; 3/4 inch min. thick floor installation.
 - a. Color: Gray
 - b. Acceptable Products:
 - i. MAPEI UltraFlex LFT, complies with ANSI A118.4
 - ii. Custom Building Products, ProLite.
 - iii. Laticrete, 4XLT.
 - iv. TEC Full Flex Mortar

B. Waterproofing and Crack Isolation Membrane: Provide materials complying with ANSI A118.10 and ANSI A118.12 and as specified below. Note: All tile to be installed on crack isolation membrane.:

1. Mapelastix AquaDefense as manufactured by MAPEI Corp.
2. Custom building products RedGard waterproofing and crack prevention membrane.
3. Hydroment ultra-set advanced as manufactured by Bostik, Inc.
4. Hydro-Ban waterproofing/anti-fracture membrane as manufactured by Laticrete International, Inc., Bethany, CT.
5. Hydraflex as manufactured by TEC. Ready to use, flexible, mold and mildew resistant waterproofing and crack isolation membrane for interior and exterior applications.

2.03 GROUTING MATERIALS

A. Epoxy-modified Grout Admixture: Complying with ANSI A118.3.

1. Provide one of the following manufacturers:
 - a) Mapei, Kerapoxy.
 - b) Custom Building Products, CEG-Lite Solids Commercial Epoxy Grout
 - c) TEC, EFX 100% Epoxy Grout
 - d) Laticrete, Bethany, CT, Spectralock Pro Grout.

B. Color: As selected by Architect.

2.04 MISCELLANEOUS MATERIAL

A. Latex Underlayment: Quick set type, as recommended by membrane manufacturer, as required to provide positive drainage to floor drains.

B. Sealants for control joints in floors and walls, use one part fungicidal silicone rubber to match grout:

1. Dow Corning 784
2. Laticrete Latasil silicone sealant meeting Fed. Spec. TT-S-001543, Class A or B.
3. TEC AccuColor 100, 100% silicone sealant low VOC ASTM C920.
4. Custom, commercial 100% silicone sealant.

PART 3 - EXECUTION

3.01 INSPECTION:

A. Installer must examine the areas and conditions under which tile work is to be installed and notify the Construction Manager, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 PREPARATION:

- A. Prepare substrate to receive setting bed and tile recommended both by the manufacturer of the tile and of the setting bed materials.
1. Fill cracks, holes and depressions with trowelable leveling and patching compound according to tile setting material manufacturer's written instructions.
 2. Remove protrusions, bumps and ridges by sanding or grinding.
 3. Provide concrete substrates for tile floors that comply with flatness tolerances specified in ANSI A108.
- B. Clean substrate as required and recommended to achieve bond using cleaners, detergents, etc.

C. Neutralize and seal substrates as recommended.

3.03 INSTALLATION:

A. Tile Installation - General:

1. Provide installation of ceramic tile in accordance with the latest edition of the Tile Council of America's "Handbook for Ceramic Tile Installation."
2. Fit tile carefully against trim and around pipes, electrical boxes and other built-up fixtures so that escutcheons, plates and collars will completely overlap cut edges.
3. Smooth exposed edges and clean tile before installation.
4. Install porcelain ceramic tile with a 1/8" joint unless noted otherwise.
5. Joint designs shall be symmetrical within room or area; border tile be not less than 1/2 normal width. Floor tile shall be set in straight line design, with wall joints in alignment with floor tile where possible.
6. At junction of base tile and projections through tile and at junctions of tile to corner guards and similar equipment, leave joint ungrouted for sealing.
7. When using tile sheets, minimize tearing sheets apart.

3.04 SETTING METHODS

- A. Method and typical detailing for tile work shall be in accordance with the following TCA alphanumeric method, listing from the "Handbook for Ceramic Tile Installation", latest edition, by the Tile Council of America.
- B. Concrete Subfloors
 1. Slabs on grade (full set method): TCA setting method F114-17 (provide with waterproof and crack isolation membrane) full set Portland cement mortar; epoxy grout A118.3 complying with tile installation specification ANSI A118.4 and epoxy grout installation specification ANSI A108.6. Install crack isolation membrane per manufacturer's specs.

3.05 GROUTING

- A. Grouting shall be installed in accordance with ANSI A108.6 and the manufacturer's recommended procedures and precautions during application and cleaning.

- B. Rinse tilework thoroughly with clean water before and after using chemical cleaners.
- C. Base Installation:
 - a. Over concrete and masonry, install base using dry-set portland cement mortar in accord with ANSI A108.5. Grout in accordance with ANSI A108.6 using epoxy grout specified for related tile floor.
- D. Jointing Pattern: Lay tile in pattern indicated. Layout tile work and enter tile fields both directions in such space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint width, unless otherwise shown.
- E. Expansion and Control Joints: Provide as indicated on drawings and as recommended by TCA and by tile and setting bed and grouting material manufacturer and as follows:
 - a. Control Joints Locations: Comply with the Tile Council of America. (TCA) and where indicated.
 - b. Interior Locations (horizontal and vertical):
 - i. Over any expansion joint, control joint, cold joint or seismic joint in the building structure.
 - ii. Expansion joints – max 25 feet in any direction.
 - iii. Expansion joints - 8 feet to 12 feet where tile work located in direct sunlight or moisture locations.
 - iv. Where tile abuts restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceiling and where changes occur in backing materials.
 - v. Coordinate joint locations with the Architect and for other areas indicated or required.
 - vi. Joint width shall be 1/4 inch, unless otherwise indicated, or required by tile manufacturer, but not less than 1/8".
 - vii. Provide under-layment systems.
 - viii. Install compatible sealant and color approved by the Architect.
- F. Grout all tile using commercial epoxy grout as specified.

- a. Temporarily protect tile as required to prevent staining.

3.06 ADJUST AND CLEAN:

A. Cleaning:

- a. Clean grout and setting materials from face of tile while materials are workable. Leave tile face clean and free of all foreign matter.
- b. Tile may be cleaned with acid solutions only when permitted by the tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush the surface with clean water before and after cleaning.

B. Finished Tile Work:

- c. Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tilework.

C. Protection:

- a. Apply a protective coat of neutral protective cleaner to completed tile work.
- b. Protect installed tile work with Kraft paper or other heavy covering during the construction period to prevent damage and wear.
- c. Prohibit all foot and wheel traffic from using tiled floors for at least 3 days, preferably 7 days.
- d. Before final inspection, remove protective coverings and rinse neutral cleaner from all tile surfaces.

END OF SECTION 09 30 00

SECTION 09 51 00 – ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of acoustical panel ceiling is shown on the drawings and in schedules.

1.03 QUALITY ASSURANCE:

- A. The installation of acoustical panel ceilings is to be by an experienced installation firm which is acceptable to the manufacturer of the acoustical units, as shown by current written statement from the manufacturer.
- B. Standard for Terminology and Performance: Applicable publications by the Acoustical and Insulating Materials Association (AIMA), including "Performance Data, Architectural Acoustical Materials."
- C. Fire Hazard Classification: UL tested, listed and labeled as Class 0.25.

1.04 SUBMITTALS:

- A. Product Data:
 - 1. For information only, submit 2 copies of manufacturer's product specifications and installation instructions for each acoustical panel ceiling material required, and for suspension system, including certified laboratory test reports and other data as required to show compliance with these specifications. Distribute one additional copy of each installation instruction to the Installer.
 - a. Include manufacturer's recommendations for cleaning and refinishing acoustical panel, including precautions against materials

and methods which may be detrimental to finishes and acoustical performance.

1.05 SAMPLES

2. Submit 3 sets of 12" square Samples for each acoustical panel required. In each set of samples show the full range of exposed color and texture to be expected in the completed work. Sample submittal and Architect's review will be for color and texture only. Compliance with other requirements is the exclusive responsibility of the Installer.
3. Submit 3, 12" long samples of exposed runner and molding. Architect's review will be for color and texture only. Compliance with other requirements is the exclusive responsibility of the Installer.

B. Maintenance Stock:

1. At the time of completing the installation, deliver stock of maintenance materials to the Owner. Furnish full size units matching the units installed, packaged with protective covering for storage and identified with appropriate labels. Furnish an amount equal to 5.0% of the amount installed.

1.06 JOB CONDITIONS:

- A. Space Enclosures: Do not install until interior acoustical panel ceilings unit space has been enclosed and is weather-tight, and until wet work in the space has been completed and is nominally dry and until work above ceilings has been completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

2.01 CEILING UNITS:

A. Acoustical Panels: (ACT-1)

2. Provide 24" x 24" mineral fiber units not less than 3/4" thick. NRC 0.75, AC170, CAC 35, light reflectance 0.89, tegular edge.
3. Acceptable Products:
 - a. Armstrong Item No.: 1911 "Ultima"
 - b. Certainteed Item No.: Symphony m1222BB-75-1
 - c. USG Item No.: 86785 "Mars"
4. Install in 15/16" exposed tee grid.
5. Provide hold down clips in Vestibule.
6. Paint exposed/cut edges where visible.

2.02 CEILING SUSPENSION MATERIALS:

- A. General: Comply with ASTM C 635, as applicable to an intermediate duty suspension system. Coordinate with other work supported by or penetrating through the ceilings, including light fixtures and HVAC equipment.
- B. Attachment Devices: Size for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung.
 - i. 1. Hanger Wires: Galvanized carbon steel, ASTM A 641, soft temper, prestretched, yield-stress load of at least 3 times design load but not less than 12 USWG.
- C. Exposed Suspension System: Exposed systems compatible with tiles specified and as follows:
 - i. Armstrong - 15/16" Prelude XL exposed tee grid system.
 - ii. CertainTeed – 15/16" Classic aluminum capped slab system.
 - iii. Donn – DX24 System; USG Interiors.
 - iv. Chicago Metallic Corp: 1200 System.
- D. Edge Moldings: Manufacturer's standard channel molding for grid type used for edges and penetrations of ceiling, with a single flange of molding exposed, finish to match grid.

2.03 MISCELLANEOUS MATERIALS:

- A. Acoustical Sealant: A heavy-bodied, non-shrinking, non-drying, non-sag grade mastic compound intended for interior sealing of concealed construction joints.
- B. Tile Cement: As recommended by tile manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION WORK:

- A. Installer must examine the conditions under which the acoustical ceiling work is to be performed and notify the Construction Manager, in writing, of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid the use of less-than-half widths units at borders, and comply with reflected ceiling plans wherever possible.

3.02 INSTALLATION:

- A. General: Install material in accordance with manufacturer's printed instructions and comply with governing regulations as indicated, and industry standards applicable to the work.
- B. Install suspension systems to comply with ASTM C 636 with hangers supported only from building structural members as indicated. Locate hangers near each end and spaced 4' - 0' along direct-hung runners, unless otherwise indicated.
 - a. 1. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for the substrate, and which will not deteriorate or fail with age or elevated temperatures.
- C. Install edge moldings at edges of each acoustical ceiling area and at locations where edge of units would otherwise be exposed after completion of the work, except where adhesively applied.
 - 1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed pm back of vertical leg before fastening to vertical surface.
 - 2. Secure moldings to building construction by fastening with screw-anchors into the substrate through holes drilled in not more than 16" o.c. along each molding.
 - 3. Level moldings with ceiling suspension system to level tolerance of 1/8" in 12' - 0".
 - 4. Miter corners of moldings accurately to provide hair-line joints, securely connected to prevent dislocation.
- D. Cope exposed flanges of intersection suspension system members so that flange faces will be flush (cope flange of member supported by other member) except as otherwise indicated.
- E. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at penetrations.
- F. Install edge trim moldings where indicated and elsewhere as needed to conceal edges of acoustical units which would otherwise be exposed to view after completion of the work. Anchor with fasteners, or if not possible, secure in place with permanent adhesive.

3.03 CLEANING AND PROTECTION:

- A. A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and required to permanently eliminate evidence of damage.
- B. The Installer shall advise the Construction Manager of required protection for the acoustical panel ceilings, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION 09 51 00

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SECTION 09 65 00 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient sheet flooring.
2. Resilient tile flooring.
3. Resilient base.
4. Resilient stair accessories.

1.2 REFERENCE STANDARDS

A. ASTM International:

1. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
2. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing.
3. ASTM F1344 - Standard Specification for Rubber Floor Tile.
4. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile.
5. ASTM F1861 - Standard Specification for Resilient Wall Base.

B. California Department of Public Health:

1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.

C. Federal Specifications:

1. FS L-F-475 - Floor Covering Vinyl, Surface (Tile and Roll), with Backing.
2. FS RR-T-650 - Treads, Metallic and Nonmetallic, Skid-Resistant.

D. NFPA:

1. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

E. SCS Global Services:

1. SCS EC10.3 - Indoor Air Quality Product Performance Standard for Building Interiors.

- F. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1113 - Architectural Coatings.
 - 2. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information describing physical and performance characteristics, including sizes, patterns, and available colors.
- C. Shop Drawings: Indicate seaming plan, custom patterns, and inlay designs.
- D. Samples:
 - 1. Submit manufacturer's complete set of color samples for initial selection.
 - 2. Submit two samples, 4 by 4 inch in size, illustrating color and pattern for each resilient flooring product specified.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
- G. Qualifications Statements:
 - 1. Submit qualifications for manufacturer and installer.
 - 2. Submit manufacturer's approval of installer.

1.4 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.
- B. Extra Stock Materials:
 - 1. Deliver to the Owner, for his use in future modifications, an extra stock of approximately 10% of each color and pattern in each material installed under this Section, packaging each type of material separately, distinctly marked, and adequately protected against deterioration.

1.6 QUALITY ASSURANCE

- A. Surface-Burning Characteristics:
 - 1. Floor Finishes:
 - a. Type: Class I, minimum 0.45 W/sq. cm.
 - b. Testing: Comply with NFPA 253.
 - 2. Base Material:
 - a. Type: Class I, minimum 0.45 W/sq. cm.
 - b. Testing: Comply with NFPA 253.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.
- B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect roll materials from damage by storing on end.
2. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
3. Provide additional protection according to manufacturer instructions.

1.9 AMBIENT CONDITIONS

- A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.
- B. Maintain temperature in storage area between 55 deg. F and 90 deg. F.
- C. Store materials for not less than 48 hours prior to installation in area of installation at temperature of 70 deg. F to achieve temperature stability.
- D. Subsequent Conditions: Maintain above 55 deg. F.

1.10 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.
- B. Furnish five year manufacturer's warranty for resilient flooring.

PART 2 - PRODUCTS

2.1 TILE FLOORING

A. Manufacturers:

1. Basis of design:

LVT-1: Shaw Contract Coded 4143V, Color: Convey 43515, 6"x48"

2. Substitutions: As specified in Section 016000 - Product Requirements.

2.2 RESILIENT BASES

A. Manufacturers:

1. Tarkett – Basis of design, "Grey WG 42"

2. Armstrong
3. Substitutions: As specified in Section 016000 - Product Requirements.

B. Base:

1. Comply with ASTM F1861.
2. Type: TS - Vulcanized Rubber
3. Style: Coved.
4. Height: 4 inches.
5. Thickness: 0.125 inch.
6. Finish: Matte.
7. Length: 4-foot sections.
8. Architect to select from full range of standard colors.

2.3 ACCESSORIES

A. Subfloor Filler:

1. Description: Cementitious.
2. Type: As recommended by adhesive material manufacturer.

B. Primers and Adhesives:

1. Description: Waterproof.
2. Type: As recommended by flooring manufacturer.

C. Moldings and Edge Strips:

1. Material: Same as flooring.

D. Feature Strips:

1. Material: Same as flooring.

E. Filler for Coved Base: Plastic.

F. Sealer and Wax: Types as recommended by flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

- B. Verify that concrete floors are dry, are to maximum moisture content as recommended by manufacturer, and exhibit negative alkalinity, carbonization, and dusting.
- C. Verify that floor and lower wall surfaces are free of substances capable of impairing adhesion of new adhesive and finish materials.

3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Remove subfloor ridges and bumps.
- C. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, and hard surface.
- D. Prohibit traffic until filler is cured.
- E. Clean substrate.
- F. Apply primer as required to prevent bleed-through or interference with adhesion by substances which cannot be removed.
- G. Existing Work:
 - 1. Extend existing resilient flooring installations using materials and methods compatible with existing installations.

3.3 INSTALLATION

- 1. Coved Bases:
 - a. Install as detailed on Drawings, using coved-base filler as backing at floor to wall junction.
 - b. Extend sheet flooring vertically to indicated height[, and cover top edge with metal cap strip].
- 2. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- 3. Access Covers:
 - a. Install flooring in recessed floor access covers.
 - b. Maintain floor pattern.
- 4. Install feature strips [and floor markings] where indicated, and fit joints tightly.

B. Tile Flooring:

1. Mix tile from container to ensure shade variations are consistent when tile is placed.
2. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
3. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
4. If floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
5. Edge Strips:
 - a. Install at unprotected or exposed edges, where flooring terminates, and where indicated.
6. Access Covers:
 - a. Install flooring in recessed floor access covers.
 - b. Maintain floor pattern.
7. Install feature strips where indicated, and fit joints tightly.

C. Bases:

1. Fitting:
 - a. Fit joints tightly and make vertical.
 - b. Maintain minimum dimension of 18 inches between joints.
2. Corners:
 - a. Miter internal corners.
 - b. At external corners, V-cut back of base strip to 2/3 of its thickness and fold.
 - c. At exposed ends, use premolded units.
3. Attachment:
 - a. Install base on solid backing.
 - b. Bond tightly to wall and floor surfaces.
4. Scribe and fit to door frames and other interruptions.

3.4 CLEANING

- A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.

- C. Clean, seal, and maintain resilient flooring products.

3.5 PROTECTION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Do not permit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 09 65 00

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Carpet tile, fully adhered.
2. Accessories.

1.2 REFERENCE STANDARDS

A. ASTM International:

1. ASTM D2859 - Standard Specification for Ignition Characteristics of Finished Textile Floor Covering Materials.

B. Carpet and Rug Institute:

1. CRI Carpet Installation Standard - Standard for Installation of Commercial Carpet.
2. CRI Green Label Plus Testing Program.
3. CRI Model Specifications for Commercial Carpets.

C. Consumer Products Safety Commission:

1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.

D. National Fire Protection Association:

1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.

1.3 PRE-INSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints, direction of carpet pile, location of edge moldings.
- D. Samples:
 - 1. Submit two carpet tiles illustrating color and pattern design for each carpet color selected. Matching roll carpet samples.

1.5 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.
- B. Extra Stock Materials:
 - 1. Furnish 10% of carpet tiles of each color and pattern selected.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an

independent testing and inspecting agency acceptable to authorities having jurisdiction.

- C. Mockups: Before installing carpet tile, build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - a. Approved mockups may become part of the completed Work if undamaged at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01 20 00 "Project Meetings". Review methods and procedures related to carpet tile installation including, but not limited to, the following:
 - 1. Review delivery, storage, and handling procedures.
 - 2. Review ambient conditions and ventilation procedures.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing work of this section with minimum 5 years experience.
 - 1. FCIB or IFCI certified carpet installers.

1.9 AMBIENT CONDITIONS

- A. Section 015000 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.
- B. Store materials in area of installation for 48 hours prior to installation.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Manufacturers:
 - 1. Mannington Commercial- Basis of Design
 - 2. Or approved equal
 - 3. Substitutions: Section 016000 - Product Requirements

- B. Carpet Tile CPT-1:
 - 1. Tile Size: 18x36 inch, nominal.
 - 2. Thickness: 0.244 inch.
 - 3. Mannington Commercial
 - 4. Style: Colorcast
 - 5. Color: Uncharted 43257

2.2 ACCESSORIES

- A. Sub-Floor Filler: Type recommended by flooring material manufacturer.

- B. Contact Adhesive: Compatible with carpet material, Recommended by carpet manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

- D. Clean substrate.

3.3 INSTALLATION

- A. Install carpet tile in accordance with CRI Carpet Installation Standard.
- B. Do not mix carpet from different cartons unless from same dye lot.
- C. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- D. Install carpet tile a monolithic pattern, set parallel to building lines.
- E. Locate change of color or pattern between rooms under door centerline.
- F. Fully adhere carpet tile to substrate.
- G. Adhere carpet tile with self-stick adhesive backing by removing protective membrane and pressing tile back onto clean and dry substrate.
- H. Trim carpet tile neatly at walls and around interruptions.
- I. Complete installation of edge strips, concealing exposed edges.

3.4 CLEANING

- A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean and vacuum carpet surfaces.

END OF SECTION 09 68 13

SECTION 09 72 00 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Surface preparation and prime painting.
2. Wall covering

B. Related Requirements:

1. Section 09 90 00 - Painting and Coating: Preparation and priming of substrate surfaces.
- 2.

1.2 DEFINITIONS

A. PVDF: Polyvinylidene fluoride.

1.3 REFERENCE STANDARDS

A. ASTM International:

1. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials.
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM F793 - Standard Classification of Wall Covering by Use Characteristics.

B. National Fire Protection Association:

1. NFPA 265 - Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls.
2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

C. UL:

1. UL - Building Materials Directory.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information regarding covering and adhesive.
- C. Shop Drawings: Indicate wall elevations, with seaming layout.
- D. Samples: Submit two samples of covering, 4 by 4 inches in size, illustrating color, finish, and texture.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer Instructions:
 - 1. Submit special procedures and perimeter conditions requiring special attention.
 - 2. Submit detailed instructions on installation requirements, including storage and handling procedures.

1.5 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Submit information regarding cleaning, touchup, and repair of covered surfaces.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.
- B. Extra Stock Materials:
 - 1. Furnish 25 linear feet of each specified color and pattern of covering.
 - 2. Store extra materials where directed by Architect/Engineer.
 - 3. Package and label each roll by manufacturer, color, pattern, and destination room number.

1.7 QUALITY ASSURANCE

- A. Surface-Burning Characteristics:

1. Textile Wall Coverings:
 - a. Maximum Flame-Spread/Smoke-Developed Index: 10/5.
 - b. Testing: Comply with ASTM E84.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.
- B. Installer: Company specializing in performing Work of this Section with minimum three years' experience.

1.9 MOCKUPS

- A. Section 014000 - Quality Requirements: Requirements for mockup.
- B. Size: Construct mockup panel, illustrating installed covering, and joint seaming technique.
- C. Locate where directed by Architect.
- D. Remove mockup when directed by Architect.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Storage:
 1. Store materials according to manufacturer instructions.
 2. Do not store roll goods on end.
- D. Protection:
 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 2. Protect packaged adhesive from temperature cycling and cold temperatures.
 3. Provide additional protection according to manufacturer instructions.

1.11 AMBIENT CONDITIONS

- A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by adhesive manufacturer or by vinyl covering product manufacturer.
- C. Subsequent Conditions: Maintain recommended conditions 24 hours before, during, and after installation of adhesive and covering.

1.12 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

1.13 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.
- B. Furnish five-year manufacturer's warranty for wall coverings.

PART 2 - PRODUCTS

2.1 WALL COVERINGS

- A. Manufacturers:
 - 1. Arc-Com.
 - 2. Koroseal Interior Products Group – Basis of Design
 - 3. Maharam.
 - 4. Substitutions: As specified in Section 016000 - Product Requirements
- B. Description:
 - 1. Vinyl coated fabric roll stock.
 - 2. Total Weight: 20 oz. ply
 - 3. Roll Width: 52-54 inches
 - 4. Color: Whit HP21-01
 - 5. Pattern: Happenstance

2.2 ACCESSORIES

- A. Adhesive Type: As recommended by covering manufacturer to suit application to substrate.
- B. Substrate Filler:
 - 1. Type: As recommended by adhesive and covering manufacturers
 - 2. Compatible with substrate.
- C. Substrate Primer and Sealer: Roman Pro 990; Rx 35™ Heavy Duty Primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that substrate surfaces are prime-painted and ready to receive Work of this Section, and that they comply with requirements of covering manufacturer.
- C. Moisture Content:
 - 1. Measure moisture content of surfaces using electronic moisture meter.
 - 2. Do not apply coverings unless moisture content of surfaces is below following maximums:
 - a. 4%
- D. Verify that flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet, or vary at rate greater than 1/16 in./ft.

3.2 PREPARATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.
- B. Fill cracks in substrate, smooth irregularities with filler, and sand smooth.
- C. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize, and then wipe dry.
- D. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- E. Surfaces:

1. Correct defects and clean surfaces that affect Work of this Section.
2. Remove existing coatings that exhibit loose surface defects.
3. Wall surfaces shall be free from defects and imperfections that could show through the finished covered surface.
4. Sand-finished plaster shall be smoothed, cinder or cement blocks shall be plastered, or otherwise rendered smooth, and old wallcoverings shall be removed.
5. For new drywall construction, manufacturer's recommended primer should be used before application of wallcovering for ease of future removal when redecorating.
6. Glossy surfaces shall either be sanded to dull surface, or a coat of manufacturer's recommended primer applied prior to installation of wallcovering.
7. If there is any evidence of mildew, it must be removed, and the wall surface treated to inhibit further mildew growth.
8. All painted surfaces should be evaluated for the possibility of pigment bleed-through. If there is any possibility, a coat of sealer, recommended by the manufacturer, should be applied before application of the wallcovering.
9. Do not install vinyl wallcovering over oil-based wood stains as a bleed-through may occur.

F. Seal marks with shellac if they may bleed through surface finishes.

G. Sealer:

1. Apply one coat of primer sealer to substrate surfaces.
2. Allow to dry and lightly sand smooth.

H. Vacuum-clean surfaces free of loose particles.

3.3 INSTALLATION

A. Lighting: Provide lighting level of 80 fc, measured midheight at substrate surfaces.

B. Adhesive:

1. Apply adhesive to surface immediately prior to application of covering.

C. Use covering in roll-number sequence.

D. Razor Trimming:

1. Razor-trim edges on flat work table, changing blade often to prevent rough cut edges.
2. Do not razor-cut on gypsum board surfaces.

- E. Application:
 - 1. Apply covering smooth, and without wrinkles, gaps, or overlaps.
 - 2. Eliminate air pockets and ensure full bond to substrate surface.
 - 3. Butt edges tight.
- F. Vertical seams are acceptable.
- G. Do not seam within 2 inches of internal corners, or within 6 inches of external corners.
- H. Items Abutting Wall Surfaces:
 - 1. Install covering before installation of bases, cabinets, hardware, or items attached to or spaced slightly from wall surface.
 - 2. Do not install covering more than 1/4 inch below top of resilient base.
- I. Cover spaces above and below windows, and above doors, in pattern sequence from roll.
- J. Apply covering to electrical and telephone wall plates prior to replacing.
- K. Terminations:
 - 1. If covering tucks into reveals, or if metal wallboard or plaster stops, apply covering with contact adhesive within 6 inches of covering termination.
 - 2. Ensure full-contact bond.
- L. Excess Adhesive:
 - 1. Remove excess adhesive while wet from seam before proceeding to next covering sheet.
 - 2. Wipe clean with dry cloth.

3.4 CLEANING

- A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.
- B. Clean coverings of excess adhesive, dust, dirt, and other contaminants.
- C. Reinstall wall plates and accessories removed prior to Work of this Section.

END OF SECTION 09 72 00

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SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of painting work is shown on the drawings and schedules, and as herein specified.
- B. The work includes painting and finishing of interior and exterior exposed items and surfaces throughout the project, except as otherwise indicated.
- C. The work includes field painting of exposed bare and covered pipe and ducts (excluding color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the mechanical and electrical work, except as otherwise indicated.
- D. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
- E. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers and other applied materials, whether used as prime, intermediate or finish coats.
- F. Paint all exposed surfaces in areas designated "paint" in "schedules," except where the natural finish of the material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint them the same as adjacent similar materials or areas.

1.03 PAINTING NOT INCLUDED:

- A. The following categories of work are not included as part of the field-applied finish work, or are included in other sections of these specifications:

1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal, hollow metal work, and similar items.
2. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as (but not limited to) metal toilet enclosures, acoustic materials, casework, finished mechanical and electrical equipment including light fixtures, switchgear and distribution cabinets, but not light or power panels where exposed elevator entrance frames, doors and equipment.
3. Concealed surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas.
4. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise indicated.
5. Operating Parts and Labels:
 - a. Moving parts of operating units, mechanical and electrical parts such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting unless otherwise indicated.
 - b. Do not paint over any code-required labels, such as Underwriters', Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.

1.04 SUBMITTALS:

A. Product Data:

1. For information only, submit 2 copies of manufacturer's technical information including paint label analysis and application instructions for each materials proposed for use. Transmit a copy of each manufacturer's instructions to the paint Applicator.

B. Samples:

1. Submit samples for Architect's review of color and texture only. Compliance with all other requirement is the Exclusive responsibility of the Contractor. Provide a listing of the materials and application for each coat of each finish sample.

- a. On 12" x 12" hardboard, provide two samples of each color and material with texture to simulate actual conditions. Resubmit each sample as requested until acceptable sheen, color and texture is achieved.

1.05 DELIVERY AND STORAGE:

- A. Deliver all materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label, and the following information:
 1. Name or title of material.
 2. Fed. Spec. Number, if applicable.
 3. Manufacturer's stock number and date of manufacturer.
 4. Manufacturer's name.
 5. Contents by volume, for major pigment and vehicle.
 6. Constituents.
 7. Thinning instructions.
 8. Application instructions.
 9. Color name and number.

1.06 JOB CONDITIONS:

- A. Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 90 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F. and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds 85% or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
 1. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

PART 2 – PRODUCTS

2.01 COLORS AND FINISHES:

- A. Prior to beginning work, the Architect will furnish color chips for surfaces to be painted. Colors will vary from wall to ceiling and from room to room. Final selection for gloss level will be by Architect and may not necessarily be the same as scheduled.
 - 1. Use representative colors when preparing samples for review.
 - 2. Final acceptance of colors will be from samples applied on the job.
- B. Color Pigments: Pure, non-fading, applicable types to suite the substrates and service indicated.
- C. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required. Notify the Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

2.02 INTERIOR PAINTING SCHEDULE:

- A. Metal-Ferrous (Semi-Gloss): (Alkyd Enamel System, Maximum VOC content 450 grams/liter)
 - 1. Primer: Modified Alkyd Resin Primer, 3 mils DFT/coat
 - S-W: Kem Kromik Universal Metal Primer, B50Z
 - PPG: Speedhide7 Inhibitive Primer #6-208 red or #6-212 white
 - Standard: Hydro-Prime
 - 2. Finish Coats: Alkyd Enamel, Semi-Gloss (40-50 units at 60 degrees F.) 3.0 mils DFT/coat.
 - S-W: (2 coats) Alkyd Enamel, Semi-Gloss B34W200.
 - PPG: (2 coats) Speedhide7 Alkyd Semi-Gloss #6-1110 Series
 - Standard: A-7067 Workrite Vinyl Acrylic Semi-Gloss
- B. Metal - Galvanized (Semi-gloss): Code #5.13 (Acrylic Latex System)

1. Finish Coats: 100 percent Acrylic, Waterborne, Semi-Gloss (30-40 units at 60 degrees F.) 3.0 mils DFT/coat.
S-W: (2 coats) DTM Acrylic coating, B66W200.
PPG: (2 coats) Pitt-TechJ Open Pack DTM Waterborne Satin Enamel #90-474 Series
Standard: A-7010 Stanoglo Semi-Gloss Enamel

C. Gypsum Board (Flat): (Acrylic Latex System)

1. Primer: Vinyl Acrylic Latex, 1.1 mils DFT/coat
S-W: ProMar 200 Latex Wall Primer, B28W200.
PPG: Speedhide7 Latex Primer-Sealer #6-2
Standard: A-7013 Vinyl Primer
2. Finish Coats: Vinyl Acrylic Flat (0-5 units at 90 degrees F.), 1.4 mils DFT/coat.
S-W: (2 coats) ProMar 200 Latex Flat Wall Paint, B30W200.
PPG: (2 coats) Speedhide7 Acrylic Latex Flat Wall Paint #6-70 Series
Standard: A-7017 Walplex Flat Latex

D. Gypsum Board (Semi-Gloss): (Acrylic Latex System)

1. Primer: Vinyl Acrylic Latex, 1.1 mils DFT/coat
S-W: ProMar 200 Latex Wall Primer, B28W200.
PPG: Speedhide7 Latex Primer-Sealer #6-2
Standard: A-7013 Vinyl Primer
2. Finish Coats: Vinyl Acrylic Semi-Gloss (25-35 units at 60 degrees F.), 1.5 mils DFT/coat.
S-W: (2 coats) ProMar 200 Semi-Gloss Enamel, B31W200.
PPG: (2 coats) Speedhide7 Acrylic Latex Semi-Gloss Enamel #6-510 Series
Standard: A-7010 Stanoglo Semi-Gloss Enamel

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Applicator must examine the areas and conditions under which painting work is to be applied and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Applicator.

- B. Starting of painting work will be construed as the Applicator's acceptance of the surfaces and conditions within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.

3.02 SURFACE PREPARATION:

A. General:

1. Perform preparation and cleaning procedure in strict accordance with the paint manufacturer's instructions and as herein specified for each particular substrate condition.
2. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workmen skilled in the trades involved.
3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program the cleaning and painting so that contaminants from the cleaning process will not fall onto wet, newly-painted surfaces.

B. Cementitious Materials:

1. Prepare cementitious surfaces to be painted by removing all efflorescence, chalk, dust, grease, oils, and by roughening as required to remove glaze conforming to SSPC SP13.
2. Determine the alkalinity and moisture content of the surfaces to be painted by performing appropriate tests. If the surfaces are found to be sufficiently alkaline to cause blistering and burning of the finish paint, correct this condition before application of paint. Do not paint over surfaces where the moisture content exceeds that permitted by the manufacturer's printed directions.

C. Ferrous Metals:

1. Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning, conforming to SSPC SP-1 and SSPC SP-2, SSPC SP-3 or SSPC – SP7/NACE – No. 4 (brush off blast cleaning)

D. Galvanized Surfaces:

1. Clean free of oil and surface contaminants with an acceptable non-petroleum based solvent per SSPC SP-1.

3.03 MATERIALS PREPARATION:

- A. Mix and prepare painting materials in accordance with manufacturer's directions.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir materials before application to produce a mixture of uniform density and stir as required during the application of the materials. Do not stir surface film into the material. Remove the film and if necessary, strain the material before using.

3.04 APPLICATION:

A. General:

1. Apply paint in accordance with the manufacturer's directions. Use applicators and techniques best suited for the substrate and type of material being applied.
2. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
3. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only

before final installation of equipment.

4. Paint interior surfaces of ducts where visible through registers or grilles with a flat, non-specular black paint.
5. Paint the back sides of access panels and removable or hinged covers to match the exposed surfaces.
6. Finish exterior doors on tops, bottoms and side edges the same as the exterior faces, unless otherwise indicated.
7. Sand lightly between each succeeding enamel or varnish coat.
8. Omit the first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

B. Scheduling Painting:

1. Apply the first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
2. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Minimum Coating Thickness:

1. Apply each material at not less than the manufacturer's recommended spreading rate to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.

D. Mechanical and Electrical Work:

1. Painting of mechanical and electrical work is limited to those items exposed in occupied spaces and includes all exterior exposed work.

E. Prime Coats:

1. Apply a prime coat of material which is required to be painted

- or finished, and which has not been prime coated by others.
2. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

F. Pigmented (Opaque) Finishes:

1. Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

G. Transparent (Clear) Finishes:

1. Use multiple coats to produce glass-smooth surface film of each luster. Provide a finish free of laps, cloudiness, color, irregularity, runs, brush marks, orangepel, nail holes, or other surface imperfections.
2. Provide satin finish for final coats, unless otherwise indicated.

H. Completed Work:

1. Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.05 CLEAN-UP AND PROTECTION:

A. Clean-up:

1. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.
2. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

B. Protection:

1. Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any

- damage by cleaning, repairing or replacing and repainting, as acceptable to the Architect.
2. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
 3. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION 09 91 00

SECTION 10400 – IDENTIFICATION DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.02 SUMMARY

- A. Provide labor, materials, and equipment necessary for the complete installation of identifying devices as indicated, including:
 - 1. Interior Signage

1.03 SUBMITTALS:

- A. Submit product data for each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Submit Shop Drawings showing fabrication and erection of signs. Include plans, elevations, and large scale sections of typical members and other components. Show anchors, grounds, layout, reinforcement, accessories, and installation details.
- C. Signage shall have 2 colors, background and letters. Match sample provided by Architect.
- D. Provide samples for verification of color, pattern, and texture selected and compliance with requirements indicated:
 - 1. Cast Acrylic Sheet: Provide a sample panel not less than 8-1/2 inches by 11 inches for each material, color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.

1.04 QUALITY ASSURANCE:

- a. Reference Codes and Specifications: Michigan Building Code, 2015 Edition.
- b. Signage shall be provided to conform with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and State and Local Regulations.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

- A. Manufacturers: (Interior Signage) Subject to compliance with requirements, provide signage by one of the following:
 1. ASI Sign Systems, Indianapolis, Indiana; Cincinnati, Ohio; Cleveland, Ohio
 2. Diskey Sign Corp. Fort Wayne, Indiana
 3. Roban, Lakemore, Ohio
 4. Best Signs, Montrose, Colorado
 5. J.L. Geisler, Inc. Michigan
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect's approval must be accompanied by the "Substitution Request Form" and complete technical data for evaluation. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date.
 1. Refer to Section 016000 – Material & Equipment for Substitution Requests for additional requirements.

2.02 MATERIALS:

- A. Cast Acrylic Sheet: Provide cast (no extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thicknesses indicated, with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 degrees F and of the following general types:
 - a. Thickness: 1/8 inch.

- b. Colors as specified.
- B. Fasteners: Use concealed fasteners fabricated from metals that are not corrosive to the sign material and mounting surface.
- C. Anchors and Inserts: Use nonferrous metal or hot dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete masonry work.
- D. Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background color that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are nonfading for the application intended.

2.03 INTERIOR SIGNAGE:

A. Signage, General:

- a. Graphic Process; Raised letters and Braille shall be formed as an integral part of the sign face. Surface applied letters and Braille are not allowed.
- b. Letters: Letters and numbers shall have width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10. Letters and numbers shall be raised 1/32 inch, uppercase, sans serif or simple sans serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be 5/8 inch high minimum and 2 inches high maximum.
- c. Ease sign edge and radius corners 3/8 inch.
- d. Material

- i. Acrylic plastic

B. Toilet Room Handicapped Signs

- i. Provide one sign depicting International Men/Women Symbol along with the words "Men" or "Women" indicated on the sign at each toilet room, equipped with facilities for the handicapped as indicated on the Signage Schedule.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. General: Located sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
 - 1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.
- B. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the method indicated below:
 - 1. Mount with adhesive as recommended by manufacturer.
 - 2. Mount with nonremovable oval head screws, using plastic plugs where mounted on masonry.

3.02 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION 10 40 00

SECTION 10 44 13 - FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The extent of fire extinguishers and wall mounted brackets is shown on the drawings.

1.03 QUALITY ASSURANCE:

- A. Manufacturer: Provide fire extinguishers with wall mounted brackets manufactured by one of the following:
 - 1. Larsens Manufacturing Company

1.04 SUBMITTALS:

- A. Manufacturer's Data:
 - 1. For information only, submit two (2) copies of manufacturer's technical data and installation instructions for fire extinguisher required. Transmit copy of each instruction to the installer.

PART 2 - PRODUCTS

2.01 FIRE EXTINGUISHERS AND CABINETS:

- A. General: Provide Architectural Series fire extinguisher cabinets including standard 10 lb. multi-purpose dry chemical fire extinguishers, as follows:
 - 1. Semi-Recessed, 3-1/2" return trim door frame. Larsens Model #SS2409-R4 with solid door.

B. Stainless Steel: 304 stainless steel, #4 finish.

- C. Construction: One-piece tubular door frames, mitered and welded. One-piece metal trim frame, to suit cabinet style required. Weld all joints and grind smooth. Provide manufacturer's standard steel box with white baked enamel interior finish.
- D. Steel Doors and Trim: Manufacturer's standard, #4 stainless steel door frame and trim, style as indicated.
- E. Door Hardware: Continuous type hinge permitting door to open 180 degrees. Provide "Fire" handle on all cabinets, unless noted otherwise.
- F. Provide fire-rated cabinets where indicated on plan or if not indicated, at all locations installed in a fire-rated wall as shown on the life safety plan.
- G. Provide each fire extinguisher cabinet with a plastic sign: 4" x 18" 3D tent "Fire Extinguisher" #PTD-108.

2.02 FIRE EXTINGUISHERS (without cabinets) where indicated:

- A. General: Provide standard 10 lb. multi-purpose (MP) dry chemical fire extinguishers (provide CD CO2 type extinguishers in the Print Room, Provide WC K type extinguishers in the Kitchen/Serving Area), as follows:
 - 1. Surface mounted fire extinguisher - Larsens Model MP10 with bracket 546.
 - 2. Surface mounted fire extinguisher - Larsens Model CD10 (CO2 Type) with bracket 575.
 - 3. Surface mounted fire extinguisher - Larsens Model WC-6L (K Type) with bracket 1007.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine the substrates and conditions under which the fire extinguishers are to be installed, and notify the Construction Manager in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION:

- A. Install in locations and at mounting height to comply with governing authorities. Securely fasten to structure, square and plumb, in accordance with manufacturer's instructions.

END OF SECTION 10 44 13

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SECTION 10 80 00 – TOILET ACCESSORIES

PART I - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION:

- A. The extent of each type of toilet accessory is shown on the drawings.

1.03 QUALITY ASSURANCE:

A. Inserts and Anchorages:

1. Furnish inserts and anchoring devices and wood blocking which must be built into masonry and metal stud assemblies for the installation of toilet accessories.
2. Coordinate delivery with other work to avoid delay.
3. See masonry sections of these specifications for installation of inserts and anchorage devices.

B. Products:

1. Provide products of the same manufacturer for units exposed in the same areas, unless otherwise acceptable to the Architect.
2. 2. Stamped names or labels on exposed faces of units will not be permitted, except where otherwise indicated.
3. 3. Provide locks where indicated, with the same keying for each type of accessory units in the project wherever possible. Furnish two keys for each lock.

- C. The specifications indicated specific products of one manufacturer to communicate design intent.

1.04 SUBMITTALS:

A. Product Data:

1. For information only, submit PDF copy of manufacturer's technical data and installation instructions for each toilet accessory. Transmit copies of installation instructions to the Installer.

B. Samples:

1. When requested, submit full-size samples of units to Architect for review of design and operation. Acceptable samples will be returned and may be used in the work. Compliance with all other requirements is the exclusive responsibility of the Contractor.

C. Setting Drawings:

1. Provide setting drawings, templates, instructions and directions for installation of anchorage devices in other work.

PART 2 – PRODUCTS

2.01 MATERIALS:

- A. Stainless Steel: AISI, Type 302/304 with polished No. 4 finish, 0.034 inch (22 gauge) minimum thickness.
- B. Brass: Unleaded, flat products, ASTM B19; rods, shapes, forgings, and flat products with finished edges, ASTM B16; castings, ASTM B30.
- C. Sheet Steel: Cold rolled, commercial quality, ASTM A336, 0.04 inch (20 gauge) minimum. Surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A527, G60.
- E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC2.

- F. Mirror Glass: Nominal 6.0mm (0.23 inch) thick, conforming to ASTM C1036, Type I, Class 1, Quality q2, and with silvering electro-plated copper coating, and protective organic coating.
 - i. Provide tempered glass, unless indicated otherwise.
- G. Galvanized Steel Mounting Devices: ASTM A153, hot-dip galvanized after fabrication.
- H. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

2.02 MIRRORS

- A. Stainless Steel Framed Mirror: Mirror shall have a one piece, Type 304 stainless steel angle frame, 3/4 inch by 3/4 inch with continuous integral stiffener on all sides and beveled front to hold frame tightly against mirror; corners shall be heliarc welded, ground and polished smooth; all exposed surfaces shall have satin finish with vertical grain. Tempered glass mirror shall be guaranteed for 15 years against silver spoilage. All edges shall be protected by plastic filler strips and the back shall be protected by full size, shock absorbing, water resistant, nonabrasive, 1/8 inch thick polyethylene padding. Galvanized steel back shall have integral hanging brackets for mounting on concealed rectangular wall hanger(s). Mirror shall be secured to hanger(s) with concealed phillips head jacking screws located in bottom of frame.
- B.
- C. Manufacturers: Subject to compliance with requirements, provide mirror unit by one of the following:
 - 1. Bobrick: B-290 2436. Provide tempered glass.
 - 2. Bradley: 781 Series 24"x36". Provide tempered glass.
 - 3. c. American Specialties, Inc.: 20650-B2536. Provide tempered glass.

2.03 GRAB BARS

- A. Stainless Steel Type: Provide grab bars with wall thickness not less than 0.05 inches and as follows:
 - 1. Mounting: Concealed, manufacturer's standard flanges and anchorages.
 - 2. Clearance: 1-1/2 inch clearance between wall surface and inside face of bar.

3. Gripping Surfaces

- a. Satin finish with peened gripping surface, unless noted otherwise.

4. Heavy Duty Size: Outside diameter of 1-1/2 inches minimum.

D. Grab bar shall be constructed of Type 304 stainless steel with satin finish. Concealed mounting flanges shall be 1/8 inch thick stainless steel plate, 3-1/8 inch diameter, and each shall have 2 screw holes for attachment to wall. Flange covers shall be 22 gauge, 3-1/4 inch diameter by 1/2 inch deep, and shall snap over mounting flange to conceal mounting screws. Ends of grab bars shall pass through concealed mounting flanges and be heliarc welded to form one structural unit. Grab bars shall comply with ADA Accessibility Guidelines for structural strength. Provide concealed anchor device or backing as specified or required in accordance with local building codes before wall is finished.

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

1. Handicap Toilet Compartments: Bobrick: B-5806.99 Series

- a. Horizontal: B-5806.99 by 36"
- b. Horizontal: B-5806.99 by 42"
- c. Vertical: B-5806.99 by 18"

2. Handicap Toilet Compartments: Bradley: 812 Series

- a. Horizontal: 36"
- b. Horizontal: 42"
- c. Vertical: 18"

1. Handicap Toilet Compartments: American Specialties, Inc.: 3800 Series.

- a. Horizontal: 36"
- b. Horizontal: 42"
- c. Vertical: 18"

2.05 SANITARY NAPKIN RECEPTACLE

A. A. Surface mounted with self-closing door. Receptacle retained in cabinet with tumbler lock.

1. Bobrick: B-254.
2. Bradley: 4737-11
3. American Specialties, Inc.: 0473-1A

2.06 TOILET TISSUE DISPENSERS

A. Roll dispenser with concealed locking device; theft resistant.

1. Bobrick: B-2740
2. Bradley: 5224
3. American Specialties, Inc.: 0715

2.07 SOAP DISPENSER

A. Vertical tank, surface mount, matte black, soap dispenser.

1. PowerFRESH Hand Hygiene Manual Push Hand Care Dispenser - Black

2.14 Hand Dryer

- A. Bradley 2923-28B001 – Basis of design
B. Xlerator – XL-GR-H-1.1N with ADA Recess Kit
C. Sloan Optima Air -Brushed nickel

2.16 MISCELLANEOUS ACCESSORIES

A. Trap wrap

1. Provide trapwrap where called for in schedule.
2. Trapwrap to be as manufactured by Brocar Products Inc. or TrueBro.

B. Fasteners and Anchors

1. Provide mounting kits with stainless steel screws for accessories requiring same.

2. Mounting kits shall include toggle nuts for hollow walls and expansion shields for solid walls. Provide 2 fasteners at each mounting plate.
3. Provide 12 gauge, 3 inches wide, steel concealed anchor plates with tapped holes for installation of grab bars on walls constructed with metal studs.
4. Provide concealed anchors for installation of grab bars on solid walls. Anchor assembly shall consist of tapped 12 gauge anchor plate, 10 gauge back plate, and 3/8 inch diameter thru-wall bolt.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer must examine the areas and conditions under which toilet accessories are to be installed and notify the Construction Manager in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION:

- A. Use concealed fastenings wherever possible.
- B. Provide anchors, bolts and other necessary anchorages and attach accessories securely to walls in locations as shown or directed.
- C. Install concealed mounting devices and fasteners fabricated of the same materials as the accessories, or of galvanized steel, as recommended by manufacturer.
- D. Install exposed mounting devices and fasteners finished to match the accessories.
- E. Provide theft-resistant fasteners for all accessory mountings.
- F. Secure toilet room accessories in accordance with the manufacturer's instructions for each item and each type of substrate construction.
- G. Schedule: Refer to Drawings

END OF SECTION 10 80 00

SECTION 12 30 00 – PLASTIC LAMINATE CASEWORK

GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to Division 0, Bidding and Contract Requirements and to Division 1 General Requirements which are hereby made a part of this Specification. Refer to other sections, divisions, and schedules for work in connection with this section.

1.02 INTENT

- A. The intent of this specification is to establish minimum performance and quality criteria consistent with preestablished standards of design and function. Casework not meeting these minimum requirements will be unacceptable.
- B. The casework contractor shall be held in strict compliance with any specific materials, finishes, construction details and hardware that are specified herein. Bids proposing to supply casework not meeting these requirements will be rejected.

1.03 WORK INCLUDED

- A. Furnish, deliver, and install to Owner's and Architect's satisfaction, all pre-fabricated plastic laminate casework as shown on drawings, schedules and equipment lists.
- B. Furnish and install all fillers, scribes, finished ends, finished backs, work surfaces/backsplashes, and cutouts required to provide a complete and finished project. Plastic laminate work surfaces shall include backer sheet.
- C. Provide sinks and fittings, electrical outlets and fixtures when specifically stated as being part of this contract.
- D. Provide locks on all cabinets capable of locking unless noted otherwise. All cabinets are to be keyed alike per room. All locks are to be masterkeyable to room doors.

- E. Installer shall coordinate with the Construction Manager and Owner's M/E/P Contractor, connection, and testing of all sinks, fittings, electrical fixtures; coordinating all Rough-ins: mechanical piping, electrical runs, and connections required for a complete project.
- F. Blocking, framing, and reinforcement in walls, ceilings, and floors for anchoring of cabinets and trim.

1.05 QUALIFICATIONS

- A. Plastic laminate casework shall be as manufactured by Stevens Cabinet Co. Division of Stevens Industries Inc., Teutopolis, Illinois. Products and catalog numbers are from Stevens catalog and are used as basis for identification, configuration, size and quality.
- B. Other pre-approved manufacturers are as follows:
 - TMI Systems Design Corp. Dickinson, North Dakota
 - Case Systems Inc., Midland, Michigan
 - LSI Corporation of America, Inc., (A Division of Stevens Industries)
 - Wood Metal Industries, Selinsgrove, PA
 - Strata Design, Inc., Traverse City, MI
- C. Casework of other manufacturers will be considered for approval providing written request is received at least ten (10) days prior to announced bid date and approved by addendum. Bidder shall state in writing any deviations from requirements and specifications. The casework shall conform to configuration, arrangement, design, material quality, joinery, panel thickness, and surfacing of that specified and shown on drawings.
- D. Manufacturers requesting approval shall submit samples with Cut-A-Ways showing cabinet construction, joinery, drawer and door construction, hardware, and materials; along with catalogs and specification in order that accurate evaluations can be made. Samples may be impounded for the duration of contract to insure construction specification compliance.

1.06 SUBMITTALS

- A. Shop drawings shall be submitted for approval within thirty (30) days after formal notification of award of contract. Drawings shall consist of floor plans indicating arrangement and relation to electrical, data technology

and adjacent work and equipment, and complete elevations of case-work. Centerline of service requirements shall be noted for use by other trades. A schedule of all sinks, fittings, and accessories that are part of this contract shall be provided.

- B. Color samples shall be submitted for selection and coordination at time of contract award. Samples of actual material and color shall be available as required.
- C. Additional catalog cuts, details and samples as requested by Architect for evaluation and coordination.
- D. Physical sample must be approved prior to fabrication.

1.07 PRODUCT DELIVERY AND STORAGE

- A. Protect cabinet and countertops during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Store cabinets and countertops at project site installation and storage areas with similar ambient conditions as final installation. Storage areas must be kept dry, heated with low relative humidity and away from construction work such as painting, wet work, grinding and similar operations.

1.08 WARRANTY

- A. Casework manufacturer shall provide lifetime guarantee and limited warranty to the original Owner against defective material and fabrication for as long as they own the product – this is a warranty of replacement and repair only, the manufacturer will correct defects in material and/or fabrication without additional cost.
- B. Accessory equipment (sinks, fittings etc.) shall be warranted by appropriate manufacturer's guarantee.

PART 2 - PRODUCTS

2.01 CORE MATERIAL

- A. Cabinet components having particle board core material shall be of a minimum 45 lb. density, M-2 industrial grade. The particle board used shall

have been tested under ANSI A208.1 1993 standards and/or ASTM D 1037-91A.

- B. Medium density fiberboard (MDF) shall be used in high stress areas as drawer members and shall be minimum 48 lb. density MD-21 grade and tested under ANSI A208.2 1994 Standards.
- C. Industrial hardboard shall be pre-finished 1/4" thickness composed of wood fibers, phenolic resin binders and moisture inhibitors that meet or exceed the hardboard product standard ANSI/AHA A135.4 1988.
- D. All countertops located with 3'-0" of any direction of built-in sink and/or bubblers shall be constructed of marine grade "Greenboard" MR moisture/water resistant particle board. The particle board shall be tested under ANSI A208.1 1-1993, M3 standards.

2.02 SURFACE MATERIAL

- A. Exposed exteriors shall be permanently thermofused plastic laminate, fused to core using a minimum average pressure of 320 PSI and average 320 degree F. temperature. Thermofused plastic laminate shall meet ALA 1996 specification standards, as tested against the high pressure laminate NEMA LD 3-1995, VGS.028 specification standards. (Warranted for life against delamination).
- B. Exposed doors and drawer fronts shall be permanently thermofused plastic laminate, fused to core using a minimum average pressure of 320 PSI and average 320 degree F. temperature. Thermofused plastic laminate shall meet ALA 1996 specification standards, as tested against the high pressure laminate NEMA LD 3-1995, VGS.028 specification standards, (Warranted for life against delamination).
- C. Exposed interiors shall be permanently thermofused melamine laminate, fused to core using a minimum average pressure of 320 PSI and average 320 degree F. temperature. Thermofused melamine laminate shall meet ALA 1996 specification standards, as tested against the high pressure laminate NEMA LD 3-1995, VGS.028 specification standards. (Warranted for life against delamination).
- D. Semi-exposed and concealed surfaces shall be permanently thermofused melamine laminate or high pressure decorative plastic laminate cabinet liner, 0.020" thickness for balanced construction. Thermofused melamine

laminate shall meet the ALA 1996 specifications standard, as tested against the high pressure laminate NEMA LD 3-1995, VGS.028 specification standards.

2.03 EDGINGS

- A. Exposed exterior cabinet front edges shall be banded with a contrasting or matching rigid PVC extrusion, 0.020" thickness, resistant to chip, crack and high impact. Edging shall have a satin finish with a UV cured top coat for additional durability. The 0.020" thick edging shall be applied with waterproof hot melt adhesive.
- B. Door and drawer front edges shall be banded with a contrasting or matching rigid PVC extrusion, 3mm (1/8") thickness, resistant to chip, crack, and high impact. Edging shall have a satin finish with UV cured top coat for additional durability. The 3mm thick edging shall be applied with waterproof hot melt adhesive, and shaped to provide radiused edges and radiused corners.
- C. Adjustable shelves shall be banded with PVC extrusion, resistant to chip, crack, and high impact. Edging shall have a satin finish with a UV cured top coat for additional durability. Edging shall be applied with waterproof hot melt adhesive. Shelves to be 1" thick. 0.020" thick PVC edging shall be applied to four (4) edges of adjustable shelf.
- D. All other interior components, including drawers, shall be banded with a PVC extrusion, 0.020" in thickness, resistant to chip, crack, and high impact. Edging shall have a satin finish with a UV cured top coat for additional durability. Edging to be machine applied with waterproof hot melt adhesive.

2.04 COLOR SELECTIONS

- A. Exposed cabinet exteriors shall be chosen from Thermofused plastic laminate selections as depicted in manufacturer's color selector guide. A minimum of seventy (70) colors and patterns shall be available as standard selection.
- B. Medium density fiberboard (MDF) shall be used in high stress areas as drawer members and shall be minimum 48 lb. density MD-21 grade and tested under ANSI A208.2 1994 Standards.

- C. Exposed doors and drawer fronts shall be chosen from Thermofused plastic laminate selections as depicted in manufacturer's color selector guide. A minimum of seventy(70) colors and patterns shall be available as standard selection.
- D. Medium density fiberboard (MDF) shall be used in high stress areas as drawer members and shall be minimum 48 lb. density MD-21 grade and tested under ANSI A208.2 1994 Standards.
- E. Semi-exposed surfaces, including drawer box components, shall be finished in either pearl or grey as selected from casework manufacturer's standard interior color selections.
- F. Exposed interior components, including both faces of shelves and interior face of backs to match exposed cabinet exterior color selection.
- G. Door and drawer front edges shall be chosen from one of twenty-two (22) trim group colors in 3mm thick PVC in contrasting or matching colors as depicted in manufacturer's color guide.
- H. Exposed front edge of cabinet, including exposed interior edges, shall be selected from one of seventy (70) trim group colors in 0.020" thick PVC in contrasting or matching colors as depicted in manufacturer's color guide, or commercial match to selected exposed exterior color based on availability.
- I. Semi-exposed edges of cabinet components including drawers, shall be either pearl or grey in 0.020" thick PVC.
- J. Pulls shall be available in chrome, brass, bent wire and injection molded pulls in either bent wire or contour design, to be available in twenty (20) colors as selected from manufacturer's color selector.
- K. Casework of substitute brands with lesser amounts or more restrictive selection requirements will not be considered equal and shall be rejected.
- L. Finishes to be laminate manufacturer's matte, suede, or equivalent finish as approved by Architect. Samples will be reviewed by Architect for color, texture, and pattern only.

2.05 HARDWARE

A. Hinges

1. 120 Degree Concealed Hinges: Shall be commercial grade 120 degree pivot overlay style. Hinges shall be two (2) piece construction with door hinge and cabinet mounting plate. Hinges shall be compact design with "minimal intrusive" mechanism into compartment space. Hinges shall have spring loaded self-close feature. Doors less than 48" in height shall have two (2) hinges per door. Doors 48" through 63" in height shall have three (3) hinges per door. Doors exceeding 63" in height shall have four (4) hinges per door. Concealed hinges shall have 3-way (vertical, in-out, horizontal) alignment adjustments. Hinges shall be mounted with 5mm thread fasteners and nylon screw mount inserts.
- B. Door catches shall be a heavy-duty spring loaded, large diameter (17.5mm - 11/16") roller type catch mounted at bottom edge. All doors over 48" in height shall be provided with roller catch at both top and bottom of door.
- C. Catch strike plate shall be injection molded ABS, with an integrally molded engagement ridge. Strike plate shall also provide a wide face bumper insuring a positive door stop.
- D. Pulls shall be impact resistant injection molded bent wire, 3-1/2" length available per color selection in Article 2.04.H.
- E. Drawer and slide out shelves shall be suspended with bottom mount, side and bottom attached nylon roller epoxy coated steel slides to ensure quiet, smooth operation. Lateral stability is achieved thru a special formed captive profile. Slides shall have 100 lb. load rating, with both in and out drawer stop, 3" self close feature and a side adjustment cam allowing 3mm side to side alignment.
- F. Drawers specifically noted for full extension file use shall be suspended with bottom mount, side and bottom attached nylon roller epoxy coated steel slides to ensure quiet, smooth operation. Lateral stability is achieved thru a special formed captive profile. Slides shall have 150 lb. load rating, with both in and out drawer stop, and 3" self close feature. File drawer shall include extruded top mounted molded side rails to accept standard hanging file folders.

- G. Knee-space, pencil drawers, and keyboard trays, shall be designed to permit under counter or support frame mounting, with 100 lb. nylon roller epoxy coated steel slides.
- H. Shelf support clips for 1" thick adjustable shelves shall be injection molded clear polycarbonate. Support clips shall incorporate integral molded lock tabs to retain shelf from topping or inadvertently being lifted out. Support clip shall have 5mm dia. double pin engagement into precision bored hole pattern in cabinet vertical members. Clips shall have a molded ridge which provide pressure against edge of shelving to maintain positive pin engagement. Clip shall be designed in such a manner to provide means for permanent retention to shelf. Static test load must exceed 200lb. per clip.
- I. Dividers that are 1/4" thick shall be fully adjustable and retained with injection molded clear polycarbonate clip.
- J. Locks shall be cylinder type, diecast, with five (5) disc tumbler mechanism. Each lock shall be provided with milled brass key. Master key cabinets to room doors. Cabinets with multiple locks installed shall be keyed alike by room, with each cabinet in that room keyed the same unless otherwise specified. Locks shall be Remov-A-Core to give flexibility for different pass key options. Locks shall be provided on all cabinets capable of locking.

2.06 COMPONENTS

- A. Base and wall cabinet ends shall be 3/4" thick particle board, laminated for balanced construction, surfaced as described in Article 2.02.A and edged as described in Article 2.03.A.
- B. Base cabinet tops and bottoms shall be 3/4" thick particle board, laminated for balanced construction, surfaced as described in Article 2.02.C, and edged as described in Article 2.03.A.
- C. Wall cabinet top and bottom shall be 1" thick particle board, laminated for balanced construction, surfaced as described in Article 2.02.C, and edged as described in Article 2.03.A.
- D. Vertical cabinet members shall be 3/4" thick particle board, laminated for balanced construction, surfaced as described in Article 2.02.C, and edged as described in Article 2.03D.

- E. Cabinet backs shall be 1/4" thick pre-finished industrial hardboard.
- F. Frame rails shall be 3/4" thick x 3 3/4" wide particle board, laminated for balanced construction, surfaced as described in Article 2.02.C, and edged as described in Article 2.03.A.
- G. Sub base shall consist of two (2) toe kick support rails shall be 3/4" thick x 3 3/4" high particle board and be inset from cabinet front and back edge, to give additional load support.
- H. Mounting rails shall be 3/4" thick x 3 3/4" wide particle board. Wall cabinets shall have rails positioned at the top and bottom. Base cabinet shall have rails positioned at the top of unit.
- I. Drawers shall be full box design with a separate front. Drawer sides and ends shall be constructed of 5/8" medium density fiberboard with pearl or grey color thermofused melamine laminate and matching PVC top edges. Bottoms shall be 1/4" thick medium density fiberboard, pearl or grey color thermofused melamine laminate.
- J. Adjustable shelves shall be 1" thick. Edges of shelf shall be banded as described in Article 2.03.C with a high impact, rigid PVC extrusion, pearl or grey in color.
- K. Solid hinged doors, and drawer fronts shall be 3/4" thick material of balanced construction, surfaced as described in Section 2.02.B, edged as described in Article 2.03.B.

2.07 CONSTRUCTION

- A. Cabinet parts shall be accurately machined and precision bored for premium grade quality joinery construction, utilizing automatic machinery to ensure consistent sizing on modular cabinets. Cabinets shall be assembled under controlled case clamp conditions, assuring final cabinet squareness and proper joint compressions.
- B. Cabinet ends shall be bored to receive 8mm, industrial grade hardwood laterally fluted dowels with chamfered ends. Cabinet ends shall be prepared to receive adjustable shelf hardware at 32mm (approximately 1 1/4") centers. Door hinges and drawer slides shall be machined drilled to maintain vertical and horizontal alignment of components. Inset grooving

with chamfer shall be machined 3/4" from rear edge to accept the 1/4" back. Base units shall have one piece end panels continuous to floor for added load capabilities.

C. Tops and bottoms shall be joined to cabinet ends using a minimum of six (6) dowels at each joint for twenty-four (24) inch deep cabinets and a minimum of four (4) dowels at each joint, for twelve (12) inch deep cabinets. All dowels to be industrial grade hardwood, laterally fluted, with chamfered ends and 8mm in diameter. Top of base cabinet will be full depth. Inset grooving with chamfer shall be machined 3/4" from rear edge to accept the 1/4" back.

D. Vertical dividers shall be bored to receive adjustable shelf hardware at 32 mm (approximately 1 1/4") centers. Dividers shall be joined to tops and bottoms with 8mm diameter hardwood dowels.

E. Frame rails shall be joined to ends with 8mm diameter hardwood dowels.

F. Two (2) toe kick supports shall be inset from cabinet front and back edges, and doweled into cabinet ends with 8mm hardwood dowels.

G. Mounting rails shall be fully concealed behind backs. Rails shall be 3/4" thick and fastened to cabinet ends with 8mm hardwood dowels. Wall cabinets shall incorporate two mounting rails. Wall cabinets shall have rails positioned at top and bottom. Base units shall have rail positioned in the upper back area.

H. Back panels shall be 1/4" thick and inset 3/4" from rear edge of cabinet. Back shall be glued and continuously trapped in top, bottom and ends of cabinets.

I. Drawer corner joints shall be interlocking dowel pin design. Hardwood dowel pins, 8mm diameter shall be inserted into drawer fronts and backs to fit into machined hole patterns in drawer sides. Bottoms shall be trapped into grooves on all four sides glued and mechanical fastened. Drawers shall be suspended on slides as described in Article 2.05.E.

2.08 WORK SURFACES

A. Core material having particle board shall be of a minimum 45 lb. density, M-2 industrial grade. The particle board used shall have been tested under ANSI A208.1 1993 standards and/or ASTM D 1037-91A.

- B. Surface material shall be high pressure decorative plastic laminate thermoset to core using catalyzed PVA glue with a minimum average pressure of 90 PSI and average 180 degree F temperature. High pressure decorative plastic laminate shall meet NEMA LD 3-1995, HGP.039 specification standards.
- C. Color selection shall be high pressure decorative plastic laminate selections as depicted in manufacturer's color selector guide. A minimum of seventy (70) colors and patterns shall be available as standard selection.
- D. Exposed edges shall be high 180 degree roll-edge unless noted otherwise on drawings.
- E. Underside of all work surfaces to have BK-20 backer or approved equivalent. This balance sheet shall be thermoset to core using catalyzed PVA glue with a minimum average pressure of 90 PSI and average 180 degree F. temperature.
- F. Counter Tops
 - a. Deck shall consist of two layers of 3/4" (19 mm) particle board at the front edge and all other exposed edges providing a total thickness of 1 1/2" (40 mm). Solid patterns or wood grain colors high-pressure plastic laminate may be selected for the surfaces. The method of application of the laminate to the substrate shall be as recommended by the Decorative Plastic Laminate Association. Medium density fiberboard (MDF) shall be used in high stress areas as drawer members and shall be minimum 48 lb. density MD-21 grade and tested under ANSI A208.2 1994 Standards.
 - b. Attached back splashes will have 1/4" (6 mm) of scribe on them to allow for normal field variances. Loose back splashes will not have scribe.
- G. Physical Properties shall meet minimally:
 - 1. Flexural Strength ASTM-Method D-790 16,000/psi
 - 2. Compressive Strength ASTM-Method D-695 36,500/psi
 - 3. Hardness Rockwell M ASTM-Method D-785 110
 - 4. Density Gr./CC. ASTM-Method D-792 123.55 lbs/ft³
 - 5. Water Absorption ASTM-Method D-570 0.0076%
 - 6. Flame Test ASTM-Method D-635 Self-Extinguishing

2.09 COLOR SELECTION

A. Laminate Color Selection:

1. PLAM-1:
 - i. Wilsonart®, Laminate, Landmark Wood 7981K-12

B. Hinge and Pull Color Selection:

1. Basis of Design: Richelieu Modern Metal Pull – 873 Square Brushed Nickel or approved equal
2. Select from full range of stock and custom colors.

C. Miscellaneous Hardware Color Selection (support brackets, table frames, rail):

1. Select from full range of stock and custom colors.

D. 3mm PVC Edge Banding Color Selection:

1. Select from full range of stock and custom colors.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The Installer must examine the job site and the conditions under which the work in this section is to be performed, and notify the Construction Manager in writing of any unsatisfactory conditions. Do not proceed with work under this section until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- B. Casework, countertops, and related materials to be conditioned to average prevailing humidity condition in installation areas prior to start of work.

- C. Install casework and countertops with factory-trained supervision authorized by manufacturer. Casework shall be installed plumb, level, true and straight with no distortions. (Shim as required). Securely attached to building structure with anchorage devices of appropriate type, size and quantity to meet applicable codes, specifications and safety conditions. Where laminate clad casework and countertops abuts other finished work, scribe and trim to accurate fit.
- D. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by the manufacturer.
- E. Repair, or remove and replace, defective work as directed upon completion of installation.
- F. Clean plastic surfaces, repair minor damage per plastic laminate manufacturer's recommendations. Replace other damaged parts of units.
- G. Advise Owner's Representative of procedures and precautions for protection of casework and countertops from damage by other trades until acceptance of work by Owner.
- H. Cover casework with 4-mil polyethylene film for protection against soiling and deterioration during remainder of construction period.

END OF SECTION 12 30 00

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**SECTION 26 00 05
BASIC ELECTRICAL REQUIREMENTS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. This section applies to all sections of Division 26 and Division 28.
- B. Drawings and general provisions of the contract, including Division 00 and Division 01 specification sections, apply to work of this section.
- C. Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on drawings and/or herein, including all labor, materials, equipment and incidentals necessary and required for their completion.
- D. The items in this section are supplementary to the requirements set forth in other portions of the specifications as indicated under Item "A" above.

1.02 DRAWINGS

- A. The drawings show the location and general arrangement of equipment, electrical systems and related items. They shall be followed as closely as elements of the construction will permit.
- B. Examine the drawings of other trades and verify the conditions governing the work on the job site. Arrange work accordingly, providing such fittings, conduit, junction boxes and accessories as may be required to meet such conditions.
- C. Deviations from the drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect/Engineer.
- D. The architectural and structural drawings take precedence in all matters pertaining to the building structure, mechanical drawings in all matters pertaining to mechanical trades and electrical drawings in all matters pertaining to electrical trades. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect/Engineer for resolution.

1.03 INSPECTION OF SITE

- A. Visit the site, examine and verify the conditions under which the work must be conducted before submitting proposal.
- B. The submitting of a proposal implies that the contractor has visited the site and understands the conditions under which the work must be conducted.

1.04 TEMPORARY FACILITIES

- A. Provide and remove upon completion of the project, in accordance with the general conditions, a complete temporary electrical and telephone service during construction.

1.05 ALTERNATES

- A. Refer to Division 01 - General Requirements for procedures.

1.06 GUARANTEE

- A. Contractor guarantees that the installation is free from defects and agrees to replace or repair, any part of this installation which becomes defective within a period of one year following final acceptance, unless noted otherwise, provided that such failure is due to defects in the equipment, material or installation or to follow the specifications and drawings. File with the Owner any and all guarantees from the equipment manufacturers.

1.07 CODES, PERMITS AND FEES

- A. Unless otherwise indicated, all required permits, licenses, inspections, approvals and fees for electrical work shall be secured and paid for by the contractor. All work shall conform to all applicable codes, rules and regulations. Applicable publications listed in all sections of Division 26 shall be the latest issue, unless otherwise noted.

- B. Rules of local utility companies shall be complied with. Check with the utility company supplying service to the installation and determine all devices including, but not limited to, all current and potential transformers, meter boxes, C.T. cabinets and meters which will be required and include the cost of all such items in proposal.
- C. All work shall be executed in accordance with the rules and regulations set forth in local and state codes. Prepare any detailed drawings or diagrams which may be required by the governing authorities. Where the drawings and/or specifications indicate materials or construction in excess of code requirements, the drawings and/or specifications shall govern.

1.08 STANDARDS OF MATERIAL AND WORKMANSHIP:

- A. All materials shall be new, unless noted otherwise. The electrical and physical properties of all materials, and the design, performance characteristics, and methods of construction of all items of equipment, shall be in accordance with the latest issue of the various, applicable standard specifications of the following recognized authorities:
 - 1. N.S.I. - American National Standards Institute
 - 2. S.T.M. - American Society for Testing Materials
 - 3. C.E.A. - Insulated Cable Engineers Association
 - 4. E.E.E. - Institute of Electrical and Electronics Engineers
 - 5. E.C. - National Electrical Code (NFPA 70)
 - 6. E.C.A. - National Electrical Contractors Association
 - 7. E.M.A. - National Electrical Manufacturer's Association
 - 8. F.P.A. - National Fire Protection Association
 - 9. L. - Underwriters Laboratories, Inc.
- B. Perform all work in a first class and workmanlike manner, in accordance with the latest accepted standards and practices for the Trades involved.
- C. All equipment of the same or similar systems shall be by the same manufacturer.

1.09 RECORD DRAWINGS

- A. Refer to Division 01 - General Requirements for procedures. All literature shall be furnished in accordance with requirements listed in Division 01.
- B. Contractor shall provide the following record drawings as part of the Project closeout document process:
 - 1. Contract Documents, specifications and submittals, indicating "As-Built" conditions and actual products selected for use.
 - 2. Product and Maintenance manuals for all equipment listed within this specification manual and in Contract Documents. Provide with parts lists as applicable.

1.10 SUBMITTALS

- A. Refer to Division 01 - General Requirements for procedures.
- B. Contractor shall provide submittals where items are referred to by symbolic designation on the drawings. All submittals shall bear the same designation (light fixtures, wiring devices, etc.). Refer to other sections of the electrical specifications for additional requirements.
- C. Engineer WILL NOT REVIEW:
 - 1. Submittals not specified.
 - 2. Submittals which do not indicate optional equipment being provided.
 - 3. Submittals not reviewed by Contractor; including Contractor stamp with signature comments.
 - 4. Submittals made after work is delivered to site and/or installed.
 - 5. Submittal resubmissions unless resubmission is required by Architect/Engineer.

1.11 MANUFACTURERS LISTED

- A. The listing of specific manufacturers does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed are not relieved from

meeting these specifications in their entirety.

- B. Products in compliance with the specification and manufactured by others not named will be considered only if pre-approved by the Engineer five (5) days prior to bid date.

1.12 USE OF EQUIPMENT

- A. The use of any equipment, or any part thereof for purposes other than testing even with the Owner's consent, shall not be construed to be an acceptance of the work on the part of the Owner, nor be construed to obligate the Owner in any way to accept improper work or defective materials.
- B. Do not use Owner's light fixtures for temporary lighting except as allowed and directed by the Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 INSTALLATION OF EQUIPMENT

- A. Install all equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the drawings and specifications, report such conflicts to the Architect/Engineer for resolution.
- B. Equipment location shall be as close as practical to locations shown on the drawings.
- C. Working clearances shall not be less than specified in NFPA 70 (National Electric Code).

3.02 COORDINATION

- A. Install work to avoid interference with work of other trades including, but not limited to, architectural and mechanical trades. Remove and relocate any work that causes an interference at Contractor's expense. Disputes regarding the cause of an interference will be resolved by the Construction Manager or Architect/Engineer.

3.03 CUTTING, PATCHING AND DAMAGE TO OTHER WORK

- A. Refer to Division 01 - General Requirements and Division 02 - Existing Conditions.
- B. All cutting, patching and repair work shall be performed by the contractor through approved, qualified subcontractors. Contractor shall include full cost of same in bid.

3.04 EXCAVATION AND BACKFILLING

- A. Provide all excavation, trenching, tunneling, dewatering and backfilling required for the electrical work. Coordinate the work with other excavating and backfilling in the same area.
- B. Where conduit is installed less than 30" below the surface of pavement, provide concrete encasement, 4" minimum coverage, all around or as shown on the electrical drawings.
- C. Backfill all excavations inside building, under drives and parking areas with well-tamped granular material. Backfill all excavations under wall footings with lean mix concrete up to underside of footings and extend concrete within excavation a minimum of four (4) feet each side of footing. Granular backfill shall be placed in layers not more than 8 inches in thickness, 95 percent compaction throughout with approved compaction equipment. Tamp, roll as required. Excavated material shall not be used.
- D. Backfill outside building with granular material to a height 12 inches over top of pipe compacted to 95 percent compaction as specified above. Backfill remainder of excavation with unfrozen, excavated material in such a way to prevent settling. Tamp, roll as required.

3.05 EQUIPMENT FOUNDATION AND SUPPORTS

- A. Shall be as required or as shown on plans or specified.
- B. Provide concrete house keeping bases 4" above finished floor, with leveling channels, where noted, for floor-mounted equipment. Coordinate requirements with Division 03 - Concrete.
- C. For equipment suspended from ceilings or walls, furnish and install all inserts, rods, structural steel frames, brackets and platforms required.

3.06 EQUIPMENT CONNECTIONS

- A. Make connections to equipment, motors, lighting fixtures, and other items included in the work in accordance with the approved shop drawings and rough-in measurements furnished by the manufacturers of the particular equipment furnished. All additional connections not shown on the drawings, but called out by the equipment manufacturer's shop drawings shall be provided.

3.07 ACCESS DOORS AND PANELS

- A. Refer to Division 08 - Openings; Provide access doors in locations as required per N.E.C. Coordinate locations with architectural trades.

3.08 CLEANING

- A. Refer to Division 01 - General Requirements; All equipment shall be cleaned as frequently as necessary through the construction process and again prior to project completion.
- B. Final cleanup shall include, but not be limited to, washing of fixture lenses or louvers, switchboards, substations, motor control centers, panels, etc. Fixture reflectors and lenses or louvers shall be left with no water marks or cleaning streaks.

3.09 DELIVERY, STORAGE AND PROTECTION OF EQUIPMENT AND MATERIALS

- A. Refer to Division 01 - General Requirements; All equipment and materials shall be delivered, stored and secured per manufacturer's recommendations.
- B. On-site storage shall be coordinated with Construction Manager and be performed in a manner as to avoid damage, deterioration and loss.

3.10 DRAWINGS AND MEASUREMENTS

- A. Electrical drawings are not intended to be scaled for rough-in measurements nor to serve as submittals. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement shall be taken by the Contractor.

END OF SECTION

**SECTION 26 05 05
SELECTIVE DEMOLITION FOR ELECTRICAL**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition and extension of existing electrical work.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements.
- C. Section 26 0005 - Basic Electrical Requirements.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that abandoned wiring and equipment serve only abandoned facilities.
- B. Demolition drawings are based on casual field observation and existing record documents.
- C. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
 - 2. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Notify Owner before partially or completely disabling system.
 - 2. Notify local fire service.
 - 3. Make notifications at least 24 hours in advance.
 - 4. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
 - 1. PCB-containing electrical equipment, including transformers, capacitors, and switches.
 - 2. PCB- and DEHP-containing lighting ballasts.
 - 3. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.
- B. Remove, relocate, and extend existing installations to accommodate new construction.

- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

3.04 CLEANING AND REPAIR

- A. See Division 01 - General Requirements.
- B. Clean and repair existing materials and equipment that remain or that are to be reused.
- C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- D. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

END OF SECTION

**SECTION 26 05 19
VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Metal-clad cable.
- C. Wiring connectors.
- D. Electrical tape.
- E. Heat shrink tubing.
- F. Oxide inhibiting compound.
- G. Wire pulling lubricant.
- H. Cable ties.
- I. Firestop sleeves.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, and repairs.
- C. Section 07 8400 - Firestopping.
- D. Section 26 0005 - Basic Electrical Requirements.
- E. Section 26 0505 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
- F. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- G. Section 26 0536 - Cable Trays for Electrical Systems: Additional installation requirements for cables installed in cable tray systems.
- H. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- I. Section 28 4600 - Fire Detection and Alarm: Fire alarm system conductors and cables.
- J. Division 31 - Earthwork: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft 2011 (Reapproved 2017).
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation 2004 (Reapproved 2020).
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- F. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC) 2012.
- G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy 2009.
- H. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.

- I. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 44 - Thermoset-Insulated Wires and Cables Current Edition, Including All Revisions.
- K. UL 83 - Thermoplastic-Insulated Wires and Cables Current Edition, Including All Revisions.
- L. UL 486A-486B - Wire Connectors Current Edition, Including All Revisions.
- M. UL 486C - Splicing Wire Connectors Current Edition, Including All Revisions.
- N. UL 486D - Sealed Wire Connector Systems Current Edition, Including All Revisions.
- O. UL 1569 - Metal-Clad Cables Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Underground feeder and branch-circuit cable is not permitted.
- E. Service entrance cable is not permitted.
- F. Armored cable is not permitted.
- G. Metal-clad cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:

- a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
 - 1) Maximum Length: 6 feet.
- b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.

H. Manufactured wiring systems are not permitted.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 - 3. Tinned Copper Conductors: Comply with ASTM B33.
- H. Minimum Conductor Size:
 - 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
 - 3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
- I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- J. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.
 - d. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 - 1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com.
 - b. Encore Wire Corporation: www.encorewire.com.
 - c. General Cable Technologies Corporation: www.generalcable.com.
 - d. Southwire Company: www.southwire.com.
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
 - 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Stranded.
 - b. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

2.04 METAL-CLAD CABLE

- A. Manufacturers:
 - 1. AFC Cable Systems Inc: www.afcweb.com/#sle.
 - 2. Encore Wire Corporation: www.encorewire.com/#sle.
 - 3. Southwire Company: www.southwire.com/#sle.
- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Stranded.
 - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- F. Provide oversized neutral conductors where indicated or required.
- G. Grounding: Full-size integral equipment grounding conductor.
- H. Armor: Steel, interlocked tape.

2.05 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 26 0526.
- C. Wiring Connectors for Splices and Taps:
 - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Wiring Connectors for Terminations:
 - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
 - 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.

4. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
- E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
- G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
- H. Mechanical Connectors: Provide bolted type or set-screw type.
- I. Compression Connectors: Provide circumferential type or hex type crimp configuration.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

- A. Circuiting Requirements:
 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 2. When circuit destination is indicated without specific routing, determine exact routing required.
 3. Arrange circuiting to minimize splices.
 4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
 5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
 6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
 7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
 8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
 9. Provide oversized neutral/grounded conductors where indicated and as specified below.
 - a. Provide 200 percent rated neutral for feeders fed from K-rated transformers.
 - b. Provide 200 percent rated neutral for feeders serving panelboards with 200 percent rated neutral bus.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Install metal-clad cable (Type MC) in accordance with NECA 120.
- E. Installation in Raceway:

1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 2. Pull all conductors and cables together into raceway at same time.
 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- F. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- G. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
- H. Terminate cables using suitable fittings.
1. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- I. Install conductors with a minimum of 12 inches of slack at each outlet.
- J. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- M. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 3. Do not remove conductor strands to facilitate insertion into connector.
 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- O. Insulate ends of spare conductors using vinyl insulating electrical tape.
- P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07.
- Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.04 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not

required.

1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing.
Replace SPDs damaged by performing high potential testing with SPDs connected.
- C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, repairs.
- C. Section 26 0005 - Basic Electrical Requirements
- D. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- E. Section 26 0536 - Cable Trays for Electrical Systems: Additional grounding and bonding requirements for cable tray systems.
- F. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- G. Section 26 5600 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.
- H. Division 31 - Earthwork: Excavating, trenching and fill.

1.03 REFERENCE STANDARDS

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System 2012.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings 2017.
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.
- E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 467 - Grounding and Bonding Equipment Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify exact locations of underground metal water service pipe entrances to building.
 - 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
 - 3. Notify Strategic Energy Solutions, Inc. of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.

- B. Project Record Documents: Record actual locations of grounding electrode system components and connections.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- E. Grounding System Resistance:
 - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
 - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
 - 3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested using "point-to-point" methods.
- F. Grounding Electrode System:
 - 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
 - a. Provide continuous grounding electrode conductors without splice or joint.
 - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
 - 2. Metal Underground Water Pipe(s):
 - a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
 - b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
 - c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
 - 3. Concrete-Encased Electrode:
 - a. Provide connection to concrete-encased electrode consisting of not less than 20 feet of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
 - 4. Ground Ring:
 - a. Provide a ground ring encircling the building or structure consisting of bare copper conductor not less than 2 AWG in direct contact with earth, installed at a depth of not less than 30 inches.
 - b. Where location is not indicated, locate ground ring conductor at least 24 inches outside building perimeter foundation.
 - c. Provide ground enhancement material around conductor.
 - d. Provide connection from ground ring conductor to:

- 1) Perimeter columns of metal building frame.
- 2) Ground rod electrodes located as indicated.
5. Ground Rod Electrode(s):
 - a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
 - b. Space electrodes not less than 10 feet from each other and any other ground electrode.
 - c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
6. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
7. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.
 - a. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.
 - b. Where ground bar location is not indicated, locate in accessible location as near as possible to service disconnect enclosure.
 - c. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.
- G. Bonding and Equipment Grounding:
 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
- H. Cable Tray Systems: Also comply with Section 26 0536.
- I. Pole-Mounted Luminaires: Also comply with Section 26 5600.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
 4. Manufacturers - Mechanical and Compression Connectors:
 - a. Advanced Lightning Technology (ALT): www.altfab.com
 - b. Burndy LLC: www.burndy.com
 - c. Harger Lightning & Grounding: www.harger.com
 - d. Thomas & Betts Corporation: www.tnb.com
 5. Manufacturers - Exothermic Welded Connections:
 - a. Burndy LLC: www.burndy.com
 - b. Cadweld, a brand of Erico International Corporation: www.erico.com
 - c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC: www.thermoweld.com
- D. Ground Bars:
1. Description: Copper rectangular ground bars with mounting brackets and insulators.
 2. Size: As indicated.
 3. Holes for Connections: As indicated or as required for connections to be made.
 4. Manufacturers:
 - a. Advanced Lightning Technology (ALT): www.altfab.com
 - b. Erico International Corporation: www.erico.com
 - c. Harger Lightning & Grounding: www.harger.com
 - d. thermOweld, subsidiary of Continental Industries; division of Burndy LLC: www.thermoweld.com
- E. Ground Rod Electrodes:
1. Comply with NEMA GR 1.
 2. Material: Copper-bonded (copper-clad) steel.
 3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.
 4. Where rod lengths of greater than 10 feet are indicated or otherwise required, sectionalized ground rods may be used.
 5. Manufacturers:
 - a. Advanced Lightning Technology (ALT): www.altfab.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. Galvan Industries, Inc: www.galvanelectrical.com/#sle.
 - d. Harger Lightning & Grounding: www.harger.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.

- D. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 26 0553.

3.03 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.13.
- C. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION

**SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, and cutting and patching requirements.
- C. Division 03 - Concrete: Concrete equipment pads.
- D. Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.
- E. Section 26 0005 - Basic Electrical Requirements
- F. Section 26 0533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- G. Section 26 0536 - Cable Trays for Electrical Systems: Additional support and attachment requirements for cable tray.
- H. Section 26 0533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.
- I. Section 26 5100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.
- J. Section 26 5600 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
- D. MFMA-4 - Metal Framing Standards Publication 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 5B - Strut-Type Channel Raceways and Fittings Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.

5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Division 03.

1.05 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
 4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 2. Conduit Clamps: Bolted type unless otherwise indicated.
 3. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com
 - b. Erico International Corporation: www.erico.com
 - c. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com
 - d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com
 - e. Thomas & Betts Corporation: www.tnb.com
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
1. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
 - d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - e. Thomas & Betts Corporation: www.tnb.com/#sle.
- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
1. Comply with MFMA-4.
 2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.

3. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com
 - b. Thomas & Betts Corporation: www.tnb.com
 - c. Unistrut, a brand of Atkore International Inc: www.unistrut.com
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
 1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Equipment Supports: 1/2 inch diameter.
 - b. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.
 - c. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.
 - d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
 - e. Outlet Boxes: 1/4 inch diameter.
 - f. Luminaires: 1/4 inch diameter.
- F. Non-Penetrating Rooftop Supports for Low-Slope Roofs: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.
 1. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 2. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
 3. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.
 4. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com
 - b. Erico International Corporation: www.erico.com
 - c. PHP Systems/Design: www.phpsd.com
 - d. Unistrut, a brand of Atkore International Inc: www.unistrut.com
- G. Anchors and Fasteners:
 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 4 inch high concrete pad constructed in accordance with Division 03.

- 5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Conduit Support and Attachment: Also comply with Section 26 0533.13.
- I. Cable Tray Support and Attachment: Also comply with Section 26 0536.
- J. Box Support and Attachment: Also comply with Section 26 0533.16.
- K. Secure fasteners according to manufacturer's recommended torque settings.
- L. Remove temporary supports.

3.02 FIELD QUALITY CONTROL

- A. See Division 01 - General Requirements for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

**SECTION 26 05 33.13
CONDUIT FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Flexible metal conduit (FMC).
- C. Electrical metallic tubing (EMT).
- D. Rigid polyvinyl chloride (PVC) conduit.
- E. Conduit fittings.
- F. Accessories.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, and repairs.
- C. Division 07 - Thermal and Moisture Protection: Firestopping.
- D. Section 07 8400 - Firestopping.
- E. Section 26 0005 - Basic Electrical Requirements
- F. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
- G. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- H. Section 26 0529 - Hangers and Supports for Electrical Systems.
- I. Section 26 0533.16 - Boxes for Electrical Systems.
- J. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- K. Section 28 4600 - Fire Detection and Alarm: Fire alarm wiring in conduit.
- L. Division 31 - Earthwork: Excavating, trenching and fill.
- M. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC) 2015.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S) 2015.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT) 2013.
- E. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit 2004.
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) 2017.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
- H. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit 2018.
- I. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit 2020.
- J. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing 2016.
- K. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

- L. UL 1 - Flexible Metal Conduit Current Edition, Including All Revisions.
- M. UL 6 - Electrical Rigid Metal Conduit-Steel Current Edition, Including All Revisions.
- N. UL 514B - Conduit, Tubing, and Cable Fittings Current Edition, Including All Revisions.
- O. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings Current Edition, Including All Revisions.
- P. UL 797 - Electrical Metallic Tubing-Steel Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 - 1. Under Slab on Grade: Use galvanized steel rigid metal conduit or rigid PVC conduit.
 - 2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit or rigid PVC conduit.
 - 3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit or rigid PVC conduit.
 - 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
 - 5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.
- D. Embedded Within Concrete:
 - 1. Within Slab on Grade (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit or rigid PVC conduit.
 - 2. Within Slab Above Ground (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit, or rigid PVC conduit.
- E. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- F. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
- I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
- K. Exposed, Exterior: Use galvanized steel rigid metal conduit or PVC-coated galvanized steel rigid metal conduit.
- L. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.
- M. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
 - 1. Maximum Length: 6 feet.
- N. Connections to Vibrating Equipment:

1. Dry Locations: Use flexible metal conduit.
 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
 3. Vibrating equipment includes, but is not limited to:
 - a. Transformers.
 - b. Motors.
- O. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

2.02 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Minimum Conduit Size, Unless Otherwise Indicated:
 1. Branch Circuits: 3/4 inch (21 mm) trade size.
 2. Flexible Connections to Luminaires: 3/8 inch (12 mm) trade size.
 3. Underground, Interior: 1 inch (27 mm) trade size.
 4. Underground, Exterior: 1 inch (27 mm) trade size.
- E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers:
 1. AFC Cable Systems, Inc: www.afcweb.com
 2. Electri-Flex Company: www.electriflex.com
 3. International Metal Hose: www.metalhose.com
- B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- C. Fittings:
 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.

2.04 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 1. Allied Tube & Conduit: www.alliedeg.com
 2. Republic Conduit: www.republic-conduit.com
 3. Wheatland Tube, a Division of Zekelman Industries: www.wheatland.com
- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use compression (gland) or set-screw type.
 - a. Do not use indenter type connectors and couplings.
 4. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.
 5. Embedded Within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

2.05 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:

1. Cantex Inc: www.cantexinc.com
 2. Carlon, a brand of Thomas & Betts Corporation: www.carlon.com
 3. JM Eagle: www.jmeagle.com
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
1. Manufacturer: Same as manufacturer of conduit to be connected.
 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.06 ACCESSORIES

- A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.
- D. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- E. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.
- F. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- G. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- E. Conduit Routing:
 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 2. When conduit destination is indicated without specific routing, determine exact routing required.
 3. Conceal all conduits unless specifically indicated to be exposed.
 4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Mechanical equipment rooms.
 5. Unless otherwise approved, do not route conduits exposed:
 - a. Across floors.
 - b. Across roofs.

- c. Across top of parapet walls.
 - d. Across building exterior surfaces.
 - 6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
 - 7. Arrange conduit to maintain adequate headroom, clearances, and access.
 - 8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
 - 9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
 - 10. Group parallel conduits in the same area together on a common rack.
- F. Conduit Support:
- 1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 - 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
 - 5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 - 6. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
 - 7. Use of wire for support of conduits is not permitted.
- G. Connections and Terminations:
- 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 - 3. Use suitable adapters where required to transition from one type of conduit to another.
 - 4. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 - 5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 - 6. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- H. Penetrations:
- 1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 - 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 - 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 - 4. Conceal bends for conduit risers emerging above ground.
 - 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 - 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 - 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and

maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.

8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07.
- I. Underground Installation:
 1. Provide trenching and backfilling in accordance with Division 31.
- J. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):
 1. Secure conduits to prevent floating or movement during pouring of concrete.
- K. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Division 03 with minimum concrete cover of 2 inches on all sides unless otherwise indicated.
- L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where conduits are subject to earth movement by settlement or frost.
- M. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
 1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- N. Provide grounding and bonding in accordance with Section 26 0526.
- O. Identify conduits in accordance with Section 26 0553.

3.03 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

**SECTION 26 05 33.16
BOXES FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 03 - Concrete: Concrete.
- C. Division 07 - Thermal and Moisture Protection: Firestopping.
- D. Division 08 - Openings: Access Doors.
- E. Section 08 3100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
- F. Section 26 0005 - Basic Electrical Requirements.
- G. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- H. Section 26 0529 - Hangers and Supports for Electrical Systems.
- I. Section 26 0533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- J. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- K. Section 26 2726 - Wiring Devices:
 - 1. Wall plates.
- L. Section 26 2813 - Fuses: Spare fuse cabinets.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2010.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports 2013.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. SCTE 77 - Specification for Underground Enclosure Integrity 2017.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- J. UL 508A - UL Standard for Safety Industrial Control Panels 2018.
- K. UL 514A - Metallic Outlet Boxes Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.
 1. Underground Boxes/Enclosures: Include reports for load testing in accordance with SCTE 77 certified by a professional engineer or an independent testing agency upon request.
- C. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. See Section 01 6000 - Product Requirements, for additional provisions.
 2. Keys for Lockable Enclosures: Two of each different key.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 3. Use suitable concrete type boxes where flush-mounted in concrete.
 4. Use suitable masonry type boxes where flush-mounted in masonry walls.
 5. Use raised covers suitable for the type of wall construction and device configuration where required.
 6. Use shallow boxes where required by the type of wall construction.

7. Do not use "through-wall" boxes designed for access from both sides of wall.
 8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 12. Wall Plates: Comply with Section 26 2726.
 13. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com
 - b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com
 - c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com
 - d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com
 - e. Thomas & Betts Corporation: www.tnb.com
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA 250 Environment Type, Unless Otherwise Indicated:
 3. Junction and Pull Boxes Larger Than 100 cubic inches:
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
 - b. Boxes 6 square feet and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
 4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
 - a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
 - b. Back Panels: Painted steel, removable.
 - c. Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide separate boxes for emergency power and normal power systems.
- E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- H. Box Locations:

1. Locate boxes to be accessible. Provide access panels in accordance with Division 08 as required where approved by the Architect.
 2. Unless dimensioned, box locations indicated are approximate.
 3. Locate boxes as required for devices installed under other sections or by others.
 4. Locate boxes so that wall plates do not span different building finishes.
 5. Locate boxes so that wall plates do not cross masonry joints.
 6. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
 7. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
 8. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0533.13.
- I. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- J. Install boxes plumb and level.
- K. Flush-Mounted Boxes:
1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- L. Install boxes as required to preserve insulation integrity.
- M. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- N. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- O. Close unused box openings.
- P. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- Q. Provide grounding and bonding in accordance with Section 26 0526.

3.03 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

**SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Voltage markers.
- E. Underground warning tape.
- F. Floor marking tape.
- G. Warning signs and labels.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 09 - Finishes: Interior and Exterior Painting.
- C. Section 09 9113 - Exterior Painting.
- D. Section 09 9123 - Interior Painting.
- E. Section 26 0005 - Basic Electrical Requirements
- F. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- G. Section 26 0536 - Cable Trays for Electrical Systems: Additional identification requirements for cable tray systems.
- H. Section 26 0573 - Power System Studies: Arc flash hazard warning labels.
- I. Section 26 2726 - Wiring Devices: Device and wallplate finishes; factory pre-marked wallplates.

1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL 969 - Marking and Labeling Systems Current Edition, Including All Revisions.

1.04 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.
- B. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.

- 5) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
- b. Transformers:
 - 1) Identify kVA rating.
 - 2) Identify voltage and phase for primary and secondary.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
- c. Enclosed switches, circuit breakers, and motor controllers:
 - 1) Identify voltage and phase.
 - 2) Identify power source and circuit number. Include location when not within sight of equipment.
 - 3) Identify load(s) served. Include location when not within sight of equipment.
- d. Transfer Switches:
 - 1) Identify voltage and phase.
 - 2) Identify short circuit current rating based on the specific overcurrent protective device type and settings protecting the transfer switch.
2. Service Equipment:
 - a. Use identification nameplate to identify each service disconnecting means.
3. Emergency System Equipment:
 - a. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.
 - b. Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.
4. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
5. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.
6. Use field-painted floor markings, floor marking tape, or warning labels to identify required equipment working clearances where indicated or where required by the authority having jurisdiction.
 - a. Field-Painted Floor Markings: Alternating black and white stripes, 3 inches wide, painted in accordance with Section 09 9123 and 09 9113.
7. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
 - a. Service equipment.
 - b. Industrial control panels.
 - c. Motor control centers.
 - d. Elevator control panels.
 - e. Industrial machinery.
8. Arc Flash Hazard Warning Labels: Comply with Section 26 0573.
- C. Identification for Conductors and Cables:
 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
- D. Identification for Cable Tray: Comply with Section 26 0536.
- E. Identification for Boxes:
 1. Use voltage markers to identify highest voltage present.
 2. Use voltage markers or color coded boxes to identify systems other than normal power system.

- a. Color-Coded Boxes: Field-painted in accordance with Division 09 per the same color code used for raceways.
- F. Identification for Devices:
 - 1. Wiring Device and Wallplate Finishes: Comply with Section 26 2726.
 - 2. Use identification label to identify fire alarm system devices.
 - a. For devices concealed above suspended ceilings, provide additional identification on ceiling tile below device location.
 - 3. Use identification label to identify serving branch circuit for all receptacles.
 - a. For receptacles in public areas or in areas as directed by Architect, provide identification on inside surface of wallplate.
- G. Identification for Luminaires:
 - 1. Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 - 1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 - 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
 - 3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
 - 4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
 - 5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
 - 1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 - 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Caution and Warning Messages:
 - 1. Minimum Size: 2 inches by 4 inches.
 - 2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
 - 3. Text: All capitalized unless otherwise indicated.
 - 4. Minimum Text Height: 1/2 inch.
 - 5. Color: Black text on yellow background unless otherwise indicated.
- D. Format for Receptacle Identification:
 - 1. Minimum Size: 3/8 inch by 1.5 inches.
 - 2. Legend: Power source and circuit number or other designation indicated.
 - 3. Text: All capitalized unless otherwise indicated.
 - 4. Minimum Text Height: 3/16 inch.
 - 5. Color: Black text on clear background.
- E. Format for Fire Alarm Device Identification:
 - 1. Minimum Size: 3/8 inch by 1.5 inches.
 - 2. Legend: Designation indicated and device zone or address.
 - 3. Text: All capitalized unless otherwise indicated.
 - 4. Minimum Text Height: 3/16 inch.
 - 5. Color: Red text on white background.

2.03 VOLTAGE MARKERS

- A. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.
- B. Minimum Size:
 - 1. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.
 - 2. Markers for Junction Boxes: 1/2 by 2 1/4 inches.
- C. Legend:
 - 1. Markers for Voltage Identification: Highest voltage present.
 - 2. Markers for System Identification:
 - a. Emergency Power System: Text "EMERGENCY".
- D. Color: Black text on orange background unless otherwise indicated.

2.04 UNDERGROUND WARNING TAPE

- A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- B. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.
- C. Legend: Type of service, continuously repeated over full length of tape.
- D. Color:
 - 1. Tape for Buried Power Lines: Black text on red background.
 - 2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

2.05 FLOOR MARKING TAPE

- A. Floor Marking Tape for Equipment Working Clearance Identification: Self-adhesive vinyl or polyester tape with overlamine, 3 inches wide, with alternating black and white stripes.

2.06 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 - 1. Materials:
 - a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
 - b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
 - 2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
 - 3. Minimum Size: 7 by 10 inches unless otherwise indicated.
- C. Warning Labels:
 - 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 - 3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Surface-Mounted Equipment: Enclosure front.

2. Flush-Mounted Equipment: Inside of equipment door.
 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 4. Elevated Equipment: Legible from the floor or working platform.
 5. Branch Devices: Adjacent to device.
 6. Interior Components: Legible from the point of access.
 7. Boxes: Outside face of cover.
 8. Conductors and Cables: Legible from the point of access.
 9. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
 - D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
 - E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
 - F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.
 - G. Secure rigid signs using stainless steel screws.
 - H. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

**SECTION 26 24 16
PANELBOARDS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Lighting and appliance panelboards.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, and repairs.
- C. Division 03 - Concrete: Concrete equipment pads.
- D. Section 26 0005 - Basic Electrical Requirements.
- E. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- F. Section 26 0529 - Hangers and Supports for Electrical Systems.
- G. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- H. Section 26 0573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.
- I. Section 26 2200 - Low-Voltage Transformers: Small power centers with integral primary breaker, transformer, and panelboard.
- J. Section 26 2813 - Fuses: Fuses for fusible switches and spare fuse cabinets.
- K. Section 26 4300 - Surge Protective Devices.

1.03 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service 2013e (Amended 2017).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards 2015.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- E. NEMA PB 1 - Panelboards 2011.
- F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less 2013.
- G. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.
- H. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- K. UL 67 - Panelboards Current Edition, Including All Revisions.
- L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures Current Edition, Including All Revisions.
- M. UL 869A - Reference Standard for Service Equipment Current Edition, Including All Revisions.
- N. UL 943 - Ground-Fault Circuit-Interrupters Current Edition, Including All Revisions.
- O. UL 1699 - Arc-Fault Circuit-Interrupters Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
 - 4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
 - 1. Include documentation of listed series ratings as indicated in Section 26 0573.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Panelboard Keys: Two of each different key.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton Corporation: www.eaton.com
- B. Schneider Electric; Square D Products: www.schneider-electric.us
- C. Siemens Industry, Inc: www.usa.siemens.com
- D. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
 - b. Panelboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.
- C. Short Circuit Current Rating:
 - 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

- E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 - 1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 3R.
 - 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 - b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.
 - 3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 - b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
 - 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- K. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 26 4300, list and label panelboards as a complete assembly including surge protective device.
 - 1. Provide Surge Protective Devices internally mounted within all panels which are specified as part of the Emergency distribution power system.
- L. Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.
- M. Load centers are not acceptable.

2.03 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 - 1. Main and Neutral Lug Material: Copper
 - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 - 1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
 - 2. Phase and Neutral Bus Material: Copper
 - 3. Ground Bus Material: Copper
- D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.
- E. Enclosures:
 - 1. Provide surface-mounted or flush-mounted enclosures as indicated.
 - 2. Provide clear plastic circuit directory holder mounted on inside of door.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 26 0529.
- F. Install panelboards plumb.
- G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.
- H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
- I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.
- J. Provide grounding and bonding in accordance with Section 26 0526.
- K. Install all field-installed branch devices, components, and accessories.
- L. Provide filler plates to cover unused spaces in panelboards.
- M. Provide circuit breaker lock-on devices to prevent unauthorized personnel from de-energizing essential loads where indicated. Also provide for the following:
 - 1. Fire detection and alarm circuits.
 - 2. Intrusion detection and access control system circuits.
 - 3. Video surveillance system circuits.

3.03 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Fusible Switches: Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.
- C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____ amperes. Tests listed as optional are not required.
- D. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.
- E. Test GFCI circuit breakers to verify proper operation.
- F. Test AFCI circuit breakers to verify proper operation.
- G. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.

- C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

**SECTION 26 27 26
WIRING DEVICES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Wall plates.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, and repairs.
- C. Section 26 0005 - Basic Electrical Requirements.
- D. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
- E. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- F. Section 26 0533.16 - Boxes for Electrical Systems.
- G. Section 26 0533.23 - Surface Raceways for Electrical Systems: Surface raceway systems, including multioutlet assemblies.
- H. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- I. Section 26 0583 - Wiring Connections: Cords and plugs for equipment.
- J. Section 26 0953 - Distributed Digital Lighting Controls

1.03 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for 2017h.
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification) 2017g.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2010.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices 1999 (Reaffirmed 2015).
- F. NEMA WD 6 - Wiring Devices - Dimensional Specifications 2016.
- G. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 20 - General-Use Snap Switches Current Edition, Including All Revisions.
- I. UL 498 - Attachment Plugs and Receptacles Current Edition, Including All Revisions.
- J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices Current Edition, Including All Revisions.
- K. UL 943 - Ground-Fault Circuit-Interrupters Current Edition, Including All Revisions.
- L. UL 1310 - Class 2 Power Units Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.

3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
 4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
 5. Coordinate the core drilling of holes for poke-through assemblies with the work covered under other sections.
 6. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.
- B. Sequencing:
1. Do not install wiring devices until final surface finishes and painting are complete.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.
- D. Provide tamper resistant receptacles for receptacles installed in areas listed below:
1. All 15 and 20-ampere 125 and 250-volt nonlocking type receptacles in the areas listed below shall be listed tamper-resistant receptacles, unless otherwise excluded in NEC.
 - a. Dwelling units in all areas specified in NEC 210.52 and 550.13.
 - b. Business offices, corridors, waiting rooms and the like in clinics, medical and dental offices and outpatient facilities.
 - c. All early childhood classrooms/daycare areas and K-5 Classrooms.
- E. Provide GFCI protection for receptacles installed within 6 feet of sinks.
- F. Provide GFCI protection for receptacles installed in kitchens.
- G. Provide GFCI protection for receptacles serving electric drinking fountains.
1. Outlet shall be readily accessible.
- H. Provide GFCI protection for outlets serving vending machines. Outlets shall be readily accessible.

2.02 WIRING DEVICE FINISHES

- A. Provide wiring device finishes as described below unless otherwise indicated.
- B. Wiring Devices, Unless Otherwise Indicated: White with gray stainless steel wall plate.
- C. Wiring Devices Connected to Emergency Power: Red with stainless steel wall plate factory engraved "Emergency".

2.03 WALL SWITCHES

- A. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

2.04 RECEPTACLES

- A. Manufacturers:
1. Hubbell Incorporated: www.hubbell.com

2. Leviton Manufacturing Company, Inc: www.leviton.com
 3. Lutron Electronics Company, Inc; Designer Style: www.lutron.com
 4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us
- B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
 2. NEMA configurations specified are according to NEMA WD 6.
- C. Convenience Receptacles:
1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
 2. Tamper Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; single or duplex as indicated on the drawings.
 3. Tamper Resistant and Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type and as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
- D. GFCI Receptacles:
1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
 - a. Provide test and reset buttons of same color as device.
 2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
 3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.
 4. Tamper Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as tamper resistant type.
- E. USB Charging Devices:
1. USB Charging Devices - General Requirements: Listed as complying with UL 1310.
 - a. Charging Capacity - Two-Port Devices: 2.1 A, minimum.
 2. USB Charging/Tamper Resistant Receptacle Combination Devices: Two-port (Type A) USB charging device and receptacle, commercial specification grade, duplex, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; rectangular decorator style.

2.05 WALL PLATES

- A. Manufacturers:
1. Hubbell Incorporated: www.hubbell-wiring.com
 2. Leviton Manufacturing Company, Inc: www.leviton.com
 3. Lutron Electronics Company, Inc: www.lutron.com
 4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us
 5. Source Limitations: Where wall controls are furnished as part of lighting control system, provide accessory matching receptacles and wallplates by the same manufacturer in locations indicated.
- B. Wall Plates: Comply with UL 514D.
1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 2. Size: Standard.
 3. Screws: Metal with slotted heads finished to match wall plate finish.

- C. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
- D. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.
- E. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of wiring devices provided under this section.
 - 1. Mounting Heights: Unless otherwise indicated, as follows:
 - a. Wall Switches: 48 inches above finished floor.
 - b. Receptacles: 18 inches above finished floor or 6 inches above counter.
 - 2. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
 - 3. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.
- I. Install wiring devices plumb and level with mounting yoke held rigidly in place.

- J. Install wall switches with OFF position down.
- K. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- L. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- N. Identify wiring devices in accordance with Section 26 0553.

3.04 FIELD QUALITY CONTROL

- A. Inspect each wiring device for damage and defects.
- B. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- C. Test each receptacle to verify operation and proper polarity.
- D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- E. Correct wiring deficiencies and replace damaged or defective wiring devices.

END OF SECTION

**SECTION 26 32 13
ENGINE GENERATORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Packaged engine generator system and associated components and accessories:
 - 1. Engine and engine accessory equipment.
 - 2. Alternator (generator).
 - 3. Generator set control system.
 - 4. Generator set enclosure.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 03 - Concrete: Concrete equipment pads.
- C. Division 23 - Heating, Ventilation and Air-Conditioning (HVAC): Fuel piping.
- D. Section 23 5100 - Breechings, Chimneys, and Stacks: Engine exhaust piping.
 - 1. Includes installation of exhaust silencer specified in this section.
- E. Section 26 0005 - Basic Electrical Requirements.
- F. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- G. Section 26 0529 - Hangers and Supports for Electrical Systems.
- H. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- I. Section 26 3600 - Transfer Switches.

1.03 REFERENCE STANDARDS

- A. MDEQ - Natural Resources and Environmental Protection Act Current Edition, Including all revisions.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- C. NECA/EGSA 404 - Standard for Installing Generator Sets 2014.
- D. NEMA MG 1 - Motors and Generators 2018.
- E. NFPA 30 - Flammable and Combustible Liquids Code 2018.
- F. NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines 2018.
- G. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. NFPA 99 - Health Care Facilities Code 2018.
- I. NFPA 110 - Standard for Emergency and Standby Power Systems 2019.
- J. NFPA 20 - Standard for the Installation of Stationary Pumps for Fire Protection 2018.
- K. UL 1236 - Battery Chargers for Charging Engine-Starter Batteries Current Edition, Including All Revisions.
- L. UL 2085 - Protected Aboveground Tanks for Flammable and Combustible Liquids Current Edition, Including All Revisions.
- M. UL 2200 - Stationary Engine Generator Assemblies Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate compatibility of generator sets to be installed with work provided under other sections or by others.

- a. Transfer Switches: See Section 26 3600.
 2. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment or other potential obstructions within the spaces dedicated for engine generator system.
 3. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 4. Coordinate the work to provide electrical circuits suitable for the power requirements of the actual auxiliary equipment and accessories to be installed.
 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Preinstallation Meeting: Convene one week before starting work of this section; require attendance of all affected installers.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features. Include alternator starting capabilities, engine fuel consumption rates, and cooling, combustion air, and exhaust requirements.
1. Include generator set sound level test data.
 2. Include characteristic trip curves for overcurrent protective devices upon request.
 3. Include alternator thermal damage curve upon request.
- C. Shop Drawings: Include dimensioned plan views and sections indicating locations of system components, required clearances, and field connection locations. Include system interconnection schematic diagrams showing all factory and field connections.
- D. Derating Calculations: Indicate ratings adjusted for applicable service conditions.
- E. Fuel Storage Tank Calculations: Indicate maximum running time for generator set configuration provided.
- F. Manufacturer's factory emissions certification.
- G. Manufacturer's certification that products meet or exceed specified requirements.
- H. Provide NFPA 110 required documentation from manufacturer, including but not limited to:
1. Certified prototype tests.
 2. Torsional vibration compatibility certification.
 3. NFPA 110 compliance certification.
 4. Certified rated load test at rated power factor.
- I. Manufacturer's detailed field testing procedures.
- J. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.
- K. Executed Warranty: Submit documentation of final executed warranty completed in Owner's name and registered with manufacturer.
- L. Maintenance contracts.
- M. Project Record Documents: Record actual locations of system components, installed circuiting arrangements and routing, and final equipment settings.

1.06 QUALITY ASSURANCE

- A. Comply with the following:
1. NFPA 70 (National Electrical Code).

2. NFPA 110 (Standard for Emergency and Standby Power Systems); meet requirements for Level 1 system.
 3. NFPA 37 (Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines).
 4. NFPA 30 (Flammable and Combustible Liquids Code).
 5. UL Certified.
 6. EPA Certified.
 7. Michigan Department of Environmental Quality (MDEQ).
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 WARRANTY

- A. Refer to Division 01 - General Requirements for additional warranty requirements.
- B. Provide minimum two year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Packaged Engine Generator Set:
 1. Cummins Power Generation Inc: www.cumminspower.com
 2. Generac Power Systems: www.generac.com/industrial
 3. Kohler Co: www.kohlerpower.com
- B. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

2.02 PACKAGED ENGINE GENERATOR SYSTEM

- A. Provide new engine generator system consisting of all required equipment, sensors, conduit, boxes, wiring, piping, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. System Description:
 1. Application: Emergency/standby.
 2. Configuration: Single packaged engine generator set operated independently (not in parallel).
- D. Packaged Engine Generator Set:
 1. Type: Gaseous (spark ignition).
 2. Power Rating: As indicated on drawings, standby.
 3. Voltage: As indicated on drawings.
- E. Generator Set General Requirements:
 1. Prototype tested in accordance with NFPA 110 for Level 1 systems.
 2. Factory-assembled, with components mounted on suitable base.
 3. List and label engine generator assembly as complying with UL 2200.
 4. Power Factor: Unless otherwise indicated, specified power ratings are at 0.8 power factor for three phase voltages and 1.0 power factor for single phase voltages.
 5. Provide suitable guards to protect personnel from accidental contact with rotating parts, hot piping, and other potential sources of injury.
- F. Service Conditions: Provide engine generator system and associated components suitable for operation under the service conditions at the installed location.
- G. Starting and Load Acceptance Requirements:

1. Cranking Method: Cycle cranking complying with NFPA 110 (15 second crank period, followed by 15 second rest period, with cranking limiter time-out after 3 cycles), unless otherwise required.
 2. Cranking Limiter Time-Out: If generator set fails to start after specified cranking period, indicate overcrank alarm condition and lock-out generator set from further cranking until manually reset.
 3. Start Time: Capable of starting and achieving conditions necessary for load acceptance within 10 seconds (NFPA 110, Type 10).
 4. Maximum Load Step: Refer to "Generator Performance Requirements" schedule in Electrical drawings.
 5. Motor Starting Capability: Supports starting of motor load indicated with a maximum voltage dip as indicated under "Maximum Load Step" above.
- H. Exhaust Emissions Requirements:
1. Comply with federal (EPA), state, and local regulations applicable at the time of commissioning; include factory emissions certification with submittals.
 2. Do not make modifications affecting generator set factory emissions certification without approval of manufacturer and Engineer. Where such modifications are made, provide field emissions testing as necessary for certification.
- I. Sound Level Requirements:
1. Do not exceed 72 dBA when measured at 23 feet from generator set in free field (no sound barriers) while operating at full load; include manufacturer's sound data with submittals.
 2. Comply with applicable noise level regulations.
- J. Interface with building automation system.

2.03 ENGINE AND ENGINE ACCESSORY EQUIPMENT

- A. Provide engine with adequate horsepower to achieve specified power output at rated speed, accounting for alternator efficiency and parasitic loads.
- B. Engine Fuel System - Gaseous (Spark Ignition):
1. Fuel Source: Natural gas.
 2. Engine Fuel Connections: Provide suitable, approved flexible fuel lines for coupling engine to fuel source.
 3. Provide components/features indicated and as necessary for operation and/or required by applicable codes, including but not limited to:
 - a. Carburetor.
 - b. Gas pressure regulators.
 - c. Fuel shutoff control valves.
 - d. Low gas pressure switches.
- C. Engine Starting System:
1. System Type: Electric, with DC solenoid-activated starting motor(s).
 2. Battery(s):
 - a. Battery Type: Lead-acid.
 - b. Battery Capacity: Size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature; capable of providing cranking through two complete periods of cranking limiter time-outs without recharging.
 - c. Provide battery rack, cables, and connectors suitable for the supplied battery(s); size battery cables according to manufacturer's recommendations for cable length to be installed.
 3. Battery-Charging Alternator: Engine-driven, with integral solid-state voltage regulation.
 4. Battery Charger:
 - a. Provide dual rate battery charger with automatic float and equalize charging modes and minimum rating of 10 amps; suitable for maintaining the supplied battery(s) at full

- charge without manual intervention.
 - b. Capable of returning supplied battery(s) from fully discharged to fully charged condition within 24 hours, as required by NFPA 110 for Level 1 applications while carrying normal loads.
 - c. Recognized as complying with UL 1236.
 - d. Furnished with integral overcurrent protection; current limited to protect charger during engine cranking; reverse polarity protection.
 - e. Provide integral DC output ammeter and voltmeter with five percent accuracy.
 - f. Provide alarm output contacts as necessary for alarm indications.
- D. Engine Speed Control System (Governor):
- 1. Single Engine Generator Sets (Not Operated in Parallel): Provide electronic isochronous governor for controlling engine speed/alternator frequency.
 - 2. Frequency Regulation, Electronic Isochronous Governors: No change in frequency from no load to full load; plus/minus 0.25 percent at steady state.
- E. Engine Lubrication System:
- 1. System Type: Full pressure, with engine-driven, positive displacement lubrication oil pump, replaceable full-flow oil filter(s), and dip-stick for oil level indication. Provide oil cooler where recommended by manufacturer.
 - 2. Oil Heater: Provide thermostatically controlled oil heater to improve starting under cold ambient conditions.
- F. Engine Cooling System:
- 1. System Type: Closed-loop, liquid-cooled, with unit-mounted radiator/fan and engine-driven coolant pump; suitable for providing adequate cooling while operating at full load under worst case ambient temperature.
 - 2. Fan Guard: Provide suitable guard to protect personnel from accidental contact with fan.
 - 3. Coolant Heater: Provide thermostatically controlled coolant heater to improve starting under cold ambient conditions; size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature.
- G. Engine Air Intake and Exhaust System:
- 1. Air Intake Filtration: Provide engine-mounted, replaceable, dry element filter.
 - 2. Engine Exhaust Connection: Provide suitable, approved flexible connector for coupling engine to exhaust system.

2.04 ALTERNATOR (GENERATOR)

- A. Alternator: 4-pole, 1800 rpm (60 Hz output) revolving field, synchronous generator complying with NEMA MG 1; connected to engine with flexible coupling; voltage output configuration as indicated, with reconnectable leads for 3 phase alternators.
- B. Exciter:
 - 1. Exciter Type: Brushless; provide permanent magnet generator (PMG) excitation system; self-excited (shunt) systems are not permitted.
 - 2. PMG Excitation Short-Circuit Current Support: Capable of sustaining 300 percent of rated output current for 10 seconds.
 - 3. Voltage Regulation (with PMG excitation): Plus/minus 0.5 percent for any constant load from no load to full load.
- C. Temperature Rise: Comply with UL 2200.
- D. Insulation System: NEMA MG 1, Class H; suitable for alternator temperature rise.
- E. Enclosure: NEMA MG 1, drip-proof.
- F. Total Harmonic Distortion: Not greater than five percent.

2.05 GENERATOR SET CONTROL SYSTEM

- A. Provide microprocessor-based control system for automatic control, monitoring, and protection of generator set. Include sensors, wiring, and connections necessary for functions/indications specified.
- B. Control Panel:
 - 1. Control Panel Mounting: Unit-mounted unless otherwise indicated; vibration isolated.
 - 2. Generator Set Control Functions:
 - a. Automatic Mode: Initiates generator set start/shutdown upon receiving corresponding signal from remote device (e.g. automatic transfer switch).
 - b. Manual Mode: Initiates generator set start/shutdown upon direction from operator.
 - c. Reset Mode: Clears all faults, allowing generator set restart after a shutdown.
 - d. Emergency Stop: Immediately shuts down generator set (without time delay) and prevents automatic restarting until manually reset. Coordinate final location with AHJ.
 - e. Cycle Cranking: Programmable crank time, rest time, and number of cycles.
 - f. Time Delay: Programmable for shutdown (engine cooldown) and start (engine warmup).
 - g. Voltage Adjustment: Adjustable through range of plus/minus 5 percent.
 - 3. Generator Set Status Indications:
 - a. Voltage (Volts AC): Line-to-line, line-to-neutral for each phase.
 - b. Current (Amps): For each phase.
 - c. Frequency (Hz).
 - d. Real power (W/kW).
 - e. Reactive power (VAR/kVAR).
 - f. Apparent power (VA/kVA).
 - g. Power factor.
 - h. Duty Level: Actual load as percentage of rated power.
 - i. Engine speed (RPM).
 - j. Battery voltage (Volts DC).
 - k. Engine oil pressure.
 - l. Engine coolant temperature.
 - m. Engine run time.
 - n. Generator powering load (position signal from transfer switch).
 - 4. Generator Set Protection and Warning/Shutdown Indications:
 - a. Comply with NFPA 110; configurable for NFPA 110 Level 1 or Level 2, or NFPA 99 systems including but not limited to the following protections/indications:
 - 1) Overcrank (shutdown).
 - 2) Low coolant temperature (warning).
 - 3) High coolant temperature (warning).
 - 4) High coolant temperature (shutdown).
 - 5) Low oil pressure (shutdown).
 - 6) Overspeed (shutdown).
 - 7) Low fuel level (warning).
 - 8) Low coolant level (warning/shutdown).
 - 9) Generator control not in automatic mode (warning).
 - 10) High battery voltage (warning).
 - 11) Low cranking voltage (warning).
 - 12) Low battery voltage (warning).
 - 13) Battery charger failure (warning).
 - b. In addition to NFPA 110 requirements, provide the following protections/indications:
 - 1) High AC voltage (shutdown).
 - 2) Low AC voltage (shutdown).
 - 3) High frequency (shutdown).
 - 4) Low frequency (shutdown).

- 5) Overcurrent (shutdown).
 - c. Provide contacts for local and remote common alarm.
 - d. Provide lamp test function that illuminates all indicator lamps.
 5. Other Control Panel Features:
 - a. Event log.
 - b. Communications Capability: Compatible with system indicated. Provide all accessories necessary for proper interface.
 - c. Remote monitoring capability.
- C. Remote Annunciator:
 1. Remote Annunciator Mounting: Wall-mounted; Provide flush-mounted annunciator for finished areas and surface-mounted annunciator for non-finished areas unless otherwise indicated.
 2. Generator Set Status Indications:
 - a. Generator powering load (via position signal from transfer switch).
 - b. Communication functional.
 3. Generator Set Warning/Shutdown Indications:
 - a. Comply with NFPA 110; configurable for NFPA 110 Level 1 or Level 2, or NFPA 99 systems including but not limited to the following indications:
 - 1) Overcrank (shutdown).
 - 2) Low coolant temperature (warning).
 - 3) High coolant temperature (warning).
 - 4) High coolant temperature (shutdown).
 - 5) Low oil pressure (shutdown).
 - 6) Overspeed (shutdown).
 - 7) Low fuel level (warning).
 - 8) Low coolant level (warning/shutdown).
 - 9) Generator control not in automatic mode (warning).
 - 10) High battery voltage (warning).
 - 11) Low cranking voltage (warning).
 - 12) Low battery voltage (warning).
 - 13) Battery charger failure (warning).
 - b. Provide audible alarm with silence function.
 - c. Provide lamp test function that illuminates all indicator lamps.
- D. Remote Emergency Stop: Provide approved red, mushroom style remote emergency stop button where indicated or required by authorities having jurisdiction.

2.06 GENERATOR SET ENCLOSURE

- A. Enclosure Type: Sound attenuating type II, weather protective.
- B. Enclosure Material: aluminum.
- C. Hardware Material: Stainless steel.
- D. Color: Manufacturer's standard.
- E. Access Doors: Lockable, with all locks keyed alike.
- F. Openings: Designed to prevent bird/rodent entry.
- G. External Drains: Extend oil and coolant drain lines to exterior of enclosure for maintenance service.
- H. Sound Attenuating Enclosures: Line enclosure with non-hydroscopic, self-extinguishing sound-attenuating material.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.

- B. Verify that the ratings and configurations of generator sets and auxiliary equipment are consistent with the indicated requirements.
- C. Verify that rough-ins for field connections are in the proper locations.
- D. Verify that mounting surfaces are ready to receive equipment.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install generator sets and associated accessories in accordance with NECA/EGSA 404.
- D. Arrange equipment to provide minimum clearances and required maintenance access.
- E. Unless otherwise indicated, mount generator set on properly sized, minimum 4 inch high concrete pad constructed in accordance with Section 26 0005 and Division 03 - Concrete. Provide suitable vibration isolators, where no factory installed.
- F. Provide required support and attachment in accordance with Section 26 0529.
- G. Use manufacturer's recommended oil and coolant, suitable for the worst case ambient temperatures.
- H. Provide engine exhaust piping in accordance with Section 23 5100, where not factory installed.
 - 1. Include piping expansion joints, piping insulation, thimble, condensation trap/drain, rain cap, hangers/supports, etc. as indicated or as required.
 - 2. Do not exceed manufacturer's maximum back pressure requirements.
- I. Install exhaust silencer in accordance with Section 23 5100, where not factory installed.
- J. Provide grounding and bonding in accordance with Section 26 0526.
- K. Identify system wiring and components in accordance with Section 26 0553.

3.03 FIELD QUALITY CONTROL

- A. See Division 01 - General Requirements for additional requirements.
- B. Provide services of a manufacturer's authorized representative to prepare and start systems and perform inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.
- C. Notify Owner and Architect at least two weeks prior to scheduled inspections and tests.
- D. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- E. Provide all equipment, tools, and supplies required to accomplish inspection and testing, including load bank and fuel.
- F. Preliminary inspection and testing to include, at a minimum:
 - 1. Inspect each system component for damage and defects.
 - 2. Verify tightness of mechanical and electrical connections are according to manufacturer's recommended torque settings.
 - 3. Check for proper oil and coolant levels.
- G. Prepare and start system in accordance with manufacturer's instructions.
- H. Perform acceptance test in accordance with NFPA 110.
- I. Provide field emissions testing where necessary for certification.
- J. Sound Level Tests: Measure sound levels for compliance with specified requirements. Identify and report ambient noise conditions.
- K. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

3.04 CLOSEOUT ACTIVITIES

- A. See Division 01 - General Requirements for closeout submittals.
- B. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.
- C. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of four hours of training.
 - 3. Instructor: Manufacturer's authorized representative.
 - 4. Location: At project site.

3.05 MAINTENANCE

- A. Provide to Owner a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of engine generator system for two years from date of Substantial Completion; Include a complete description of preventive maintenance, systematic examination, adjustment, inspection, and testing, with a detailed schedule.

END OF SECTION

**SECTION 26 36 00
TRANSFER SWITCHES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Transfer switches for low-voltage (600 V and less) applications and associated accessories:
 - 1. Automatic transfer switches.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 03 - Concrete: Concrete equipment pads for floor mounted units.
- C. Division 14 - Conveying Equipment: For interface with transfer switch.
- D. Section 26 0005 - Basic Electrical Requirements.
- E. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- F. Section 26 0529 - Hangers and Supports for Electrical Systems.
- G. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- H. Section 26 0573 - Power System Studies: Additional criteria for the selection of equipment specified in this section.
- I. Section 26 2816.16 - Enclosed Switches: Safety switches not listed for use as transfer switch equipment.
- J. Section 26 3213 - Engine Generators: For interface with transfer switches.
 - 1. Includes code requirements applicable to work of this section.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- C. NEMA ICS 10 Part 1 - Industrial Control and Systems Part 1: Electromechanical AC Transfer Switch Equipment 2020.
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems 2017.
- E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 110 - Standard for Emergency and Standby Power Systems 2019.
- G. UL 1008 - Transfer Switch Equipment Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate compatibility of transfer switches to be installed with work provided under other sections or by others.
 - a. Engine Generators: See Section 26 3213.
 - 2. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
 - 3. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Coordinate the work with placement of supports, anchors, etc. required for mounting.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features.
 - 1. Where applicable, include characteristic trip curves for overcurrent protective devices upon request.
- C. Shop Drawings: Include dimensioned plan views and sections indicating locations of system components, required clearances, and field connection locations. Include system interconnection schematic diagrams showing all factory and field connections.
- D. Maintenance contracts.
- E. Project Record Documents: Record actual locations of system components, installed circuiting arrangements and routing, and final equipment settings.

1.06 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. NFPA 70 (National Electrical Code).
 - 2. NFPA 110 (Standard for Emergency and Standby Power Systems); meet requirements for system Level specified in Section 26 3213.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Transfer Switches:
 - 1. ASCO Power Technologies: www.ascopower.com
 - 2. Same as manufacturer of engine generator(s) used for this project.
- B. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.
- C. Source Limitations: Furnish transfer switches and accessories produced by a single manufacturer and obtained from a single supplier.

2.02 TRANSFER SWITCHES

- A. Provide complete power transfer system consisting of all required equipment, conduit, boxes, wiring, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Applications:
- D. Construction Type: Either "contactor type" (open contact) or "breaker type" (enclosed contact) transfer switches complying with specified requirements are acceptable.
- E. Automatic Transfer Switch:
 - 1. Transfer Switch Type: As indicated on the drawings.
 - 2. Transition Configuration: As indicated on the drawings.
 - 3. Voltage: As indicated on the drawings.
 - 4. Ampere Rating: As indicated on the drawings.
 - 5. Neutral Configuration: Solid neutral (unswitched), except as indicated.
 - 6. Features:
 - a. Provide signal connection to elevator programming hub.

- F. Comply with NEMA ICS 10 Part 1, and list and label as complying with UL 1008 for the classification of the intended application (e.g. emergency, optional standby).
- G. Do not use double throw safety switches or other equipment not specifically designed for power transfer applications and listed as transfer switch equipment.
- H. Load Classification: Classified for total system load (any combination of motor, electric discharge lamp, resistive, and tungsten lamp loads with tungsten lamp loads not exceeding 30 percent of the continuous current rating) unless otherwise indicated or required.
- I. Switching Methods:
 - 1. Open Transition:
 - a. Provide break-before-make transfer without a neutral position that is not connected to either source, and with interlocks to prevent simultaneous connection of the load to both sources.
 - 2. Obtain control power for transfer operation from line side of source to which the load is to be transferred.
- J. Service Conditions: Provide transfer switches suitable for continuous operation at indicated ratings under the service conditions at the installed location.
- K. Enclosures:
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - 2. Finish: Manufacturer's standard unless otherwise indicated.
- L. Short Circuit Current Rating:
 - 1. Withstand and Closing Rating: Provide transfer switches, when protected by the supply side overcurrent protective devices to be installed, with listed withstand and closing rating not less than the available fault current at the installed location as indicated on the drawings.
- M. Automatic Transfer Switches:
 - 1. Description: Transfer switches with automatically initiated transfer between sources; electrically operated and mechanically held.
 - 2. Control Functions:
 - a. Automatic mode.
 - b. Test Mode: Simulates failure of primary/normal source.
 - c. Voltage and Frequency Sensing:
 - 1) Undervoltage sensing for each phase of primary/normal source; adjustable dropout/pickup settings.
 - 2) Undervoltage sensing for alternate/emergency source; adjustable dropout/pickup settings.
 - 3) Underfrequency sensing for alternate/emergency source; adjustable dropout/pickup settings.
 - d. Outputs:
 - 1) Contacts for engine start/shutdown (except where direct generator communication interface is provided).
 - 2) Auxiliary contacts; one set(s) for each switch position.
 - e. Adjustable Time Delays:
 - 1) Engine generator start time delay; delays engine start signal to override momentary primary/normal source failures.
 - 2) Transfer to alternate/emergency source time delay.
 - 3) Retransfer to primary/normal source time delay.
 - 4) Engine generator cooldown time delay; delays engine shutdown following retransfer to primary/normal source to permit generator to run unloaded for cooldown period.

- f. In-Phase Monitor (Open Transition Transfer Switches): Monitors phase angle difference between sources for initiating in-phase transfer.
- g. Engine Exerciser: Provides programmable scheduled exercising of engine generator selectable with or without transfer to load; provides memory retention during power outage.
- 3. Status Indications:
 - a. Connected to alternate/emergency source.
 - b. Connected to primary/normal source.
 - c. Alternate/emergency source available.
- 4. Automatic Sequence of Operations:
 - a. Upon failure of primary/normal source for a programmable time period (engine generator start time delay), initiate starting of engine generator where applicable.
 - b. When alternate/emergency source is available, transfer load to alternate/emergency source after programmable time delay.
 - c. When primary/normal source has been restored, retransfer to primary/normal source after a programmable time delay. Bypass time delay if alternate/emergency source fails and primary/normal source is available.
 - d. Where applicable, initiate shutdown of engine generator after programmable engine cooldown time delay.
- N. Manual Transfer Switches:
 - 1. Description: Transfer switches with manually initiated transfer between sources; mechanically operated and mechanically held.
- O. Interface with Other Work:
 - 1. Interface with engine generators as specified in Section 26 3213.
 - 2. Interface with elevators as specified in Division 14.
 - 3. Interface with building automation system.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of transfer switches are consistent with the indicated requirements.
- C. Verify that rough-ins for field connections are in the proper locations.
- D. Verify that mounting surfaces are ready to receive transfer switches.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Arrange equipment to provide minimum clearances and required maintenance access.
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install transfer switches plumb and level.
- F. Unless otherwise indicated, mount floor-mounted transfer switches on properly sized 3 inch high concrete pad constructed in accordance with Section 03 3000.
- G. Provide grounding and bonding in accordance with Section 26 0526.
- H. Identify transfer switches and associated system wiring in accordance with Section 26 0553.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Prepare and start system in accordance with manufacturer's instructions.

- C. Automatic Transfer Switches:
 - 1. Inspect and test in accordance with NETA ATS, except Section 4.
 - 2. Perform inspections and tests listed in NETA ATS, Section 7.22.3. The insulation-resistance tests listed as optional are not required.
- D. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

3.04 MAINTENANCE

- A. Provide to Owner at no extra cost, a separate maintenance contract for the service and maintenance of transfer switches for two years from date of Substantial Completion; Include a complete description of preventive maintenance, systematic examination, adjustment, inspection, and testing, with a detailed schedule.

END OF SECTION

**SECTION 26 51 00
INTERIOR LIGHTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior luminaires.
- B. Ballasts and drivers.
- C. LED emergency power supply units.
- D. Emergency Lighting Control Units (Transfer Switches)
- E. Accessories.

1.02 RELATED REQUIREMENTS

- A. Division 01 - General Requirements: Project administrative and procedural requirements.
- B. Division 02 - Existing Conditions: Demolition, cleaning and disposal requirements, cutting and patching requirements, repairs.
- C. Section 26 0005 - Basic Electrical Requirements.
- D. Section 26 0533.13 - Conduit for Electrical Systems.
- E. Section 26 0529 - Hangers and Supports for Electrical Systems.
- F. Section 26 0533.16 - Boxes for Electrical Systems.
- G. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- H. Section 26 0935 - Distributed Digital Lighting Control System: Devices for automatic control of lighting, including occupancy sensors, daylighting controls, networked control stations and motion sensors.
- I. Section 26 2726 - Wiring Devices: Manual wall switches and wall dimmers.
- J. Section 26 5600 - Exterior Lighting.

1.03 REFERENCE STANDARDS

- A. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code) 2013 (Corrigendum 2019).
- B. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits 2002 (Corrigendum 2012).
- C. IES LM-63 - IESNA Standard File Format for Electronic Transfer of Photometric Data and Related Information 2002 (Reaffirmed 2008).
- D. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products 2008.
- E. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules 2015, with Errata (2017).
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- G. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems 2006.
- H. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems 2006.
- I. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts 2016.
- J. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility 2012.
- K. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

- L. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- M. UL 924 - Emergency Lighting and Power Equipment Current Edition, Including All Revisions.
- N. UL 1598 - Luminaires Current Edition, Including All Revisions.
- O. UL 1598C - Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits Current Edition, Including All Revisions.
- P. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
 - 2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
 - 3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
 - 4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for equipment listed herein. Refer to Division 01 for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
 - 1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70 and NFPA 101.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70 and NFPA 101.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Unless otherwise indicated, provide complete luminaires including lamp(s), light engines, drivers and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- G. Recessed Luminaires:
 - 1. Ceiling Compatibility: Comply with NEMA LE 4.
 - 2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
 - 3. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.
 - 4. Air-Handling Recessed Fluorescent Luminaires: Suitable for air supply/return, heat removal, or combination as indicated.
- H. LED Luminaires:
 - 1. Components: UL 8750 recognized or listed as applicable.
 - 2. Tested in accordance with IES LM-79 and IES LM-80.
 - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.03 EMERGENCY LIGHTING UNITS

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery:
 - 1. Sealed maintenance-free lead calcium unless otherwise indicated.
 - 2. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.04 BALLASTS AND DRIVERS

- A. Ballasts/Drivers - General Requirements:
 - 1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
 - 2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
 - 3. Electronic Ballasts/Drivers: Inrush currents not exceeding peak currents specified in NEMA 410.
- B. Dimmable LED Drivers:
 - 1. Dimming Range: Continuous dimming from 100 percent to 10 percent relative light output unless dimming capability to lower level is indicated, without flicker.
 - 2. Control Compatibility: Fully compatible with the dimming controls to be installed.
- C. Dimmable LED Drivers: Comply with Section 26 0935 - Distributed Digital Lighting Control System.

2.05 LED EMERGENCY POWER SUPPLY UNITS

- A. Manufacturers:
 - 1. Iota Engineering, LLC: www.iotaengineering.com/#sle.
 - 2. Lithonia Lighting: www.lithonia.com/#sle.
 - 3. Philips Emergency Lighting/Bodine: www.bodine.com/#sle.

4. Manufacturer Limitations: Where possible, for each type of luminaire provide fluorescent emergency power supply units produced by a single manufacturer.
5. Where a specific manufacturer or model is indicated elsewhere in the luminaire schedule or on the drawings, substitutions are not permitted unless explicitly indicated.
- B. Description: Self-contained fluorescent emergency power supply units suitable for use with indicated luminaires, complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- C. Operation: Upon interruption of normal power source, solid-state control automatically switches connected lamp(s) to the fluorescent emergency power supply for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- D. Battery: Sealed maintenance-free high-temperature nickel cadmium unless otherwise indicated.
- E. Diagnostics: Provide accessible and visible multi-chromatic combination test switch/indicator light to display charge, test, and diagnostic status and to manually activate emergency operation.
- F. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status and field selectable audible alert.

2.06 EMERGENCY LIGHTING CONTROL DEVICES (TRANSFER DEVICES)

- A. Manufacturers:
 1. Philips Emergency Lighting Bodine: www.philips.com/bodine
 2. Iota Engineering: www.iotaengineering.com
 3. Engineer pre-approved equal
- B. General Requirements:
 1. The emergency lighting control device shall work in conjunction with an auxiliary generator or a central inverter system to power light fixtures for egress lighting regardless of fixture wall switch position.
 2. All units shall be UL924 listed and approved.
- C. Operation:
 1. Device shall sense loss of normal power and switch the AC driver input power connected to an unswitched generator (or central inverter) supplied lighting circuit.
 2. The device shall be capable of bypassing the wall switch when the auxiliary generator (or central inverter) powers.
 3. Unit shall be capable of 120/277 volt operation.
- D. Equipment:
 1. Emergency Lighting Control Device - 3 Amp
 - a. For use within a single luminaire. Device shall be suitable for indoor and damp locations and capable of being used with fluorescent or LED lighting loads. Device shall be UL listed for installation inside, on top of or remote from the fixture. Shall include power loss sensing, UL924 listed and approved.
 2. Emergency Lighting Control Device - 20 Amp
 - a. For use adjacent to local switching means. Device shall be suitable for indoor and damp locations and capable of being used with incandescent, fluorescent and LED lighting loads. Shall include power loss sensing, UL 924 listed and approved.
 3. Branch Circuit Emergency Lighting Transfer Switch
 - a. Mounted onto junction box type, verify with field conditions. Device shall be suitable for indoor, damp and plenum (UL 2043) locations and capable of being used with incandescent, fluorescent and LED lighting loads. Shall include power loss sensing, UL 924 listed and approved.

2.07 MICRO AND MINI INVERTERS

- A. Manufacturers:
 - 1. Philips Emergency Lighting Bodine: www.philips.com/bodine
 - 2. Iota Engineering: www.iotaengineering.com
 - 3. Engineer pre-approved equal.
- B. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- C. Operation: Upon interruption of normal power source, solid-state control automatically switches connected lamp(s) to the emergency power supply for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- D. Battery:
 - 1. Hightemperature rechargeable, replaceable nickel-cadmium.
 - 2. Battery shall be sized to supply all connected lamps where indicated.
- E. Diagnostics: Unit shall include test switch and charge indicator light.
- F. Unit shall be sine wave output capable with dual voltage input and output capabilities.
- G. Provide with low-voltage battery disconnect.
- H. Installation locations shall be coordinated with selected manufacturer's requirements and said manufacturer's distance limitations.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- B. Verify that suitable support frames are installed where required.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.
- B. Install products in accordance with manufacturer's instructions.
- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Suspended Ceiling Mounted Luminaires:
 - 1. Do not use ceiling tiles to bear weight of luminaires.
 - 2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
 - 3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
 - 4. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
 - 5. See appropriate Division 09 section where suspended grid ceiling is specified for additional requirements.
- G. Recessed Luminaires:
 - 1. Install trims tight to mounting surface with no visible light leakage.

2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
 3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.
- H. Suspended Luminaires:
1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
 2. Install canopies tight to mounting surface.
- I. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to bottom of luminaire.
- J. Install accessories furnished with each luminaire.
- K. Bond products and metal accessories to branch circuit equipment grounding conductor.
- L. Emergency Lighting Units:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- M. Exit Signs:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- N. LED Emergency Power Supply Units:
1. For field-installed units, install inside luminaire unless otherwise indicated. Where installation inside luminaire is not possible, install on top of luminaire.
- O. Identify luminaires connected to emergency power system in accordance with Section 26 0553.
- P. Install lamps in each luminaire.

3.03 FIELD QUALITY CONTROL

- A. Inspect each product for damage and defects.
- B. Operate each luminaire after installation and connection to verify proper operation.
- C. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.

END OF SECTION