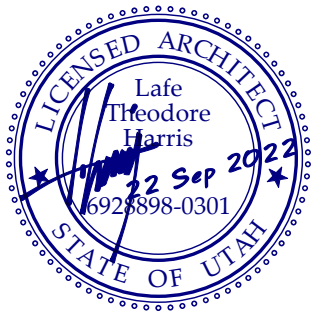
Project Manual

Provo Deseret Industries
Restrooms Remodel

1415 North State Street
Provo, Utah

THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS

Property Number: 508-8321 **Plan Series:** Large Deseret Industries **County Parcel:** 19:062:0005 **BHD Number:** 2218



Architect

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BHD Architects

65 East Wadsworth Park Drive, Suite 205
Draper, Utah 84020

Phone - 801.571.0010
Mobile - 801.631.9722

Owner - Project Manager

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Meetinghouse Facilities Dept.

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Mobile - 801.783.6285

Owner - Facilities Manager

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Utah South UT FM Group

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INTRODUCTORY INFORMATION

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BIDDING REQUIREMENTS

FOR SMALL PROJECTS (U.S.)

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INVITATION TO BID (U.S.)

1. CONTRACTORS INVITED TO BID THE PROJECT:

BC Builders
Dynamic Construction
Gines Construction
Hall Construction
Stone River Construction

2. PROJECT:

Provo DI Restrooms

3. LOCATION:

1415 North State Street, Provo, Utah, 84604

4. OWNER:

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole
c/o
Meetinghouse Facilities Department, Ryan Haughton

5. CONSULTANT:

BHD Architects, Mike Davey 801-631-9722, mike@bhdarchitects.com

6. DESCRIPTION OF PROJECT:

A. Remodel of the two sales floor restrooms and the two processing area main floor restrooms, including all new finishes and fixtures.

7. TYPE OF BID: Bids will be on a lump-sum basis. Segregated bids will not be accepted.

8. TIME OF SUBSTANTIAL COMPLETION: The time limit for substantial completion of this work will be 60 calendar days and will be as noted in the Agreement.

9. BID OPENING: Sealed bids will be received by ConsLog. Bids will be publicly opened at 2:00 pm on 6 Oct 2021.

10. BIDDING DOCUMENTS:

A. Bidding Documents are available to invited Contractors in ConsLog or by contacting the Architect, BHD Architects, Mike Davey, 801-631-9722, mike@bhdarchitects.com

11. BIDDER'S QUALIFICATIONS: Bidding by the Contractors will be by invitation only.

12. OWNER'S RIGHT TO REJECT BIDS: Owner reserves the right to reject any or all bids and to waive any irregularity therein.

END OF DOCUMENT

INSTRUCTIONS TO BIDDERS (U.S.)

1. DOCUMENTS:

A. Bidding Documents include Bidding Requirements and proposed Contract Documents. Proposed Contract Documents consist of:
   1) Agreement Between Owner and Contractor for Small Project (U.S.)
   2) Other documents included by reference
   3) Addenda.

B. Bidding Requirements are those documents identified as such in proposed Project Manual.

C. Addenda are written or graphic documents issued prior to execution of the Contract which modify or interpret the Bidding Documents. They become part of the Contract Documents as noted in the Agreement Between Owner and Contractor for Small Project (U.S.) upon execution of the Agreement by Owner.

2. BIDDER'S REPRESENTATIONS:

A. By submitting a bid proposal, bidder represents that
   1) Bidder has carefully studied and compared Bidding Documents with each other. Bidder understands the Bidding Documents and the bid is fully in accordance with the requirements of those documents,
   2) Bidder has thoroughly examined the site and any building located thereon, has become familiar with local conditions which might directly or indirectly affect contract work, and has correlated its personal observations with requirements of proposed Contract Documents, and
   3) Bid is based on materials, equipment, and systems required by Bidding Documents without exception.

3. BIDDING DOCUMENTS:

A. Copies
   1) Owner will provide the Bidding Documents as set forth in the Invitation to Bid.
   2) Partial sets of Bidding Documents will not be issued.

B. Interpretation or Correction of Bidding Documents
   1) Bidders will request interpretation or correction of any apparent errors, discrepancies, and omissions in the Bidding Documents.
   2) Corrections or changes to Bidding Documents will be made by written Addenda.

C. Substitutions and Equal Products
   1) Equal products may be approved upon compliance with Contract Document requirements.
   2) Base bid only on materials, equipment, systems, suppliers or performance qualities specified in the Bidding documents.
   3) Where a specified product is identified as a "quality standard", products of other manufacturers that meet the performance, properties, and characteristics of the specified "quality standard" may be used without specific approval as a substitute.

D. Addenda. Addenda will be sent to bidders and to locations where Bidding Documents are on file no later than one week prior to bid opening or by fax no later than 48 hours prior to bid opening.

4. BIDDING PROCEDURES:

A. Form and Style of Bids
   1) Use Owner's Bid Form in ConsLog.
   2) Bid will be complete and executed by authorized representative of Bidder.
   3) Do not delete from or add to the information requested on bid form.

B. Submission of Bids
   1) Submit bid in ConsLog.
   2) It is bidder's sole responsibility to see that its bid is received at or before the specified time. Bids received after specified bid opening time may not be accepted.
   3) No oral, facsimile transmitted, telegraphic, or telephonic bids, modifications, or cancellations will be considered.

C. Modification or Withdrawal of Bid
   1) Bidder guarantees there will be no revisions or withdrawal of bid amount for 45 days after bid opening.
   2) Prior to bid opening, bidders may withdraw bid in ConsLog.

5. CONSIDERATION OF BIDS:

A. Opening Of Bids - See Invitation to Bid.

B. Acceptance Of Bid
   1) No bidder will consider itself under contract after opening and reading of bids until Owner accepts Contractor's Bid Proposal by executing same.
   2) Bidder's past performance, organization, subcontractor selection, equipment, and ability to perform and complete its contract in manner and within time specified, together with amount of bid, will be elements considered in award of contract.

6. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:

A. Agreement form will be "Agreement Between Owner and Contractor for Small Project (U.S.)" provided by Owner.

7. MISCELLANEOUS:

A. Pre-Bid Conference. A pre-bid conference will be held at at the project site on 22 Sep 2022 at 10:30 am.

B. Examination Schedule for Existing Building and Site
   1) As directed at the pre-bid conference.

END OF DOCUMENT

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Sample Only – Do not use. Only submit bid in ConsLog.

BID FORM

FOR GENERAL CONTRACT WORK (U.S.)

PROJECT IDENTIFICATION:

OWNER:

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole ("Owner")

CONSULTANT:

BID

1. In submitting this Bid, Bidder represents that:
   a. If this Bid is accepted, Bidder will enter into an agreement with Owner to perform and furnish the Work described in the Bidding Documents for the Bid Price and within the Time of Substantial Completion indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
   b. Bidder has carefully examined the Bidding Documents consisting of the Project Manual containing the Bidding Requirements, the Conditions of the Contract, and the Specifications, entitled _____, the Drawings entitled _____ and dated _____, and including sheets numbered _____, and addenda numbers _____.
   c. Bidder has examined the site of the work, existing conditions, and all other conditions affecting the work on the above-named Project.
   d. Bidder has carefully correlated the information known to Bidder and information and observations obtained from visits to the site with the Bidding Documents.
   e. Bidder is familiar with federal, State, and local laws and regulations applicable to Project.
   f. Bidder guarantees there will be no revisions or withdrawal of bid amount for forty-five (45) days after the bid opening.

2. Bidder hereby proposes to furnish all materials, labor, equipment, tools, transportations, services, licenses, fees, permits, etc., required by said documents to complete the Work described by the Contract Documents for the lump-sum of: _____ Dollars ($ _____).

3. Bidder agrees to achieve substantial completion of the Work within the number of days indicated in the Invitation to Bid.

RESPECTFULLY SUBMITTED:

_____
Signature

_____
Printed name

_____
Title

_____
Company name

_____
Business Address

_____ _____
Date City, State, and Zip Code

_____ _____
License No. Telephone Fax

_____
Contact Email Address

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CONSTRUCTION MATERIAL ASBESTOS STATEMENT (U.S.)

PROJECTS FOR:
THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS,
a Utah corporation sole

Building Name: _____

Building Plan Type: _____

Building Address: _____

Building Owner: The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole.

Project Number: _____

Completion Date: _____

As PROJECT CONSULTANT and principal in charge; based on my best knowledge, information, inspection, and belief; I certify that on the above referenced Project, no asbestos-containing building materials were specified in the construction documents or given approval in shop drawings or submittals.

_____ _____
Project Consultant and Principal in Charge (signature) Date

_____
Company Name

As GENERAL CONTRACTOR in charge of construction; based on my best knowledge, information, inspection, and belief; I affirm that on the above-referenced Project, no asbestos-containing building materials were used in the construction.

_____ _____
General Contractor (signature) Date

_____
Company Name

SMALL PROJECT AGREEMENT
BETWEEN OWNER AND CONTRACTOR
Fixed Sum (U.S.)

The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole ("Owner") and _____ ("Contractor") enter into this *Small Project Agreement Between Owner and Contractor (U.S.)* ("Agreement") and agree as follows:

1. **Property/Project.**

   Property/Project Number: _____
   Property Address ("Project Site"): _____
   Project Type: _____
   Project Name ("Project"): _____
   Stake Name: _____

2. **Scope of Work.** Contractor will furnish all labor, materials, tools, and equipment necessary to complete the Work in accordance with the Contract Documents. The Work is all labor, materials, tools, equipment, construction, and services required by the Contract Documents (the "Work").

3. **Contract Documents.** Contract Documents consist of:
   a. This Agreement;
   b. Supplementary Conditions for Small Project Agreement Between Owner and Contractor (U.S.);
   c. The Specifications (Division 01 and Divisions _____);
   d. Drawings entitled and dated _____;
   e. Addendum No. with date(s) _____;
   g. All written Field Changes, written Construction Change Directives and written Change Orders when prepared and signed by Owner and Contractor.

4. **Compensation.** Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the sum of _____ Dollars ($_____) (the "Contract Sum"). This Contract Sum includes all labor, materials, equipment, tools, costs, expenses, work and services of Contractor and its subcontractors necessary to perform the Work in accordance with the terms of this Agreement, including without limitation travel, communications, and copying costs.

5. **Payment.**
   a. If the Contract Sum is over $100,000 or if otherwise requested by Owner, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner will be used as a basis for reviewing Contractor's payment requests.
   b. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for work completed within thirty (30) days after Owner receives:
      1) Contractor's payment request for work to date;
      2) a certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
      3) releases of all mechanics' liens and claims of subcontractors, laborers, or material suppliers who supplied labor and/or materials for the Work covered by the payment request.
      4) updated Construction Schedule.
   c. Owner may modify or reject the payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.
   d. Contractor will timely pay subcontractors their portion of fees and expenses that Owner has paid to Contractor.

6. **Extras and Change Orders.** Owner may order changes in the Work by altering, adding to, or deducting from the Work. In the event of such a change, the Contract Sum and/or the time of completion will be adjusted to reflect the change by means of a written Change Order signed by Contractor and Owner. Contractor will not commence work on any change until either: (a) Contractor and Owner have executed a Change Order; or (b) Owner has issued a written order for the change acknowledging that there is a dispute regarding the compensation adjustment relating to the change. If Contractor proceeds with a change in the Work without complying with the preceding sentence, Contractor agrees that it will not be entitled to any additional compensation for such change.

7. **Warranty and Correction of Work.** For all Work, services, labor, materials, products, and equipment provided under the Contract Documents, Contractor provides and extends to Owner all statutory, common law, and standard industry warranties as well as those warranties set forth in Owner's Contract Documents. Unless a longer period is specified by Owner's Contract Documents or otherwise, Contractor, at a minimum and in addition to all other warranties, warrants all Work under the Contract Documents for at least one year. Specifically, and without limitation, Contractor will promptly correct at its own expense:
   a. any portion of the Work which
      1) fails to conform to the requirements of the Contract Documents, or
      2) is rejected by the Owner as defective or because it is damaged or rendered unsuitable during installation or resulting from failure to exercise proper protection.
   b. any defects due to faulty materials, equipment, or workmanship which appear within a period of one year from the date of completion of the Work or within such longer period of time as may be prescribed by law or the terms of any applicable special warranty required by the Contract Documents.

8. **Time of Completion.** Contractor will complete the Work and have it ready for Owner's inspection within _____ (_____) calendar days from Notice to Proceed issued by Owner. Time is of the essence. If Contractor is delayed at any time in the progress of the Work by any act or neglect of Owner, or by changes in the Work, or by strikes, lockouts, unusual delay in transportation, unavoidable casualties, or acts of nature beyond Contractor's control, then the time for completion will be extended by the time that completion of the Work is delayed. However, Contractor expressly waives any damages for any such delays.

9. **Owner Provided Items.** Owner may provide furnishings, equipment, and/or other items for the Project. Contractor will install items furnished by Owner and/or receive, store, and protect such items on site until the date Owner accepts the Project.

10. **Product Requirements**. Contractor will provide products that comply with Contract Documents, are undamaged, and, unless otherwise indicated, are new and unused at time of installation. Contractor will provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

11. **Permits, Surveys, and Taxes.** Contractor will obtain and pay for all permits and licenses, and also pay any applicable taxes. Contractor will also obtain and pay for any surveys it needs to perform the Work.

12. **Independent Contractor Relationship.** Contractor is not an agent or employee of Owner but is an independent contractor.

13. **Comply with Laws.** Contractor will comply, and ensure that all subcontractors comply, with all applicable laws, ordinances, rules, regulations, covenants, and restrictions.

14. **Indemnity and Hold Harmless.**
   a. Contractor will indemnify and hold harmless Owner and Owner's representatives, employees, agents, architects, and consultants from and against any and all claims, liens, damages, liability, demands, costs, judgments, awards, settlements, causes of action, losses and expenses (collectively "Claims" or "Claim"), including but not limited to attorney fees, consultant fees, expert fees, copy costs, and other expenses, arising out of or resulting from performance of or failure to perform the Work, attributable to bodily injury,

sickness, disease, or death, or to injury to or destruction of real or personal property, including loss of use resulting therefrom, except to the extent that such liability arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity includes, without limitation, indemnification of Owner from all losses or injury to Owner's property, except to the extent that such loss or injury arises out of the negligence of Owner, its representatives, agents, and employees. This indemnity applies, without limitation, to include Claims occurring both during performance of the Work and/or subsequent to completion of the Work. In the event that any Claim is caused in part by a party indemnified hereunder, that party will bear the cost of such Claim to the extent it was the cause thereof. In the event that a claimant asserts a Claim for recovery against any party indemnified hereunder, the party indemnified hereunder may tender the defense of such Claim to Contractor. If Contractor rejects such tender of defense and it is later determined that the negligence of the party indemnified hereunder did not cause all of the Claim, Contractor will reimburse the party indemnified hereunder for all costs and expenses incurred by that party in defending against the Claim. Contractor will not be liable hereunder to indemnify any party for damages resulting from the sole negligence of that party.

b. In addition to the foregoing, Contractor will be liable to defend Owner in any lawsuit filed by any Subcontractor relating to the Project. Where liens have been filed against Owner's property, Contractor (and/or its bonding company which has issued bonds for the Project) will obtain lien releases and record them in the appropriate county and/or local jurisdiction and provide Owner with a title free and clear from any liens of Subcontractors. In the event that Contractor and/or its bonding company are unable to obtain a lien release, Owner in its absolute discretion may require Contractor to provide a bond around the lien or a bond to discharge the lien, at Contractor's sole expense.
c. In addition to the foregoing, Contractor will indemnify and hold Owner harmless from any claim of any other contractor resulting from the performance, nonperformance or delay in performance of the Work by Contractor.
d. The indemnification obligation herein will not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or a Subcontractor under workers compensation acts, disability benefit acts, or other employee benefit acts.

15. **Work Restrictions.** Contractor will ensure that Contractor, its agents, employees, and subcontractors:
    a. Do not use or consume alcohol or cannabis, or illegally use drugs, on the Project Site or enter on or perform any Work on the Project Site while under their influence.
    b. Do not smoke or vape anything on the Project Site. Do not use tobacco in any form on the Project Site.
    c. Do not perform Work on the Project Site on Sundays except for emergency work.
    d. Refrain from using profanity or being discourteous or uncivil to others on the Project Site or while performing Work under this Agreement.
    e. Do not view or allow pornographic or other indecent materials on the Project Site.
    f. Do not play obnoxious and/or loud music on the Project Site. Do not play any music within existing facilities.
    g. Refrain from wearing immodest, offensive, or obnoxious clothing, while on the Project Site.
    h. Do not bring weapons on the Project Site.

16. **Safety Hazards.** Contractor will ensure that no work or services will be performed that may pose an undue safety hazard to Contractor, Contractor's employees, or any other person.

17. **Contractor's Insurance.** Prior to performing any work, Contractor will obtain and maintain during the term of this Agreement the following insurance:
    a. Workers Compensation Insurance or evidence of exemption.
    b. Employers Liability Insurance with minimum limits of the greater of $500,000 E.L. each accident, $500,000 E. L. disease-each employee, $500,000 E.L. disease-policy limit or as required by the law of the state in which the Project is located.
    c. Commercial General Liability Insurance – ISO Form CG 00 01 (12/07) or equivalent Occurrence policy which will provide primary coverage to the additional insureds (the Owner and the Architect) in the event of any Occurrence, Claim, or Suit with:
        1) Limits of the greater of: Contractor's actual coverage amounts or the following:

a) $2,000,000 General Aggregate;
b) $2,000,000 Products - Comp/Ops Aggregate;
c) $1,000,000 Personal and Advertising Liability;
d) $1,000,000 Each Occurrence; and
e) $50,000 Fire Damage to Rented Premises (Each Occurrence)

2) Endorsements attached to the General Liability policy including the following or their equivalent:
a) ISO Form CG-25-03 (05/09), Amendment of Limits of Insurance (Designated Project or Premises) describing the Agreement and specifying limits as shown above.
b) ISO Form CG 20 10 (07/04), Additional Insured – Owners, Lessees, Or Contractors (Form B), naming Owner and Architect as additional insureds.

d. Automobile Liability Insurance, with:
1) Combined Single Limit each accident in the amount of no less than $500,000; and
2) Coverage applying to "Any Auto" or its equivalent.

Contractor will provide evidence of these insurance coverages to Owner by providing an ACORD 25 (2010/05) Form or its equivalent: (1) listing Owner as the Certificate Holder and Additional Insured on the general liability and any excess liability policies, (2) listing the insurance companies providing coverage (all companies listed must be rated in A.M. Best Company Key Rating Guide-Property-Casualty and each company must have a rating of B+ Class VII or higher), (3) attaching the endorsements set forth above for the Certificate of Liability Insurance, and (4) bearing the name, address and telephone number of the producer and signed by an authorized representative of the producer. (The signature may be original, stamped, or electronic.) Notwithstanding the foregoing, Owner may, in writing and at its sole discretion, modify these insurance requirements.

18. **Resolution of Disputes.** In the event there is any dispute arising under the Contract Documents which cannot be resolved by agreement between the parties, either party may submit the dispute with all documentation upon which it relies to Director of Architecture, Engineering, and Construction, 50 East North Temple, Salt Lake City, Utah 84150, who will convene a dispute resolution conference within thirty (30) days. The dispute resolution conference will constitute settlement negotiations and any settlement proposal made pursuant to the conference will not be admissible as evidence of liability. In the event that the parties do not resolve their dispute pursuant to the dispute resolution conference, either party may commence legal action to resolve the dispute. Any such action must be commenced within six (6) months from the first day of the dispute resolution conference or be time barred. Submission of the dispute to the Director as outlined above is a condition precedent to the right to commence legal action to resolve any dispute. In the event that either party commences legal action to adjudicate any dispute without first submitting the dispute to the Director, the other party will be entitled to obtain an order dismissing the litigation without prejudice and awarding such other party any costs and attorney fees incurred by that party in obtaining the dismissal, including without limitation copy costs, and expert and consultant fees and expenses. Pending final resolution of a dispute hereunder, Contractor will proceed diligently with the performance of its obligations pursuant to this Agreement.

19. **Termination by Contractor.** In the event Owner materially breaches any term of the Contract Documents, Contractor will promptly give Written Notice of the breach to Owner. If Owner fails to cure the breach within ten (10) days of the Written Notice, Contractor may terminate this Agreement by giving Written Notice to Owner and recover from Owner the percentage of the Contract Sum represented by the Work completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation or damages as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor's indemnities and obligations as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

20. **Termination by Owner for Cause.** Should Contractor fail to timely provide Owner with the certificates of insurance, make a general assignment for the benefit of its creditors, fail to apply enough properly skilled workmen or specified materials to properly prosecute the Work in accordance with Contractor's schedule, or otherwise materially breach any provision of the Contract Documents, then Owner may, without any prejudice to any other right or remedy, give Contractor Written Notice thereof. If Contractor fails to cure its default within ten (10) days, Owner may terminate this Agreement by giving Written Notice to Contractor. In such case, Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor and/or take possession of the premises and all materials, tools, equipment, and appliances thereon, and finish the Work by whatever method Owner deems expedient. Contractor will not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, including compensation for additional administrative, architectural, consultant, and legal services (including without limitation attorney fees, expert fees, copy costs, and other expenses), such excess will be paid to Contractor, less any offsets. If such expense exceeds the unpaid balance, Contractor will pay the difference to Owner. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Without limitation, Contractor's indemnities and obligations as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

21. **Termination by Owner for Convenience.** Notwithstanding any other provision contained in the Contract Documents, Owner may, without cause and in its absolute discretion, terminate this Agreement at any time. In the event of such termination, Contractor will be entitled to recover from Owner the percentage of the Contract Sum equal to the percentage of the Work which Owner and/or its architect determines has been completed on the Project site as of the date of termination together with any out of pocket loss Contractor has sustained with respect to materials and equipment as a result of the termination prior to completion of the Work, less any offsets. Contractor will not be entitled to unearned profits or any other compensation as a result of the termination and hereby waives any claim therefor. Contractor will provide to Owner all warranty, as built, inspection, and other close out documents as well as materials that Contractor has in its possession or control at the time of termination. Owner may, in Owner's sole discretion, take legal assignment of subcontracts and other contractual rights of Contractor. Without limitation, Contractor's indemnities and obligations as well as all warranties relative to Work provided through the date of termination survive a termination hereunder.

22. **Enforcement.** In the event either party commences legal action to enforce or rescind any term of this Agreement, the prevailing party will be entitled to recover its attorney fees, costs and legal expenses, including without limitation all copy costs and expert and consultant fees and expenses, incurred in that action and on all appeals, from the other party.

23. **Ownership of Materials, Products, and Intellectual Property Rights.** Owner will retain ownership and intellectual property rights in all plans, designs, drawings, documents, concepts, and materials provided by or on behalf of Owner to Contractor and to all work products of Contractor and its subcontractors for products, services, and Work provided under this Agreement, such products, services, and Work of Contractor and its subcontractors constituting works made for hire. Neither Contractor nor its subcontractors will reuse any portion of such items provided by Owner or work products developed by Contractor or its subcontractors for Owner pursuant to this Agreement or disclose any such items to any third party without the prior written consent of Owner. Owner may withhold its consent in its absolute discretion. Contractor shall obtain the written agreement of each of its subcontractors to the terms of this section prior to permitting the subcontractor to perform any services contemplated by this Agreement.

24. **Comply with Intellectual Property Rights of Others.** Contractor represents and warrants that no Work or services (with its means, methods, goods, and services attendant thereto), provided to Owner will infringe or violate any right of any third party and that Owner may use and exploit such Work, means, methods, goods, and services without liability or obligation to any person or entity (specifically and without limitation, such Work, means, methods, goods, and services will not violate rights under any patent, copyright, trademark, or other intellectual property right or application for the same).

25. **Ownership and Use of Renderings and Photographs.** Renderings, photographs, and/or other images of or representing the services, Work, or any improvement on or relative to the Project Site, whether created before, during, or at completion of construction (and whether created by Owner, Contractor, or Contractor's subcontractors), are the property of the Owner. Contractor hereby transfers and assigns to Owner all ownership and intellectual property rights that Contractor and/or its subcontractors may have in and to all such renderings, photographs, and other images. The Owner reserves all rights including copyrights and other intellectual property rights to such renderings, photographs, and other images. No such renderings, photographs, or other images shall be used or distributed without written consent of the Owner.

26. **Public Statements.** Contractor will not make any statements or provide any information to the media about the Project or Work without the prior written consent of Owner. If Contractor receives any requests for information from media, Contractor will refer such requests to Owner.

27. **Confidentiality.** Contractor shall ensure that Contractor and its subcontractors, and the employees, agents and representatives of Contractor and its subcontractors, maintain in strict confidence, and shall use and disclose only as authorized by Owner all Confidential Information of Owner that Contractor receives in connection with the performance of this Agreement. Notwithstanding the foregoing, Contractor may use and disclose any information to the extent required by an order of any court or governmental authority, but only after it has notified Owner and Owner has had an opportunity to obtain reasonable protection for such information in connection with such disclosure. For purposes of this Agreement, "Confidential Information" means:
    a. The name or address of any affiliate, customer or contractor of Owner or any information concerning the transactions of any such person with Owner;
    b. Any contracts, agreements, business plans, budgets or other financial information, renderings, photographs, and materials provided by Owner, relating to the Work or any improvement on the Project Site to the extent such has not been made available to the public by the Owner;
    c. Any other information that is marked or noted as confidential at the time of its disclosure.

28. **No Commercial Use of Transaction or Relationship.** Without the prior written consent of Owner, which Owner may grant or withhold in its sole discretion, neither Contractor nor Contractor's affiliates, officers, directors, agents, representatives, shareholders, members, Subcontractors, or employees shall make any private commercial use of their relationship to Owner or the Project, including, without limitation:
    a. By referring to the Owner or Project verbally or in any sales, marketing or other literature, letters, client lists, press releases, brochures or other written materials except as may be necessary for Contractor to perform Contractor's obligations under the terms of this Agreement;
    b. By using or allowing the use of any photographs of the Work or Project or any part thereof, or of any service marks, trademarks or trade names or other intellectual property now or which may hereafter be associated with, owned by or licensed by Owner, in connection with any work, service or product; or
    c. By contracting with or receiving money or anything of value from any person or commercial entity to facilitate such person or entity obtaining any type of commercial identification, advertising or visibility in connection with the Owner or Project.

    Notwithstanding the foregoing, Contractor may include a reference to Owner or the Project in a professional résumé or other similar listing of Contractor's references without seeking Owner's written consent in each instance, provided that such reference to Owner or the Project is included with at least several other similar references to projects of different owners and is given no more prominence than such other references.

29. **Entire Agreement.** This Agreement contains the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral, relating to the Project. This Agreement may be amended only by a writing signed by both parties. This Agreement will not be construed to create a contractual relationship of any kind between any persons or entities other than Owner and Contractor.

30. **Assignment.** Contractor will not assign any right or obligation hereunder without the prior written consent of

the Owner, which consent may be granted or withheld in Owner's absolute discretion.

31. **Governing Law.** The parties acknowledge that the Contract Documents have substantial connections to the State of Utah. The Contract Documents will be deemed to have been made, executed, and delivered in Salt Lake City, Utah. To the maximum extent permitted by law, (i) the Contract Documents and all matters related to their creation and performance will be governed by and enforced in accordance with the laws of the State of Utah, excluding conflicts of law rules, and (ii) all disputes arising from or related to the Contract Documents will be decided only in a state or federal court located in Salt Lake City, Utah and not in any other court or state. Toward that end, the parties hereby consent to the jurisdiction of the state and federal courts located in Salt Lake City, Utah and waive any other *venue* to which they might be entitled by virtue of domicile, habitual residence, place of business, or otherwise.

32. **Effective Date.** The effective date of this Agreement is the date indicated by Owner's signature.

OWNER:	**CONTRACTOR:**
The Church of Jesus Christ of Latter-day Saints, a Utah corporation sole	
Signature:	Signature:
Print Name:	Print Name:
Title:	Title:
Address:	Address:
Telephone No:	Telephone No:
Facsimile No:	Facsimile No:
Email:	Email:
Effective Date:	Fed. I.D. or SSN:
	License No:
Reviewed By:	Date Signed:

SUPPLEMENTARY CONDITIONS

FOR SMALL PROJECT AGREEMENT BETWEEN OWNER AND CONTRACTOR (U.S.)

ITEM 1 - GENERAL

1. Conditions of the Small Project Agreement Between Owner and Contractor (U.S.) apply to each Division of the Specifications.

2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

ITEM 2 - LIQUIDATED DAMAGES PAYABLE TO OWNER

This section may be included as a separate additional paragraph to the Small Project Agreement Between Owner and Contractor (U.S.), at Owner's discretion:

Delay in Completion of the Work. For each day after the expiration of the designated Time of Completion that Contractor has not completed the Work, Contractor will pay Owner the amount of One Hundred Fifty dollars ($200.00) per day as liquidated damages for Owner's loss of use and the added administrative expense to Owner to administer the Project during the period of delay. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorneys' fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay. Owner may deduct any liquidated damages or reimbursable expenses from any money due or to become due to Contractor. If the amount of liquidated damages and reimbursable expenses exceeds any amounts due to Contractor, Contractor will pay the difference to Owner within ten (10) days after receipt of a written request from Owner for payment.

ITEM 3 - PERMITS

1. Delete Number 11 of the Small Project Agreement and replace with the following:

   A. Contractor will obtain and pay for the building permit, and all other permits, governmental fees, and inspections necessary for the proper execution and completion of the Work. Do not include these fees in the Bid Amount. The Owner will reimburse the Contractor for the payment of these permits and fees. The reimbursement of these permits and fees will not be part of and will be processed separately from the project's Contract Sum.

ITEM 4 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

Utah

UTAH STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Contractors should be exempt on purchases of material installed or converted into real property to be used by the Owner. The Contractor will furnish each vendor with a completed Exemption Certificate Form TC-721. The certificate will be prepared by the Contractor for each vendor in order to obtain the exemption.

2. The Owner's tax exempt number is 11871701-002-STC.

UTAH NOTICE OF INTENT TO OBTAIN FINAL COMPLETION:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

A. Contractor shall file with the State Construction Registry, on its own behalf and/or on behalf of Owner, a notice of intent to obtain final completion at least 45 days before the day on which the Owner or Contractor files or could file a notice of completion under Utah Code Ann. Section 38-1a-506 if:
    1. The completion of performance time under the original contract for construction work is greater than 120 days;
    2. The total original construction contract price exceeds $500,000; and
    3. The original contractor or owner has not obtained a payment bond in accordance with Utah Code Ann. Section 14-2-1.

UTAH NOTICE OF COMPLETION:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

A. Within five (5) calendar days of final completion of the Project and in compliance with Section 38-1a-507 Utah Code Annotated, Contractor shall file with the State Construction Registry, and copy to Owner, a notice of completion which shall include, without limitation, the following:
    1. The name, address, telephone number, and email address of the person filing the notice of completion;
    2. The name of the county in which the Project and/or Project site is located;
    3. The date on which final completion is alleged to have occurred;
    4. The method used to determine final completion; and
    5. One of the following:
        a. The tax parcel identification number of each parcel included in the Project and/or Project site;
        b. The entry number of a preliminary notice on the same project that includes the tax parcel identification number of each parcel included in the Project and/or Project site; or
        c. The entry number of the building permit issued for the Project.
B. Notwithstanding any other provision of the Contract Documents to the contrary, Contractor and Owner agree that any breach or failure to comply with this Section by the Contractor will constitute a breach of contract and the Contractor will be liable for any direct, indirect, or consequential damages to the Owner flowing from this breach.

UTAH STATE PROGRESS PAYMENTS AND FINAL PAYMENT:

Replace paragraph 5 of the Small Project Agreement Between Owner and Contractor (U.S.) with the following:

5. <u>Payment</u>

a. If the Contractor's Bid Proposal Amount is over $100,000, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner, will be used as a basis for reviewing Contractor's payment requests.
b. Progress Payments: Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor progress payments for work completed within fifteen (15) days after Owner receives:
    1. Contractor's progress payment request for work to date;
    2. A certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
    3. Conditional Waiver and Release Upon Progress Payment documents submitted by Contractor (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's progress payment request.

c. Final Payment: Owner will make full and final payment of the Contract Sum due within thirty (30) days of the completion of all of the following requirements:
   1. Contractor has submitted its final payment request;
   2. Contractor has submitted a certification that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the final payment request; and
   3. Contractor has submitted Waiver and Release Upon Final Payment documents (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's final payment request.

   Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made to Owner in writing and identified by Contractor in its affidavit as still pending.
   If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

d. Owner may modify or reject any payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.

e. Upon receipt of any payment from Owner, Contractor will pay to each Subcontractor the amount paid to Contractor on account of such Subcontractor's portion of the Work.

f. Contractor will maintain a copy of each payment request at the Project site for review by the Subcontractors.

g. No payment made, either in whole or in part, by Owner will be construed to be an acceptance of defective or improper materials or workmanship.

END OF DOCUMENT

DIVISION 01

SECTION 01 0000

GENERAL REQUIREMENTS: R&I PROJECT

SECTION 01 1000 SUMMARY

A. Work Covered By Contract Documents:
   1. Provisions contained in Division 01 apply to all other sections and divisions of Specifications. All instructions contained in Specifications are directed to Contractor. Unless specifically provided otherwise, all obligations set forth in Specifications are obligations of Contractor.
   2. Comply with applicable laws and regulations.
B. Work By Owner:
   1. Owner will furnish and install some portions of the Work with its own forces. Complete the Work necessary to accommodate the Work to be performed by Owner before scheduled date for performance of such Work.
   2. Owner may provide furnishings and/or equipment for Project. Contractor will receive, store, and protect such items on site until the date Owner accepts Project.

SECTION 01 1200 MULTIPLE CONTRACT SUMMARY

A. Separate Contracts:
   1. Contracts may be issued by Owner for performance of certain construction operations at Project site.
   2. Contractor will afford other contractors reasonable opportunity to place and store their materials and equipment on site and to perform their work and will properly connect and coordinate its work with theirs where applicable:

SECTION 01 1400 WORK RESTRICTIONS

A. Project Conditions:
   1. During construction period, Contractor will have use of premises for construction operations. Contractor will ensure that Contractor, its employees, subcontractors, and employees comply with following requirements:
      a. Confine operations to areas within Contract limits shown on Drawings. Do not disturb portions of site beyond Contract limits.
      b. Do not allow alcoholic beverages, illegal drugs, or persons under their influence on Project Site.
      c. Do not allow use of tobacco in any form on Project Site.

d. Do not allow pornographic or other indecent materials on site.
e. Do not allow work on Project Site on Sundays except for emergency work.
f. Refrain from using profanity or being discourteous or uncivil to others on Project Site or while performing The Work.
g. Wear shirts with sleeves, wear shoes, and refrain from wearing immodest, offensive, or obnoxious clothing, while on Project Site.
h. Do not allow playing of obnoxious and loud music on Project Site. Do not allow playing of any music within existing facilities.
i. Do not build fires on Project Site.
j. Do not allow weapons on Project Site, except those carried by law enforcement officers and/or other uniformed security personnel who have been retained by Owner or Contractor to provide security services.

2. Existing Facilities:
   a. If Owner will occupy existing building, reasonably accommodate use of existing facilities by Owner.

SECTION 01 3000 ADMINISTRATIVE REQUIREMENTS

A. Administrative Requirements:
   1. Coordination:
      a. Coordinate construction activities to ensure efficient and orderly installation of each part of the Work.
      b. Coordinate construction operations that are dependent upon each other for proper installation, connection, and operation.
      c. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

SECTION 01 3100 PROJECT MANAGEMENT AND COORDINATION

A. Multiple Contract Coordination:
   1. Contractor shall be responsible for coordination of Temporary Facilities and Controls, Construction Waste Management and Disposal services, and Final Cleaning for entire Project unless directed otherwise by Owner's Representative for those who perform work on Project from Notice to Proceed to date of Substantial Completion.

B. Project Meetings And Conferences:
   1. Attend preconstruction conference and organizational meeting scheduled by Architect or Owner Representative at Project site or other convenient location.
   2. Be prepared to discuss items of significance that could affect progress, including such topics as:
      a. Construction schedule, equipment deliveries, general inspection of tests, preparation of record documents and O&M manuals, project cleanup, security, shop drawings, samples, use of premises, work restrictions, and working hours.
   2. Pre-Installation Conferences.
      a. Attend pre-installation conferences specified in Contract Document.

SECTION 01 3300 SUBMITTAL PROCEDURES

A. Submittal Procedure:
   1. Coordination: Coordination preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently before performance of related construction activities to avoid delay.
   2. Process Time: Allow sufficient review time so installation will not be delayed by time required to process submittals.
   3. Identification: Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
   4. Transmittal: Package each submittal appropriately for transmittal and handling.

B. Action Submittals:
   1. Product Data: Submit product data, as required by individual Sections of Specifications.
   2. Shop Drawings: Submit shop drawings for review and designate (stamp) approval of shop drawings.

3. Samples: Samples used for comparison with actual component to be installed. Samples when accepted will be used for quality comparisons throughout course of construction.

C. Informational Submittals:
1. Informational submittals are design data, test reports, certificates, manufacturer's instructions, manufacturer's field reports, and other documentary data affirming quality of products and installations.
a. Return copies or PDF files marked with action taken and with corrections or modifications required.

D. Closeout Submittals:
1. Submittals that occur during project closeout.

SECTION 01 3500 SPECIAL PROCEDURES

A. Quality Assurance:
1. Hot Work Permit (Available from Owner's Representative):
a. Required for doing hot work involving open flames or producing heat or sparks such as:
1) Brazing.
2) Cutting.
3) Grinding.
4) Soldering.
5) Thawing pipe.
6) Torch applied roofing.
7) Welding.

SECTION 01 4000 QUALITY REQUIREMENTS

A. Administrative Requirements:
1. Conflicting Requirements:
a. If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement.
2. Minimum Quantity or Quality Levels:
a. Quantity or quality level shown or specified shall be the minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.
3. Submit to Owner permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records establishing compliance with standards and regulations bearing upon performance of the Work.

B. Quality Assurance:
1. Testing and inspecting services are used to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
2. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to verify compliance and guard against defects and deficiencies and substantiate that proposed construction will comply with requirements. Owner or Owner’s designated representative(s) will perform quality assurance to verify compliance with Contract Documents.
3. Notify Owner immediately if asbestos-containing materials or other hazardous materials are encountered while performing the Work.

C. Quality Control:
1. Quality Control Services:
a. Quality Control will be sole responsibility of Contractor.
1) Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements performed by Contractor.
a) They do not include inspections, tests or related actions performed by Architect or Owner Representative, governing authorities or independent agencies hired by Owner or Architect.

b) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.

2) Where services are indicated as Contractor's responsibility, engage qualified Testing Agency to perform these quality control services:

a) Contractor will not employ same testing entity engaged by Owner, without Owner's written approval.

D. Repair And Protection:
1. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
2. Protect construction exposed by or for Quality Assurance and Quality Control activities.
3. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

SECTION 01 4301 QUALITY ASSURANCE - QUALIFICATIONS

A. Qualifications: Qualifications in this Section establish minimum qualification levels required; individual Specification Sections specify additional requirements:
1. Fabricator / Supplier / Installer Qualifications:
a. Firm experienced in producing products similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units:
1) Where heading *'VMR (Value Managed Relationship) Suppliers / Installers*' is used to identify list of specified suppliers or installers, Owner has established relationships that extend beyond requirements of this Project. No other suppliers / installers will be acceptable. Follow specified procedures to preserve relationships between Owner and specified suppliers / installers and advantages that accrue to Owner from those relationships.
2) Where heading 'Acceptable or Approved Suppliers / Installers / Fabricators' is used to identify list of specified suppliers / installers / fabricators, use only one of listed suppliers / installers / fabricators. No others will be acceptable.
2. Factory-Authorized Service Representative Qualifications:
a. Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
3. Installer Qualifications:
a. Firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with record of successful in-service performance.
4. Manufacturer Qualifications:
a. Firm experienced in manufacturing products or systems similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
5. Manufacturer's Field Services Qualifications:
a. Experienced authorized representative of manufacturer to inspect field-assembled components and equipment installation, including service connections.
6. Professional Engineer Qualifications:
a. Professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated:
1) Engineering services are defined as those performed for installations of system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
7. Specialists:
a. Certain sections of Specifications require that specific construction activities will be performed by entities who are recognized experts in those operations:
1) Specialists will satisfy qualification requirements indicated and will be engaged for activities indicated.
2) Requirement for special will not supersede building codes and regulations governing the Work.
8. Testing Agency Qualifications:

a. Independent Testing Agency with experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
b. Testing Laboratory:
   1) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
   2) Cement and Concrete Reference Laboratory (CCRL).
   3) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
   4) National Voluntary Laboratory (NVLAP): Testing Agency accredited according to National Institute of Standards and Technology (NIST) Technology Administration, U. S. Department of Commerce Accreditation Program.

SECTION 01 4523 TESTING AND INSPECTION SERVICES

A. Submittals:
1. Certificates: Testing Agency will submit certified written report of each inspection, test, or similar service.
2. Tests and Evaluation Reports:
   a. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies to Owner's Representative and to each of following if involved on project: Architect, Consulting Engineers (Engineer of Record), General Contractor, Authorities Having Jurisdiction (if required).
3. Testing Agency:
   a. Qualifications of Testing Agency management, personnel, inspector and technicians designated to project.
   b. Provide procedures for non-destructive testing, equipment calibration records, personnel training records, welding inspection, bolting inspection, shear connector stud inspection, and seismic connection inspections.

B. Quality Assurance:
1. Owner or Owner's designated representative(s) will perform quality assurance. Owner's quality assurance procedures may include observations, inspections, testing, verification, monitoring and any other procedures deemed necessary by Owner to verify compliance with Contract Documents.
2. Owner will employ independent Testing Agencies to perform certain specified testing, as Owner deems necessary.
3. Certification:
   a. Product producers and associations, which have instituted approved systems of quality control and which have been approved by document approval agencies, are not required to have further testing.
   b. Concrete mixing plants, plants producing fabricated concrete and wood or plywood products certified by agency, lumber, plywood grade marked by approved associates, and materials or equipment bearing underwriters' laboratory labels require no further testing and inspection.
4. Written Practice for Quality Assurance:
   a. Testing Agency will maintain written practice for selection and administration of inspection personnel, describing training, experience, and examination requirements for qualification and certification of inspection personnel.
   b. Written practice will describe testing agency procedures for determining acceptability of structure in accordance with applicable codes, standards, and specifications.
   c. Written practice will describe Testing Agency inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.

C. Quality Control:
1. Quality Control will be sole responsibility of Contractor. Contractor will be responsible for testing, coordination, start-up, operational checkout, and commissioning of all items of the Work included in Project. All costs for these services will be included in Contractor's cost of the Work.
2. Notify results of all Testing and Inspection performed by Contractor's independent Testing Agencies to Architect and/or Owner's Representative within 24 hours of test or inspection having been performed:
   a. Testing and Inspection Reports will be distributed as follows:
      1) 1 copy to Owner's Representative.

2) 1 copy to Architect.
3) 1 copy to Consulting Engineer(s) (Engineer of Record).
4) 1 copy to Authorities Having Jurisdiction (if required).

3. Contractor's Responsibility:
   a. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents.
   b. Tests and inspections that are not explicitly assigned to Owner are responsibility of Contractor.
   c. Cooperate with Testing Agency(s) performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify Testing Agency before operations to allow assignment of personnel. Auxiliary services required include but are not limited to:
      1) Providing access to the Work and furnishing incidental labor, equipment, and facilities deemed necessary by Testing Agency to facilitate inspections and tests at no additional cost to Owner.
      2) Taking adequate quantities of representative samples of materials that require testing or helping Testing Agency in taking samples.
      3) Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
      4) Providing Testing Agency with preliminary design mix proposed for use for materials mixes that require control by Testing Agency.
   d. For any requested inspection, Contractor will complete prior inspections to ensure that items are ready for inspection.
   e. All Work is subject to testing and inspection and verification of correct operation.
   f. Comply:
      1) Upon completion of Testing Agency's inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
      2) Comply with Contract Documents in making such repairs.
   g. Data:
      1) Furnish records, drawings, certificates, and similar data as may be required by testing and inspection personnel to assure compliance with Contract Documents.
   h. Defective Work (Non-Conforming Work): Non-conforming Work as covered in General Conditions applies, but is not limited to following requirements Protection:
      1) Where results of inspections, tests, or similar services show that the Work does not comply with Contract Document requirements, correct deficiencies in the Work promptly to avoid work delays.
      2) Where testing personnel take cores or cut-outs to verify compliance, repair prior to acceptance.
      3) Contractor will be responsible for any and all costs incurred resulting from inspection that was scheduled prematurely or retesting due to failed tests.
      4) Remove and replace any Work found defective or not complying with contract document requirements at no additional cost to Owner.
      5) Should test return unacceptable results, Contractor will bear all costs of retesting and re-inspection as well as cost of all material consumed by testing, and replacement of unsatisfactory material and/or workmanship.
   i. Protection:
      1) Protect construction exposed by or for quality assurance and quality control service activities, and protect repaired construction.
   j. Scheduling: Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities:
      1) Schedule testing and inspections in advance so as not to delay the Work and to eliminate any need to uncover the Work for testing or inspection.
      2) Notify Testing Agency and Architect or Owner as noted in Sections in Division 01 thru Division 50 prior to any time required for such services.
      3) Incorporate adequate time for performance of all inspections and correction of noted deficiencies.
      4) Schedule sequence of activities to accommodate required services with minimum of delay.
      5) Schedule sequence of activities to avoid necessity of removing and replacing construction to accommodate testing and inspections.
   k. Test and Inspection Log:
      1) Provide system of tracking all field reports, describing items noted, and resolution of each item. Prepare record of tests and inspections. Include following requirements:

(a) Date test or inspection was conducted.
(b) Description of the Work tested or inspected.
(c) Date test or inspection results were transmitted to Architect or Owner Representative.
(d) Identification of Testing Agency or inspector conducting test or inspection.

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

D. Tests And Inspections - General:
1. Testing specifically identified to be conducted by Owner, will be performed by an independent entity and will be arranged and paid for by Owner.
2. Individual Sections in Division 01 through Division 50 indicate if Owner will provide testing and inspection of the Work of that Section.
3. Owner may engage additional consultants for testing, air balancing, commissioning, or other special services:
   a. Activities of any such Owner consultants are in addition to Contractor testing of materials or systems necessary to prove that performance is in compliance with Contract requirements.
   b. Contractor must cooperate with persons and firms engaged in these activities.
4. Tests include but not limited to those described in detail in 'Field Quality Control' in Part 3 of Individual Sections in Divisions 01 through Division 50.
5. Taking Specimens:
   a. Only testing laboratory shall secure, handle, transport, or store any samples and specimens for testing.
6. Scheduling Testing Agency:
   a. Contractor will coordinate the Work and facilitate timeliness of such testing and inspecting services so as not to delay the Work.
   b. Contractor will notify Testing Agency and Architect or Owner Representative to schedule tests and / or inspections.

E. Testing Agency Services And Responsibility:
1. Testing Agency, including independent testing laboratories, will be licensed and authorized to operate in jurisdiction in which Project is located:
   a. Approved Testing Agency Qualifications: Requirements of Section 01 4301 apply.
2. Testing and Inspection Services:
   a. Testing Agency will not release, revoke, alter, or increase Contract Document requirements or approve or accept any portion of the Work.
   b. Testing Agency will not give direction or instruction to Contractor.
   c. Testing Agency will have full authority to see that the Work is performed in strict accordance with requirements of Contract Documents and directions of Owner's Representative and/or Architect.
   d. Testing Agency will not provide additional testing and inspection services beyond scope of the Work without prior approval of Owner's Representative and/or Architect.
3. Testing Agency Duties:
   a. Independent Testing Agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification Sections will cooperate with Architect or Owner Representative and Contractor in performance of its duties and will provide qualified personnel to perform required inspections and tests.
   b. Testing Agency will test or obtain certificates of tests of materials and methods of construction, as described herein or elsewhere in technical specification.
   c. Testing Agency will provide management, personnel, equipment, and services necessary to perform testing functions as outlined in this section.
   d. Testing Agency must have experience and capability to conduct testing and inspecting indicated by ASTM standards and that specializes in types of tests and inspections to be performed.
   e. Testing Agency will comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D3666, ASTM D3740, and other relevant ASTM standards.
   f. Testing Agency must calibrate all testing equipment at reasonable intervals (minimum yearly) with accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
   g. Welding Procedure Review: Testing Agency will provide review and approval or rejection of all welding procedures to be used and verify compliance with all reference standard requirements.

4. Testing and Inspection Reports:
    a. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
    b. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
        1) Description of method of test.
        2) Identification of sample and portion of the Work tested:
            (a) Description of location in the Work of sample.
            (b) Time and date when sample was obtained.
            (c) Weather and climatic conditions at time when sample was obtained.
        3) Evaluation of results of tests including recommendations for action.
    c. Inspection Reports:
        1) Testing Agency will furnish “Inspection at Site” reports for each site visit documenting activities, observations, and inspections.
        2) Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
    d. Reporting Testing and Inspection (Conforming Work):
        1) Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
    e. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
        1) Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:
            (a) Verbally notify results to Architect, Contractor, and Owner’s Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
            (b) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
    f. Final Report:
        1) Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

F. Architect's Responsibility:
    1. Architect Duties:
        a. Notify Owner’s Representative before each test and/or inspection:

G. Field Quality Control:
    1. Field Tests And Inspections:
        a. Field Test and Inspection requirements are described in detail in ‘Field Quality Control’ in Part 3 Execution' of individual Sections in Division 01 thru Division 49.

SECTION 01 5000 TEMPORARY FACILITIES AND CONTROLS

A. Administrative Requirements:
    1. Contractor is responsible for security of materials, tools, and equipment. Do not permit others to use building keys provided by Owner. Safeguard building and contents while the Work is being performed and secure building when the Work is finished for day.
    2. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and reduce possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result:
        a. Avoid use of tools and equipment that produce harmful noise.
        b. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near site.
        c. Protect the Work, materials, apparatus, and fixtures from injury due to weather, theft, and vandalism.
    3. Existing restroom facilities may be used by Contractor. Clean restrooms and portions of existing building used in accessing restrooms daily. If existing facilities are not usable, provide and maintain temporary sanitary toilet.

B. Temporary Barriers And Enclosures:
   1. Protect existing trees and plants. Remove and replace vegetation that dies or is damaged beyond repair due to construction activities.
   2. Erect adequate barricades, warning signs, and lights necessary to protect persons from injury or harm.
   3. Provide temporary enclosures at exterior building openings for security and protection from weather, theft, and vandalism. Erect and maintain dust-proof partitions and enclosures as required to prevent spread of dust and fumes to occupied portions of building.
   4. Proprietary Camera Services: In its absolute discretion, and with or without notice to Contractor, Owner may provide from time to time, but is not obligated to provide, one or more cameras on or about Project site and/or signage or notices of the same:
      a. If provided by Owner, such camera(s) and/or signage and notices are solely for Owner's benefit and convenience and shall not be for benefit of Contractor, Subcontractor(s) or for any third person.
      b. Owner shall have no liability, obligation, or responsibility to Contractor, Subcontractors, or any third person relative to such camera(s), signage, or notices, or absence of camera(s), signage, or notices, including without limitation, installation, maintenance, operation, repair, testing, functionality, capacity, recording, monitoring, posting, etc., of the same (hereafter 'Proprietary Camera Services').
      c. Contractor, with Owner's prior consent (which shall not be unreasonably withheld), may relocate such camera(s), signage, or notices as necessary to not unreasonably, materially and physically interfere with work at Project Site.
      d. Contractor's obligations under Contract Documents, including but not limited to, Contractor's obligation for security of Project Site, are not modified by Owner's opportunity to provide, actually providing, or not providing Proprietary Camera Services and/or signage or notices regarding the same.
      e. This Specification Section does not preclude Contractor from providing its own camera(s), signage, or notices pursuant to terms and conditions of this Agreement. Neither does this Section reduce, expand or modify any other right or obligation of Owner pursuant to terms of this Agreement.

C. Utilities:
   1. Electrical Power: Owner will provide electric power for construction activities within limits available at existing facility.
   2. Fire Protection: Exercise caution to avoid fire damage: Do not build fires on site.
   3. Heating, Cooling, And Ventilation:
      a. Permanent mechanical system may be operated upon following conditions:
         1) Do not interfere with normal set-back temperature patterns except as approved by Project Manager.
         2) Do not operate system when the Work causing airborne dust is occurring or when dust caused by such Work is present without first installing temporary filtering system.
   4. Lighting: Existing lighting system may be used by Contractor.
   5. Water Service: Contractor will use existing water supply for construction purposes to extent of existing facilities.

SECTION 01 6100 COMMON PRODUCT REQUIREMENTS

A. Administrative Requirements:
   1. Provide products that comply with Contract Documents, are undamaged, and, unless otherwise indicated, are new and unused at time of installation. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

SECTION 01 6200 PRODUCT OPTIONS

A. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include:
   1. Substitutions And Equal Products:
      a. Generally speaking, substitutions for specified products and systems, as defined in Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
      b. Approved Products / Manufacturers / Suppliers / Installers:
         1) Category One:

(a) Owner has established 'Value Managed Relationships' that extend beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
(b) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.

2) Category Two:
(a) Owner has established National Contracts that contain provisions extending beyond requirements of this Project. No substitutions or equal products will be allowed on this Project.
(b) Follow specified procedures to preserve relationships between Owner and specified manufacturers / suppliers and advantages that accrue to Owner from those relationships.

3) Category Three:
(a) Specified products are provided to Church Projects under a National Account Program. Use these products to preserve advantages that accrue to Owner from those programs. No substitutions or equal products will be allowed on this Project.

4) Category Four:
(a) Provide only specified products available from manufacturers listed. No substitutions, private-labeled, or equal products, or mixing of manufacturers' products is allowed on this Project.
(b) In Sections where lists recapitulating Manufacturers previously mentioned in Section are included under heading '*Manufacturers*' or '*Approved Manufacturers*', this is intended as convenience to Contractor as listing of contact information only. It is not intended that all manufacturers in list may provide products where specific products and manufacturers are listed elsewhere in Section.

c. Acceptable Products / Manufacturers / Suppliers / Installers:
1) Type One: Use specified products / manufacturers unless approval to use other products / manufacturers has been obtained from Architect or Owner Representative by Addendum.
2) Type Two: Use specified products / manufacturers unless approval to use other products and manufacturers has been obtained from Architect or Owner Representative in writing before installing or applying unlisted or private-labeled products.
3) Use 'Equal Product Approval Request Form' to request approval of equal products, manufacturers, or suppliers before bidding or before installation, as noted in individual Sections.

d. Quality / Performance Standard Products / Manufacturers:
1) Class One: Use specified product / manufacturer or equal product from specified manufacturers only.
2) Class Two: Use specified product / manufacturer or equal product from any manufacturer.
3) Products / manufacturers used will conform to Contract Document requirements.

SECTION 01 6400 OWNER-FURNISHED PRODUCTS

A. Administrative Requirements:
1. Install items furnished by Owner or receive and store in safe condition items purchased directly by Owner according to requirements of Contract Documents.

SECTION 01 6600 DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

A. Administrative Requirements:
1. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.

B. Delivery, Storage, and Handling:
1. Delivery and Acceptable Requirements:
a. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
b. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
c. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

d. Inspect products upon delivery to ensure compliance with Contract Documents, and to ensure that products are undamaged and properly protected.

2. Storage and Handling Requirements:
   a. Store products at site in manner that will simplify inspection and measurement of quantity or counting of units.
   b. Store heavy materials away from Project structure so supporting construction will not be endangered.
   c. Store products subject to damage by elements above ground, under cover in weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

SECTION 01 7000 EXECUTION REQUIREMENTS

A. Administrative Requirements:
   1. Require installer of each major component to inspect both substrate and conditions under which the Work is to be done:
      a. Notify Owner in writing of unsatisfactory conditions.
      b. Do not proceed until unsatisfactory conditions have been corrected.

B. Common Installation Provisions:
   1. Provide attachment and connection devices and methods necessary for securing the Work:
      a. Secure the Work true to line and level.
      b. Allow for expansion and building movement.
   2. Recheck measurements and dimensions before starting each installation.
   3. Design, furnish, and install all shoring, bracing, and sheathing as required for safety and for proper execution of the Work and, unless otherwise required, remove same when the Work is completed.
   4. Where mounting heights are not shown, install individual components at standard mounting heights recognized within industry or local codes for that application. Refer questionable mounting height decisions to Owner for final decision.

C. Protection:
   1. Cover and protect furniture, equipment, and fixtures from soiling and damage when demolition the Work is performed in rooms and areas from which such items have not been removed.

D. Completion Inspection:
   1. Upon 100 percent completion of Project, Contractor will request Substantial Completion Inspection.
   2. Owner will conduct Substantial Completion Inspection in presence of Contractor and furnish list of items to be corrected.
   3. Contractor will notify Owner in writing when items have been corrected.

SECTION 01 7400 CLEANING AND WASTE MANAGEMENT

A. Disposal Of Waste:
   1. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in landfill or incinerator acceptable to authorities having jurisdiction:
      a. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
      b. Remove and transport debris in manner that will prevent spillage on adjacent surfaces and areas.
   2. Burning: Do not burn waste materials.
   3. Disposal: Transport waste materials off Owner’s property and legally dispose of them.

B. Progress Cleaning:
   1. Keep premises broom-clean during progress of the Work.
   2. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.
   3. Clean and maintain completed construction as frequently as necessary throughout construction period.

4. Remove waste materials and rubbish caused by employees, subcontractors, and contractors under separate contract with Owner and dispose of legally.

C. Final Cleaning:
1. Clean each surface or unit to condition expected in normal, commercial-building cleaning and maintenance program. Comply with manufacturer's instructions. Remove all rubbish from under and about building and leave building clean and habitable.
2. In addition to general cleaning noted above, perform cleaning for all trades at completion of the Work in areas where construction activities have occurred.
3. If Contractor fails to clean up, Owner may do so and charge cost to Contractor.

SECTION 01 7700 CLOSEOUT PROCEDURES

A. General:
1. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.
2. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.
3. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect / Owner's Representative and included on Certificate of Substantial Completion.

B. Preliminary Closeout Review:
1. When Architect, Owner and Contractor agree that project is ready for closeout, Pre-Substantial Inspection shall be scheduled. Preparation of floor substrate to receive carpeting and any work which could conceivably damage or stain carpet must be completed, as carpet installation will be scheduled immediately following this inspection.
2. Prior to this inspection, completed test and evaluation reports for HVAC system and font, where one occurs, are to be provided to Project Manager, Architect, and applicable consultants.
3. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
    a. Punch list of items requiring completion and correction will be created.
    b. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

C. Substantial Completion Inspection:
1. When Architect, Owner and Contractor agree that project is ready for Substantial Completion, an inspection is held. Punch list created at Pre-Substantial Inspection is to be substantially complete.
2. Prior to this inspection, Contractor shall discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.
3. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
    a. Date of Substantial Completion.
    b. Punch List Work not yet completed, including seasonal and long lead items.
    c. Amount to be withheld for completion of Punch List Work.
    d. Time period for completion of Punch List Work.
    e. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List Work within time set forth in Certificate.
4. Contractor shall present Closeout Submittals to Architect and place tools, spare parts, extra stock, and similar items required by Contract Documents in locations as directed by Facilities Manager.

D. Final Acceptance Meeting:
1. When punch list items except for any seasonal items or long lead items which will not prohibit occupancy are completed, Final Acceptance Meeting is held.
2. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:

a. All seasonal and long lead items not prohibiting occupancy, if any, are identified, with committed to completion date and amount to be withheld until completion.
b. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
c. Final cleaning requirements have been completed.

3. If applicable, once any seasonal and long lead items are completed, Closeout Inspection is held where Owner and Architect verify that The Work has been satisfactorily completed, and Owner, Architect and Contractor execute Closeout portion of the Project Closeout - Final Acceptance form.
4. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

SECTION 01 7800 CLOSEOUT SUBMITTALS

A. Administrative Requirements:
1. Project Record Documents:
a. Do not use record documents for construction purposes:
1) Protect from deterioration and loss in secure, fire-resistive location.
2) Provide access to record documents for reference during normal Working hours.
b. Maintain clean, undamaged set of Drawings. Mark set to show actual installation where installation varies from the Work as originally shown. Give particular attention to concealed elements that would be difficult to measure and record at later date:
1) Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
2) Mark new information that is important to Owner, but was not shown on Contract Drawings.
3) Note related Change Order numbers where applicable.
2. As Built Record Drawings:
a. Provide two full-size sets of prints and PDF file of As Built Record Drawings to Facilities Management Office, printed from the updated AutoCAD drawing files or updated Revit model files, as specified by Owner, that have been modified to show actual dimensions and location of equipment, material, utility lines, and other work as actually constructed, based upon information provided by Contractor. Architect will submit updated As Built Record Drawings in PDF (ISO32000 format) to Owner. In addition, Architect will submit to Owner updated AutoCAD as built record drawing files with associated plot style tables or the Revit as built record model files, as specified by Owner.

B. Operations And Maintenance Manual:
1. General:
a. Include closeout submittal documentation as required by Contract Documentation. Include only closeout submittals as defined in individual specification section.
b. Submittal Format: Digital copies unless otherwise noted, required for each individual specification section that include 'Closeout Submittals'.
2. Project Manual:
c. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
(1) Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
(2) Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.
3. Maintenance Contracts: (digital format only).
4. Operations and Maintenance Data (digital format only):
a. Operations and maintenance submittals includes cleaning instructions, maintenance instructions, operations instructions, equipment list, and parts lists.
5. Warranty Documentation: Digital format of final, executed warranties.
6. Record Documentation:
a. Documentation includes Certifications, color and pattern selections, Design Date, Geotechnical Evaluation Reports (soils reports), Manufacture Reports, Literature or cut sheets, Shop Drawings, Source Quality Control, Special Procedures, and Testing and Inspection Reports.
7. Software: Audio and Video System software, programming and set-files.

8. Irrigation Plan: Laminated and un-laminated reduced sized hard copies.
9. Landscape Management Plan (LMP):
   a. Irrigation Section:
      (1) Documentation required by Sections under 32 8000 Heading: Irrigation.
   b. Landscaping Section:
      (1) Documentation required by Sections under 32 8000 Heading: Irrigation.

C. Warranties:
1. When written guarantees beyond one (1) year after substantial completion are required by Contract Documents, secure such guarantees and warranties properly addressed and signed in favor of Owner. Include these documents in Operations & Maintenance Manual(s) specified above.
2. Delivery of guarantees and warranties will not relieve Contractor from obligations assumed under other provisions of Contract Documents.

END OF SECTION

SECTION 02 4119

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Demolition and removal of selected portions of building or structure.
   2. Salvage of existing items to be reused or recycled.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 241, 'Standard for Safeguarding Construction, Alteration, and Demolition Operations', 2013 Edition.
   2. American Society of Safety Engineers:
      a. ASSE A10.6-2006, 'Safety Requirements for Demolition Operations'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Storage or sale of removed items or materials will not be permitted on-site.

B. Pre-Installation Conference:
   1. Before beginning Selective Demolition work, in addition to requirements of Section 01 3100, meet on site to confirm work to be demolished, items to be salvaged or reused, and coordination with Owner.

C. Scheduling:
   1. Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, on Schedule specified in Section 01 3200.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Special Procedure Submittals:
      a. Inventory:
         1) After selective demolition is complete, submit list of items that have been removed and salvaged.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Comply with governing EPA notification regulations before beginning selective demolition.
   2. Comply with hauling and disposal regulations of authorities having jurisdiction.
   3. Standards: Comply with ANSI A10.6 and NFPA 241.

1.6 FIELD CONDITIONS

A. Existing Conditions:
   1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
      a. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

B. Evaluation And Assessment:
   1. Hazardous Materials:
      a. It is not expected that hazardous materials will be encountered in the Work. Identified hazardous materials will be removed by Owner before start of the Work.
      b. If materials suspected of containing hazardous materials are encountered, do not disturb and immediately notify Architect.
   2. Inventory and record condition of items to be removed and reinstalled and items to be removed and salvaged.
   3. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure nature and extent of conflict. Promptly submit written report to Architect.
   4. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.
   5. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 PREPARATION

A. Temporary Facilities:
   1. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   2. Maintain fire-protection facilities in service during selective demolition operations.

B. Temporary Shoring:
   1. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   2. Strengthen or add new supports when required during progress of selective demolition.

C. Utility Services:
   1. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
   2. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
      a. Arrange to shut off indicated utilities with utility companies.

b. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 SELECTIVE DEMOLITION

A. General:
1. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
2. Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   a. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   b. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   c. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
   d. Maintain adequate ventilation when using cutting torches.
   e. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   f. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   g. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   h. Dispose of demolished items and materials promptly.

B. Selective Demolition Procedures For Specific Materials:
1. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
2. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
3. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

C. Removed and Salvaged Items:
1. Relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
   a. Clean salvaged items as directed by Owner.
   b. Pack or crate items after cleaning. Identify contents of containers.
   c. Store items in a secure area until delivery to Owner.
   d. Transport items to Owner's storage area designated by Owner.
   e. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain:
1. Protect construction indicated to remain against damage and soiling during selective demolition.
2. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 CLEANING

A. General:
1. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations.
2. Return adjacent areas to condition existing before selective demolition operations began.

B. Waste Management:
1. Disposal of Demolished Materials:
a. Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. Do not burn demolished materials.
1) Do not allow demolished materials to accumulate on-site.
2) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3) Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

END OF SECTION

SECTION 06 1011

WOOD FASTENINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of wood fastening methods and materials used for Rough Carpentry unless specified otherwise.

B. Related Requirements:
   1. Furnishing and installing of other fasteners are specified in individual Sections where installed.

1.2 REFERENCES

A. Reference Standards;
   1. ASTM International:
      a. ASTM A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
      b. ASTM D3498-18, 'Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems'.
      c. ASTM F1667-18a, 'Standard Specification for Driven Fasteners: Nails, Spikes, and Staples'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature on framing anchors and powder actuated fasteners.
   2. Shop Drawings:
      a. Submit diameter and lengths of fasteners proposed for use on Project. If length or diameter of proposed fasteners differ from specified fasteners, also include technical and engineering data for proposed fasteners including, but not limited to:
         1) Adjusted fastener spacing where using proposed fasteners and,
         2) Adjusted number of fasteners necessary to provide connection capacity equivalent to specified fasteners.
      b. Submit on powder-actuated fasteners other than those specified in Contract Documents showing design criteria equivalents at each application.
      c. Show type, quantity, and installation location of framing anchors. Where necessary, reference Drawing details, etc, for installation locations.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Description:
   1. Nail Terminology:
      a. When following nail terms are used in relation to this Project, following lengths and diameters will be understood. Refer to nails of other dimensions by actual length and diameter, not by one of listed terms:

Nail Term	Length	Diameter	Length	Diameter
8d Box	2-1/2 inches	0.113 inch	63.5 mm	2.827 mm
8d Common	2-1/2 inches	0.131 inch	63.5 mm	3.389 mm
10d Box	3 inches	0.128 inch	76.2 mm	3.251 mm
10d Common	3 inches	0.148 inch	76.2 mm	3.759 mm
16d Box	3-1/2 inches	0.135 inch	88.9 mm	3.411 mm
16d Sinker	3-1/4 inches	0.148 inch	82.6 mm	3.759 mm
16d Common	3-1/2 inches	0.162 inch	88.9 mm	4.115 mm

B. Materials:
1. Wood fastener list:
   a. Provide VMR Suppliers with wood fastener list.
2. Fasteners:
   a. General:
      1) Fasteners for preservative treated and fire-retardant-treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronzed, or copper. Coating weights for zinc-coated fasteners shall be in accordance with ASTM A153/A153M.
   b. Nails:
      1) Meet requirements of ASTM F1667.
      2) Unless noted otherwise, nails listed on Drawings or in Specifications shall be common nail diameter, except 16d nails, which shall be box diameter.
   c. Wood Screws:
      1) SDS Screws:
         a) Category Four Approved Products. See Section 01 6200 for definitions of categories.
            (1) SDS Screws by Simpson Strong Tie Co, Dublin, CA www.strongtie.com.
      2) All Other: Standard type and make for job requirements.
   d. Powder-Actuated Fasteners:
      1) Type One Quality Standard: Hilti X-DNI 62P8.
      2) Manufacturers:
         a) Hilti, Tulsa, OK www.us.hilti.com.
         b) Redhead Division of ITW, Wood Dale, IL www.itw-redhead.com and Markham, ON www.itwconstruction.ca.
         c) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6200.
3. Adhesives:
   a. Construction Mastics:
      1) Meet requirements of 'APA-The Engineered Wood Association' Specification AFG-01 or ASTM D3498.
      2) Use phenol-resorcinol type for use on pressure treated wood products.

PART 3 - EXECUTION

3.1 ERECTION

A. Secure one Manufacturer approved fastener in each hole of framing anchor that bears on framing member unless approved otherwise in writing by Architect.

B. Provide washers with bolt heads and with nuts bearing on wood.

END OF SECTION

SECTION 06 1100

WOOD FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install wood framing and blocking as described in Contract Documents.

B. Related Requirements:
   1. Sections under 06 4000 Heading: 'Architectural Woodwork' for wall blocking requirements.

1.2 REFERENCES

A. Reference Standards:
   1. American Lumber Standard Committee (ALSC) (Maintains NIST standard):
      a. Voluntary Product Standard:
         1) PS 20-15, 'American Softwood Lumber Standard'.
   2. National Institute of Standards and Technology (NIST), U. S. Department of Commerce:
      a. Voluntary Product Standard DOC PS 20-15, 'American Softwood Lumber Standard'.
      b. CSA-O141-05 (R2014), ‘Softwood Lumber'.
      c. CSA-O151-09 (R2014), ‘Canadian Softwood Plywood'.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Protect lumber and plywood and keep under cover in transit and at job site.
   2. Do not deliver material unduly long before it is required.

B. Storage And Handling Requirements:
   1. Store lumber and plywood on level racks and keep free of ground to avoid warping.
   2. Stack to insure proper ventilation and drainage.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Dimension Lumber:
   1. Meet requirements of PS 20 and National Grading Rules for softwood dimension lumber.
   2. Bear grade stamp of WWPA, SPIB, or other association recognized by American Lumber Standards Committee identifying species of lumber by grade mark or by Certificate of Inspection.
   3. Lumber 2 inches (50 mm) or less in nominal thickness shall not exceed 19 percent in moisture content at time of fabrication and installation and be stamped 'S-DRY', 'K-D', or 'MC15'.
   4. Preservative Treated Plates / Sills:
      a. 2x4 (38 mm by 64 mm): Standard and better Douglas Fir, Southern Pine, or HemFir, or StrandGuard by iLevel by Weyerhaeuser Boise, ID www.ilevel.com. (LSL 1.3 E)
      b. 2x6 (38 mm by 140 mm) And Wider: No. 2 or or MSR 1650f - 1.5e Douglas Fir, Southern Pine, HemFir, or StrandGuard by iLevel by Weyerhaeuser, Boise, ID www.ilevel.com. (LSL 1.3 E).

B. Lumber Ledgers:
   1. No. 1 Douglas Fir, Larch, or Southern Pine.

C. Blocking:
   1. Sound lumber without splits, warps, wane, loose knots, or knots larger than 1/2 inch (13 mm).

D. Furring Strips:
   1. Utility or better.

PART 3 - EXECUTION

3.1 ERECTION

A. General:
   1. Use preservative treated wood for wood members in contact with concrete or masonry.

B. Masonry Wall Plates:
   1. Anchor 2x6 (50 mm by 150 mm) and 2x8 (50 mm by 200 mm) wall plates to top of block walls with 5/8 inch (16 mm) diameter anchor bolts at 32 inches (800 mm) on center unless noted otherwise.
   2. Set plates on masonry bearing walls true and level to provide full bearing. Use mortar as specified in Division 04 for leveling if leveling is required.

C. Accessory / Equipment Mounting And Standing & Running Trim Blocking (nailers):
   1. Furnish and install blocking in wood framing required for hardware, specialties, equipment, accessories, and mechanical and electrical items, etc.
   2. Attach blocking not installed with clips with two fasteners in each end of each piece of blocking.

D. Furring Strips
   1. On Wood or Steel: Nail or screw as required to secure firmly.
   2. On Concrete or Masonry:
      a. Back up furring strips on exterior walls or walls in contact with earth with 15 lb (6.8 kg) felt strip.
      b. Nail at 12 inches (300 mm) on center maximum.

END OF SECTION

SECTION 06 2024

DOOR, FRAME, AND FINISH HARDWARE INSTALLATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants for caulking door frames as described in Contract Documents.

B. Products Installed But Not Furnished Under This Section:
   1. Flush wood doors.
   2. Finish hardware.

C. Related Requirements:
   1. Section 07 9213: ' Elastomeric Joint Sealants' for quality of sealants.
   2. Sections under 08 1000 heading: Furnishing of doors and metal frames.
   3. Sections under 08 7000 heading: Furnishing of finish hardware.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference.
   1. Participate in pre-installation conference.
   2. In addition to agenda items specified in Section 01 3100, review following:
      a. Schedule conference after hardware has been delivered to site and organized into hardware groups by door, but before installation of hardware.
      b. Check for appropriate blocking and for correct hardware models and fasteners for substrates.
      c. Review submittals and set of Manufacturer's installation, adjustment, and maintenance instructions submitted under Section 08 7101.
      d. Review use of crowbar or other prying devices are not permitted to be used to set door frame into wall opening.

1.3 SUBMITTALS

A. Informational Submittals:
   1. Installer Report:
      a. Report verifying correct operation and adjustment of installed hardware.
   2. Special Procedure Submittals:
      a. Copy of 'Installation Guide for Doors & Hardware' by Door & Hardware Institute. Guide may be obtained from Door and Hardware Institute (DHI).

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Wood Doors:
      a. Do not have doors delivered to building site until after plaster, cement, and taping compound are dry.
      b. If doors are to be stored at job-site for more than one week, seal top and bottom edges if not factory sealed.
   2. Metal Frames:

a. Examine door frames and note damage upon acceptance.

B. Storage And Handling Requirements:
1. Wood Doors:
a. Store flat on a level surface in a dry, well ventilated building.
1) Cover to keep clean but allow air circulation
b. Handle with clean gloves and do not drag doors across one another or across other surfaces.
c. Do not subject doors to abnormal heat, dryness, or humidity or sudden changes therein
1) Condition doors to average prevailing humidity of locality before hanging.
2. Metal Frames:
a. Protect metal frames from damage before and during installation.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hollow Metal Frames:
1. Site Tolerances:
a. Squareness: 1/16 inch (1.6 mm) from top edge to opposite top edge.
b. Plumbness: 1/16 inch (1.6 mm) from top of jamb to bottom of jamb.
c. Alignment: 1/16 inch (1.6 mm) from plane of left side face of jamb to right side face of jamb.
d. Twist: 1/16 inch (1.6 mm) across throat of jamb plane measured across each face to plane of opposite jamb throat.
e. Finished Clearance Between Door And Frame:
1) 1/16 inch (1.6 mm) at head and hinge jamb plus 1/16 inch (1.6 mm) maximum
2) 1/8 inch (3 mm) at strike jamb plus or minus 1/16 inch (1.6 mm) maximum.
3) 1/2 inch (12.7 mm) to top of finished floor surface or 1/4 inch (6 mm) to top of threshold, plus or minus 1/16 inch (1.6 mm) maximum.
2. Set frame in location and level head.
a. Use of crowbar or other prying device to set door frame into wall opening will damage door frames and are not permitted to be used.
3. Equalize with adjustable floor anchor.
4. Set spreaders and fasten jambs to floor and wall.
a. Wood spreaders shall be square, fabricated from lumber one inch minimum thick, be same length as door opening at header, and same depth as frame.
b. Cut notches for frame stops.
c. Do not remove spreaders until frames are permanently anchored in wall.
d. Use one spreader at base of frame and another at strike level.
e. Do not use temporary spreaders welded to base of jambs during installation of frame.
5. Fill gap between frame and framing with urethane foam or tightly-packed fiberglass insulation. If urethane foam is used, foam interior of frames before installing frame. Trim excess before installation of frame.
6. Caulking:
a. Caulk around both sides of frames of doors receiving acoustical seals with specified sealant.
b. Caulk around both sides of frames installed in exposed masonry walls with specified sealant.

B. Doors:
1. When Project is completed, doors shall not bind, stick, or be mounted so as to cause future hardware difficulties.
2. Do not impair utility or structural strength of door in fitting of door, applying hardware, or cutting and altering door louvers, panels, or other special details.

C. Hardware:
   1. General:
      a. Install using set of Manufacturer's installation, adjustment, and maintenance instructions submitted with hardware under Section 08 7101. Follow as closely as possible.
      b. Mount closers on jamb stop side of door in parallel arm configuration where it is physically possible to do so and not damage or hinder operation of door or closer.
   2. Hardware for Wood Doors:
      a. If doors are not factory-machined, use hardware templates furnished by Hardware Manufacturer when mounting hardware.
      b. Set hinges flush with edge surface. Be sure that hinges are set in a straight line to prevent distortion.
      c. Mount door latches high in strike plate opening so when door later settles, latch will not bind.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
   1. Arrange to have keys brought to Project site and, in meeting attended by local representatives and Architect, test every new key and locking mechanism.

B. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.
   2. Door frames:
      a. Door frames damaged by use of crowbar or other prying devices to set door frames shall be repaired or replaced at no additional cost to Owner.

3.3 CLOSEOUT ACTIVITIES

A. Instruction of Owner:
   1. Using Owner's Operations And Maintenance Manual, explain keying systems at same time keys and locking mechanisms are tested.

B. Key Delivery:
   1. Immediately before Final Acceptance Meeting, turn change keys over to Owner properly organized, tagged, and placed in new or existing key cabinet.

END OF SECTION

SECTION 06 6413

PLASTIC PANELING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install plastic sanitary wall paneling as described in Contract Documents.

1.2 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's product literature.

B. Informational Submittals:
   1. Manufacturer Instructions:
      a. Manufacturer’s written installation instructions.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories.
      a. Glasteel, Moscow, TN www.glasteel.com.
      b. Kemlite, Channahon, IL www.cranecomposites.com.
      c. Marlite FRP Products, Dover, OH www.marlitefrp.com.
      d. Nudo Products Inc, Springfield, IL www.nudo.com.

B. Materials:
   1. FRP Sanitary Wall Panels:
      a. 0.090 inch (2.3 mm) thick with embossed surface (match existing finish).
      b. Color Quality Standard: No. 659 White by Glasteel (match existing color).
      c. Quality Standard: Glasliner by Glasteel.

2.2 ACCESSORIES

A. Use Panel Manufacturer’s standard vinyl moldings at joints, edges, and corners.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 07 9213

ELASTOMERIC JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants not specified to be furnished and installed under other Sections.
   2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.

B. Related Requirements:
   1. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.

1.2 REFERENCES

A. Definitions:
   1. Sealant Types and Classifications:
      a. ASTM Specifications:
         1) Type:
            a) Type S: Single-component sealant.
            b) Type M: Multi-component sealant.
         2) Grade:
            a) Grade P: Pourable or self-leveling sealant used for horizontal traffic joints.
            b) Grade NS: Non-sag or gunnable sealant used for vertical and non-traffic joints.
         3) Classes: Represent movement capability in percent of joint width.
            a) Class 100/50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand of at least 100 percent increase and decrease of at least 50 percent of joint width as measured at time of application.
            b) Class 50: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 50 percent of joint width as measured at time of application.
            c) Class 25: Sealant that, when tested for adhesion or cohesion under cyclic movement shall withstand increase and decrease of at least 25 percent of joint width as measured at time of application.
            d) Class 12: Sealant that, when tested for adhesion and cohesion under cyclic movement shall withstand increase and decrease of at least 12 percent of joint width as measured at time of application.
         4) Use:
            a) T (Traffic): Sealant designed for use in joints in pedestrian and vehicular traffic areas such as walkways, plazas, decks and parking garages.
            b) NT (Non-Traffic): Sealant designed for use in joints in non-traffic areas.
            c) I (Immersion): Sealant that meets bond requirements when tested by immersion (Immersion rated sealant applications require primer).
            d) M (Mortar): Sealant that meets bond requirements when tested on mortar specimens.
            e) G (Glass): Sealant that meets bond requirements when tested on glass specimens.
            f) A (Aluminum): Sealant that meets bond requirements when tested on aluminum specimens.
            g) O (Other): Sealant that meets bond requirements when tested on substrates other than standard substrates, being glass, aluminum, mortar.

2. Silicone: Any member of family of polymeric products whose molecular backbone is made up of alternating silicon and oxygen atoms and which has pendant hydrocarbon groups attached to silicon atoms. Used primarily as a sealant. Offers excellent resistance to water and large variations in temperature (minus 100 deg F to + 600 deg F) (minus 73.3 deg C to + 316 deg C).

B. Reference Standards:
   1. ASTM International:
      a. ASTM C920-18, 'Standard Specification for Elastomeric Joint Sealants'.
      b. ASTM C1193-16, 'Standard Guide for Use of Joint Sealants'.
      c. ASTM C1330-18, 'Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants'.
      d. ASTM C1481-12(2017) 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
      e. ASTM D5893/D5893M-16, 'Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
   1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
   2. Ensure sealants are cured before covering with other materials.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
      b. Manufacturer's literature for each Product.
      c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

B. Informational Submittals:
   1. Certificates:
      a. Manufacturer's Certificate:
         1) Certify products are suitable for intended use and products meet or exceed specified requirements.
         2) Certificate from Manufacturer indicating date of manufacture.
   2. Manufacturers' Instructions:
      a. Manufacturer's installation recommendations for each Product.
      b. Manufacturer's installation for completing sealant intersections when different materials are joined.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
   2. Applicator Qualifications:
      a. Company specializing in performing work of this section.
      b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
      c. Designate one (1) individual as project foreman who shall be on site at all times during installation.

B. Preconstruction Testing:
1. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

C. Mockups:
1. Provide mockups including sealant and joint accessories to illustrate installation quality and color if requested by Architect or Project Manager.
a. Incorporate accepted mockup as part of Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
1. Deliver and keep in original containers until ready for use.
2. Inspect for damage or deteriorated materials.

B. Storage and Handling Requirements:
1. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
2. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
3. Store in a cool dry location, but never under 40 deg F (4 deg C) or subjected to sustained temperatures exceeding 90 deg F (32 deg C) or as per Manufacturer's written recommendations.
4. Do not use sealants that have exceeded shelf life of product.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
2. Follow Manufacturer’s temperature recommendations for installing sealants.

1.8 WARRANTY

A. Manufacturer Warranty:
1. Signed warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of three (3) years from date of Substantial Completion.
a. Manufacturer's standard warranty covering sealant materials.
b. Applicator’s standard warranty covering workmanship.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
1. Manufacturer Contact List:
a. Dow Corning Corp., Midland, MI www.dowcorning.com.
b. Franklin International, Inc. Columbus, OH www.titebond.com.
c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
d. Laticrete International Inc., Bethany, CT www.laticrete.com.
e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.

g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
h. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.

B. Materials:
1. Design Criteria:
a. Compliance: Meet or exceed requirements of these standards:
1) ASTM C920: Elastomeric joint sealant performance standard.
2) ASTM D5893/D5893M: Silicone Joint Sealant for Concrete Pavements.
b. Comply with Manufacturer's ambient condition requirements.
c. Sealants must meet Manufacturer's shelf-life requirements.
d. Sealants must adhere to and be compatible with specified substrates.
e. Sealants shall be stable when exposed to UV, joint movements, and environment prevailing at project location.
f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
1) Adhesion Test:
a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.
2) If Primer required, shall not stain and shall be compatible with substrates.
3) Allow primer to dry before applying sealant.
g. Design Criteria:
1) Meet following standards for Sealant:
a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.
2) Limitations:
a) Do not use below-grade applications.
b) Do not use on surfaces that are continuously immersed or in contact with water.
c) Do not use on wet, damp, frozen or contaminated surfaces.
d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.
3) Color:
a) Architect to select from Manufacturer's standard colors.
h. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Dow Corning:
a) Primer: 1200 Prime Coat.
b) Sealant: 791 Silicone Weatherproofing Sealant.
2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
a) Primer: SS4044 Primer.
b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
3) Tremco:
a) Primer:
(1) Metal surface: No. 20 primer.
(2) Porous surfaces: No. 23 primer.
b) Sealant: Spectrum 1 Silicone Sealant.
2. General Interior Sealants:
a. General:
1) Inside jambs and heads of exterior door frames.
2) Both sides of interior door frames.
3) Inside perimeters of windows.
4) Miscellaneous gaps between substrates.
b. Design Criteria:
1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
2) 100 percent silicone sealant.

c. Non-Paintable Sealant (Installer Option A):
1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
a) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
b) Laticrete: Latasil Silicone Sealant.
c) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2800 SilGlaze II Silicone Sealant.
d) Sherwin Williams: White Lightning Silicone Ultra Low Odor Window and Door Sealant.
e) Tremco: Tremsil 200 Silicone Sealant.
f) Franklin International: Titebond 2601 (White) 2611 (Clear) 100% Silicone Sealant.
d. Paintable Sealant (Installer Option B):
1) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
a) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS7000 Paintable Silicone Sealant.

3. Sealants For Interior Joints:
a. Description:
1) One-part acetoxy cure silicone sealant with fungicides to resist mold and mildew.
b. Design Criteria:
1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
2) 100 percent silicone sealant.
c. Color: As selected by Architect from Manufacturer's standard colors.
d. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
2) Laticrete: Latasil Tile and Stone Silicone Sealant.
3) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS1700 Sanitary Silicone Sealant.
4) Tremco: Tremsil 200 Silicone Sealant.

2.2 ACCESSORIES

A. Bond Breaker Tape:
1. Pressure sensitive tape as by Sealant Manufacturer to suit application.
2. Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.

B. Joint Backing:
1. Comply with ASTM C1330.
2. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
3. Oversized 25 to 50 percent larger than joint width.

C. Joint Cleaner:
1. Non-corrosive and non-staining type as recommended by Sealant Manufacturer, compatible with joint forming materials.

D. Masking Tape:
1. Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Examine substrate surfaces and joint openings are ready to receive Work.

a. Verify each sealant is compatible for use with joint substrates.
b. Verify joint surfaces are clean and dry.
c. Ensure concrete surfaces are fully cured.
2. Sealants provided shall meet Manufacturer's shelf-life requirements.
3. Notify Architect of unsuitable conditions in writing.
a. Do not proceed until unsatisfactory conditions are corrected.
4. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Surface Preparation:
1. Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer's instructions:
a. Porous surfaces: Clean by mechanical methods to expose sound surface free of contamination and laitance followed by blasting with oil-free compressed air.
b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193. Allow solvent to evaporate prior to sealant application.
c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
d. Primers:
1) Primers enhance adhesion ability.
2) Use of primers is not a substitution for poor joint preparation.
3) Primers should be used always in horizontal application where there is ponding water.
2. Field test joints in inconspicuous location.
a. Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
3. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

B. Joints:
1. Prepare joints in accordance with ASTM C1193.
a. Clean joint surfaces of contaminates capable of affecting sealant bond to joint surface using Manufacturer's recommended instructions for joint preparation methods.
b. Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.
c. Clean concrete joint surfaces to remove curing agents and form release agents.

C. Protection:
1. Protect elements surrounding the Work of this section from damage or disfiguration.

3.3 APPLICATION

A. General:
1. Apply silicone sealant in accordance with Manufacturer's instructions.
2. Do not use damaged or deteriorated materials.
3. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions.
4. Apply primer where required for sealant adhesion.
5. Install sealants immediately after joint preparation.
6. Do not use silicone sealant as per the following:
a. Apply caulking/sealant at temperatures below 40 deg F (4 deg C).
b. Below-grade applications.
c. Brass and copper surfaces.
d. Materials bleeding oils, plasticizers, and solvents.
e. Structural glazing and adhesive.

f. Surfaces to be immersed in water for prolonged time.

B. Joint Backing:
1. Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.
3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.

C. Bond Breaker:
1. Install bond breaker where joint backing is not used or where backing is not feasible.
a. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.

D. Sealant:
1. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
2. Fill joint opening to full and proper configuration.
3. Apply in continuous operation.
4. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.
5. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.

E. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates. Caulk gaps larger than 3/16 inch (5 mm) between painted or coated substrates.

3.4 TOLERANCES

A. Provide joint tolerances in accordance with Manufacturer’s printed instructions.

3.5 FIELD QUALITY CONTROL

A. Adhesion Test (Installer Option to use adhesion test to determine if primer is required).
1. Perform adhesion tests in accordance with Manufacturer’s instructions and ASTM C1193, Method A, Field-Applied Sealant joint Hand-Pull Tab:
a. Perform five (5) tests for first 1,000 linear feet (300 meters) of applied silicone sealant and one (1) test for each 1,000 linear feet (300 meters) seal thereafter or perform one (1) test per floor per building elevation minimum.
b. For sealants applied between dissimilar materials, test both sides of joints.
2. Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and re-testing performed.
3. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

3.6 CLEANING

A. Remove masking tape and excess sealant.

B. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.

C. Waste Management: Dispose of products in accordance with manufacturer’s recommendation.

END OF SECTION

SECTION 08 1429

FLUSH WOOD DOORS: Factory-Finished, Clear

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Factory-finished flush wood doors.

B. Related Requirements:
   1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation.
   2. Section 09 9324: ‘Interior Clear-Finished Hardwood’.

1.2 REFERENCES

A. Abbreviations And Acronyms:
   1. AWS: Architectural Woodwork Standards (formerly AWI).
   2. FD: Fire-resistant core, fire-resistant materials assembled to stiles and rails according to methods prescribed by the testing agency to meet rigorous smoke, flame, and pressure tests.
   3. FD-5: Core with 2 layers on each side.
   4. ME: Matching edges, i.e., vertical edges same as decorative faces.
   5. PC: Particleboard core, solid core door with stiles and rails bonded to the core and abrasive planed flat prior to the application of the faces.
   6. PC-5: Core with 2 layers on each side.

B. Association Publications:
   1. Architectural Woodwork Institute / Architectural Woodwork Manufacturers Association of Canada, 46179 Westlake Drive, Suite 120, Potomac Falls, VA www.awinet.org.
      a. Architectural Woodwork Standards (AWS), 2nd Edition, 2014.

C. Definitions:
   1. Book-Match: Matching between adjacent veneer leaves on one panel face. Every other piece of veneer is turned over so that the adjacent leaves are “opened” as two pages in a book. The fibers of the wood, slanting in opposite directions in the adjacent leaves, create a characteristic light and dark effect when the surface is seen from an angle.
   2. Fire-rated: Fire-retardant particleboard with an Underwriters’ Laboratory (UL) stamp for Class 1 fire rating (Flame Spread 20, Smoke Developed 25). Fire-rated doors are available with particleboard and mineral cores for ratings up to 1-1/2 hours.
   3. Fire-rated Door: A door made of fire-resistant material that can be closed to prevent the spread of fire and can be rated as resisting fire for 20 minutes (1/3 hour), 30 minutes (1/2 hour), 45 minutes (3/4 hour) (C), 1 hour (B), or 1-1/2 hours (B). The door must be tested and carry an identifying label from a qualified testing and inspection agency.
   4. Grade: Unless otherwise noted, this term means Grade rules for Economy, Custom, and/or Premium Grade.
      a. Custom Grade: Typically specified for and adequately covers most high-quality architectural woodwork, providing a well-defined degree of control over a project’s quality of materials, workmanship, or installation.
      b. Premium Grade: The highest Grade available in both material and workmanship where the highest level of quality, materials, workmanship, and installation is required.
   5. Running Match: Each panel face is assembled from as many veneer leaves as necessary. Any portion left over from one panel may be used to start the next.

D. Reference Standards:

1. American Architectural Manufacturers Association / Window & Door Manufacturers Association / CSA Group:
   a. AAMA/WDMA/CSA 101/I.S.2/A440-17, 'North American Fenestration Standard/Specification for windows, doors, and skylights'
2. ASTM International:
   a. ASTM C1036-16, 'Standard Specification for Flat Glass'.
   b. ASTM C1048-18, 'Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass'.
3. Hardwood, Plywood, and Veneer Association:
   a. HPVA HP-1-2016 'Standard for Hardwood and Decorative Plywood'.
4. National Particleboard Association / Composite Panel Association:
   a. NPA A208.1-2009, 'Particleboard'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Schedule showing type of door at each location. Included shall be size, veneer, core type, fire rating, hardware prep, openings, blocking, etc.
      b. Indicate factory finish color and type.
   2. Samples:
      a. Interior Hardwood for Transparent Finish:
         1) Approval subject to Annual Review:
            a) Prepare sample to match Control Sample available from Owner to be used as finishing standard for interior clear finished hardwood as specified in Section 09 9324.
            b) Approval of sample by Owner will establish performance standard of stain to be used until next annual review.
         2) Design Criteria:
            a) Provide 8 inch by 10 inch (200 mm by 255 mm) sample of Red Oak to match stain Control Sample provided by Owner.

B. Informational Submittals:
   1. Source Quality Control Submittals:
      a. Samples:
         1) Interior Hardwood for Transparent Finish:
            a) Owner will provide Control Sample for finish.

C. Closeout Submittals:
   1. Include following information in Operations And Maintenance Manuals specified in Section 01 7800:
      a. Record Documentation:
         1) Manufacturers Documentation:
            a) Manufacturer's product literature on doors and factory finish.
            b) Maintenance and repair instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver in clean truck and, in wet weather, under cover.
   2. Deliver to building site only after plaster, cement, and taping compound are completed and dry and after interior painting operations have been completed.
   3. Individually wrap in polyethylene bags for shipment and storage.

B. Storage And Handling Requirements:

1. Store doors in a space having controlled temperature and humidity range between 25 and 55 percent.
2. Store flat on level surface in dry, well ventilated space.
3. Cover to keep clean but allow air circulation.
4. Do not subject doors to direct sunlight, abnormal heat, dryness, or humidity.
5. Handle with clean gloves and do not drag doors across one another or across other surfaces.
6. Leave shipping bag on door after installation until immediately before substantial completion inspection.
7. Doors have been acclimated to the field conditions for a minimum of 72 hours before installation is commenced.

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard full door warranty for lifetime of original installation.
      a. Warranty shall include finishing, hanging, and installing hardware if manufacturing defect was discovered after door was finished and installed.
      b. Warranty to include defects in materials including following:
         1) Delaminating in any degree.
         2) Warp or twist of 1/4 inch (6 mm) or more in door panel at time of one-year warranty inspection.
         3) Telegraphing of core assembly: Variation of 1/100 inch (0.25 mm) or more in 3 inch (75 mm) span.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Suppliers:
   1. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories and Section 01 4301 for Qualification Requirements:
      a. Architectural Building Supply, Salt Lake City, UT www.cookandboardman.com:
         1) Contact Information: Russ Farley: phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
      b. Beacon Metals Inc, Salt Lake City, UT www.beacon-metals.com:
         1) Contact Information: Jared Butler: phone (801) 486-4884, cell (435) 216-2297, FAX 801-485-7647, or e-mail Jared@beacon-metals.com.
      c. Midwest D-Vision Solutions, Salt Lake City, UT www.mwdsutah.com.
         1) Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail danm@mwdsutah.com.

B. Manufacturers:
   1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
      a. Graham Wood Doors, Mason City, IA.
      b. Marshfield Door Systems Inc, Marshfield, WI.
      c. VT Industries, Holstein, IA.

C. Wood Doors:
   1. Type: AWS PC-5ME or FD-5ME.
   2. Grade: AWS Premium, except face veneer.
   3. Fully Type I Construction: Adhere all glue lines with Type I adhesive, including veneer lay-up.
   4. Face Veneer:
      a. Plain sliced Red Oak meeting requirements of AWS Grade A, 1/50 inch (0.5 mm) thick minimum immediately before finishing.
      b. Face veneers shall be running book matched.

5. Core:
    a. Fully bonded to stiles and rails and sanded as a unit before applying veneers.
    b. Non-Rated:
        1) 32 lb density meeting requirements of ANSI A208.1 Mat Formed Wood Particle Board, Grade 1-L-1 minimum.
        2) Stiles:
            a) 1-3/8 inches (35 mm) deep minimum before fitting.
            b) Stile face to be hardwood matching face veneer material, thickness manufacturer's standard.
        3) Rails:
            a) 1-1/8 inches (28 mm).
            b) Manufacturer's option.

D. Fabrication:
1. Doors shall be factory-machined. Coordinate with Section 08 1213 and Sections under 08 7000.

E. Finishes:
1. Factory Finishing:
    a. Applied by Door Manufacturer before leaving factory.
    b. Performance / Design Criteria:
        1) Finish factory-finish to match Owner selected sample as specified in Section 09 9324.
        2) Color:
            a) Match existing.
    c. Finish: AWS Finish System TR-6 Catalyzed Polyurethane Premium Grade for unfilled, open-grain woods.

2.2 SOURCE QUALITY CONTROL

A. Inspections:
1. Verification of Performance:
    a. Doors shall have following information permanently affixed on top of door:
        1) Manufacturer:
        2) Door designation or model.
        3) Veneer species.
        4) Factory finish.
2. Clear Finished Hardwood:
    a. Color matches Owner provided sample specified in Section 09 9324.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 08 7101

COMMON FINISH HARDWARE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General requirements for finish hardware related to architectural wood and hollow metal doors.

B. Related Requirements:
   1. Section 06 2024: 'Door, Frame, And Finish Hardware Installation' for installation of hardware.
   2. Section 06 4114: 'Wood-Veneer-Faced Architectural Cabinets' for architectural woodwork hardware.
   3. Section 08 0601: 'Hardware Group and Keying Schedules'.
   4. Section 08 4113: 'Aluminum-Framed Entrances and Storefronts' for storefront hardware.

1.2 REFERENCES

A. Association Publications:
   1. Builders Hardware Manufacturers Association (BHMA), 355 Lexington Avenue, 15th Floor, New York, NY 10017-6603, Tel: 212-297-2122 Fax: 212-370-9047, www.buildershardware.com.

B. Reference Standards:
   1. International Code Council / American National Standards Institute:
      a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.
   2. Underwriters Laboratories (UL):
      a. UL 10B, 'Fire Tests of Door Assemblies' (10th Edition).
      b. UL 10C, 'Positive Pressure Fire Tests of Door Assemblies' (Third Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Hardware Templates:
      a. Provide hardware templates to Sections 08 1213, 08 1313, and 08 1429 within fourteen (14) days after Architect approves hardware schedule.
      b. Supply necessary hardware installation templates to Section 06 2024 before pre-installation conference.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's cut sheets.
      b. Two (2) copies of Manufacturer's installation, adjustment, and maintenance instructions for each piece of hardware. Include one (1) set in 'Operations And Maintenance Manual' and send one (1) set with hardware when delivered.
      c. Copy of hardware schedule.
      d. Written copy of keying system explanation.
   2. Shop Drawings:
      a. Submit hardware schedule indicating hardware to be supplied.

b. Schedule shall indicate details such as proper type of strikeplates, spindle lengths, hand, backset, and bevel of locks, hand and degree opening of closer, length of kickplates, length of rods and flushbolts, type of door stop, and other necessary information necessary to determine exact hardware requirements.

B. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Operations and Maintenance Data:
1) Manufacturer’s installation, adjustment, and maintenance instructions for each piece of hardware.
b. Record Documentation:
1) Manufacturers documentation:
a) Manufacturer's literature and/or cut sheets.
b) Include keying plan and bitting schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:
1. Neatly and securely package hardware items by hardware group and identify for individual door with specified group number and set number used on Supplier's hardware schedule.
2. Include fasteners and accessories necessary for installation and operation of finish hardware in same package.

PART 2 - PRODUCTS

2.1 SUPPLIERS

A. Category Three Approved Suppliers. See Section 01 6200 for definitions of Categories:
1. Architectural Building Supply, Salt Lake City, UT www.cookandboardman.com:
a. Contact Information: Russ Farley, phone (800) 574-4369, fax 801-484-6817, or e-mail russf@absdoors.com.
2. Beacon Metals Inc, Salt Lake City, UT www.beacon-metals.com:
a. Contact Information: Jared Butler, phone (801) 486-4884, cell (435) 216-2297, FAX 801-485-7647, or e-mail Jared@beacon-metals.com.
3. Midwest D-Vision Solutions, Salt Lake City, UT www.mwdsutah.com.
a. Contact Information: Dan Mercer, office (801) 377-4355, cell (801) 618-9456, e-mail danm@mwdsutah.com.

2.2 FINISHES

A. Hardware Finishes:
1. Finishes for brass or bronze hardware items shall be:
a. ANSI / BHMA Finish Code 626.
1) Description: Satin Chromium Plated.
2) Base Metal: Brass. Bronze.
2. Finishes for flat goods items may be:
a. ANSI / BHMA Finish Code 630.
1) Description: Satin Stainless Steel.
2) Base Metal: Stainless Steel (300 Series).
3. Materials other than steel, brass, or bronze shall be finished to match appearance satin chromium plated, except flat goods which shall be satin stainless steel.

2.3 FASTENERS

A. Fasteners shall be of suitable types, sizes and quantities to properly secure hardware. Fasteners shall be of same material and finish as hardware unless otherwise specified. Fasteners exposed to weather shall be non-ferrous or corrosion resisting steel.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before ordering materials, examine Contract Documents to be assured that material to be ordered is appropriate for thickness and substrate to which it is to be secured and will function as intended.

END OF SECTION

SECTION 08 7102

HANGING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Hinges for flush wood and hollow metal doors.

B. Related Requirements:
   1. Section 08 7101: 'Common Hardware Requirements'.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Hager Companies, St Louis, MO www.hagerhinge.com.
      b. Ives, New Haven, CT www.iveshardware.com.
      c. McKinney, Scranton, PA www.mckinneyhinge.com.
      d. PBB, Ontario, CA www.pbbinc.com.
      e. Stanley (dormakaba Americas), Indianapolis IN www.stanleyhardwarefordoors.com/products/.

B. Hinges:
   1. Doors:
      a. Sizes:
         1) Non-Fire-Rated Doors:
            a) 1-3/4 inch 44.5 mm non-fire-rated wood doors in wood frames: 4 inches by 4 inches (100 mm by 100 mm).
            b) 1-3/8 inch 35 mm wood or metal doors: 3-1/2 inches by 3-1/2 inches (89 mm by 89 mm).
   2. Use non-removable pins on exterior opening doors.
   3. Hinges on exterior doors shall be solid brass, plated to achieve specified finish.
   4. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a. Interior:
         1) Hager: BB 1279.
         2) Ives: 5BBI.
         3) McKinney: TA 2714.
         4) MacPro / McKinney: MPB79.
         5) PBB: BB81.
         6) Stanley: FBB 179.
      b. Exterior:
         1) Hager: BB 1191.
         2) Ives: 5BBI.
         3) McKinney: TA 2314.
         4) PBB: BB21.
         5) Stanley: FBB 191.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 08 7106

CLOSING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Closers for flush wood doors.

B. Related Requirements:
   1. Section 08 7101: 'Common Finish Hardware Requirements'.
   2. Section 08 7108: 'Stops And Holders'.

1.2 SUBMITTALS

A. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Manufacturer's final executed copy of warranty.

1.3 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's Standard Warranty, five (5) years minimum.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers:
   1. Category Four Approved Manufacturers. See Section 01 6200 for definitions of Categories:
      a. 8900 Series by Dorma Architectural Hardware, Reamstown, PA www.dorma.com/usa.
      b. 1461 Series by LCN Closers, Princeton, IL www.lcnclosers.com.
      c. 8501 Series by Norton Door Controls, Charlotte, NC www.nortondoorcontrols.com.
      d. 1431 Series by Sargent, New Haven, CT www.sargentlock.com.
      e. D-3550/D-3551 Series by Stanley (dormakaba Americas), Indianapolis IN www.stanleyhardwarefordoors.com/products/.

B. Surface-Mounted Overhead Door Closers:
   1. Closers provided under this Section shall be from same Manufacturer.
   2. Provide parallel arms on closers unless door position in relation to adjacent wall requires otherwise. Provide covers.
   3. Door Closers shall allow for 180 degree opening as shown on Contract Documents:
      a. Closers shall allow for 180 degree opening without engaging stop function. Wall stop or Floor stop is specified in Door Schedule and Section 08 7108, 'Stops And Holders'.
      b. Closers shall have following features:
         1) Adjustable sweep speed.
         2) Adjustable backcheck.
         3) Non-handed, non-sized.
         4) Hold open arm function (Friction Hold Open) (Non-Fire-Rated Corridors).

4. Door Closers on doors that swing 90 degree as shown on Contract Documents:
   a. Closers shall allow for 100 degree opening with engaging stop function.
   b. Closers shall have following features:
      1) Adjustable sweep speed.
      2) Adjustable backcheck.
      3) Non-handed, non-sized.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mount closers on stop side of door wherever conditions permit.

B. Through-bolt hardware-to-door connections.

3.2 ADJUSTING

A. Adjust closers to provide maximum opening force as required by governing code authority and proper backcheck and sweep speed.

END OF SECTION

SECTION 08 7107

PROTECTIVE PLATES AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Kick plates.

B. Related Requirements:
   1. Section 08 7101: Common Hardware Requirements and VMR Suppliers.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers:
   1. Type Two Acceptable Manufacturers:
      a. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
      b. Hager, St Louis, MO (800) 255-3590 or (314) 772-4400 www.hagerhinge.com.
      c. Ives, Wallingford, CT www.iveshardware.com.
      d. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
      e. Equal as approved by Architect before installation. See Section 01 6200.

B. Protective Plates:
   1. Material: 0.050 inch (1.27) mm thick Stainless Steel.
   2. Sizes as shown on drawings:
      a. Kick Plates: 10 inches (255) mm high by width of door less 3/4 inch (19 mm) on each side.
      b. Armor Plates: 40 inches (1 000 mm) high by width of door less 3/4 inch (19 mm) on each side.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 08 7108

STOPS AND HOLDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Products Supplied But Not Installed Under This Section:
   1. Door stops.

B. Related Sections:
   1. Section 08 7101: Common Hardware Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Glynn-Johnson, Indianapolis, IN www.glynn-johnson.com.
      b. Hager, St Louis, MO www.hagerhinge.com.
      c. Ives, Wallingford, CT www.iveshardware.com.
      d. Rockwood Manufacturing Co, Rockwood, PA www.rockwoodmfg.com.
      e. Sargent, New Haven, CT (800) 906-6606 or (203) 562-2151 www.sargentlock.com.

B. Stops:
   1. Use wall type stops unless indicated otherwise on Door Schedule.
   2. Provide model appropriate for substrate. Wall stops may be either cast or wrought.
   3. Type Two Acceptable Products:

a.		Interior Wall
b.	Hager	236W
c.	Ives	WS407CCV
d.	Rockwood	409
e.	Glynn Johnson	- - -
f.	Sargent	- - -

   g. Equal as approved by Architect before Installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work: When using overhead stops, coordinate installation with door closer and other door hardware.

END OF SECTION

SECTION 08 7109

ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Smoke Gaskets.

B. Related Requirements:
   1. Section 08 4113: 'Aluminum-Framed Entrances And Storefronts' for thresholds.
   2. Section 08 7101: 'Common Finish Hardware Requirements' for general finish hardware requirements and Approved Suppliers.

1.2 REFERENCES

A. Association Publications:
   1. American Architectural Manufacturers Association (AAMA:
      a. AAMA 609 & 609-09, 'Cleaning and Maintenance Guide for Architecturally Finished Aluminum' (combined document).
      b. AAMA 611-12, 'Voluntary Standards for Anodized Architectural Aluminum'.
      c. AAMA 701/702-11, 'Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals'.
   2. National Association of Architectural Metal Manufacturers (NAAMM):
      a. AMP 500-06, 'Metal Finishes Manual' for Architectural and Metal Products.

B. Reference Standards:
   1. American National Standards Institute / Builders Hardware Manufacturers Association:
      a. ANSI / BHMA A156.18-2012, 'Materials and Finishes'.
      b. ANSI / BHMA A156.21-2014, 'American National Standard for Thresholds'.
   2. International Code Council / American National Standards Institute:
      a. ICC / ANSI A117.1-2009, 'Accessible and Usable Buildings and Facilities'.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Hager, St Louis, MO www.hagerhinge.com.
      b. NGP - National Guard Products, Memphis, TN www.ngpinc.com.
      c. Pemko Manufacturing, Ventura, CA www.pemko.com.

B. Smoke Gaskets:
   1. Color as selected by Architect.
   2. Type One Acceptable Products:
      a. 726 by Hager.
      b. 5050 by NGP.
      c. PK 55 by Pemko.
      d. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install smoke gaskets and acoustical seals in manner to give continuous air-tight fit.
   1. Install smoke gaskets as per Manufacturer's installation requirements:
      a. Hinge Jamb: Install smoke gaskets on jamb face of door frame so door will compress smoke gasket.
      b. Header and Strike Jamb: Install smoke gaskets on face of stop of door frame so door will compress smoke gasket.

END OF SECTION

SECTION 09 2216

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install metal framing and furring systems and blocking as described in Contract Documents.

B. Related Requirements:
   1. Section 06 1100: 'Wood Framing' for wood blocking.
   2. Section 09 2226: 'Metal Suspension System' for furring on suspended ceilings.

1.2 REFERENCES

A. Association Publications:
   1. Steel Framing Industry Association (SFIA):
      a. SFIA 'Technical Guide for Cold-Formed Steel Framing Products', www.sfia.net.
   2. Steel Stud Manufacturers Association (SSMA):
      a. 2015 IBC - SSMA 'Product Technical Guide'.

B. Definitions:
   1. Non-Structural Member: Member in steel-framed system that is not part of the gravity load resisting system, lateral force resisting system or building envelope.

C. Reference Standards:
   1. American Iron and Steel Institute (AISI):
      a. AISI S220-15, 'North American Specification For The Design Of Cold-Formed Steel Framing – Nonstructural Members'.
   2. ASTM International:
      a. ASTM A653/A653M-15, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
      b. ASTM A1003/A1003M-15, 'Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members'.
      c. ASTM C645-18, 'Standard Specification for Nonstructural Steel Framing Members'.
      d. ASTM C754-18, 'Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products'.
      e. ASTM C1513-18, 'Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections'.
      f. ASTM E119-18, 'Standard Test Methods for Fire Tests of Building Construction and Materials'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Schedule pre-installation conference to be held after submittals have been reviewed and returned by Architect, but before beginning metal framing work.
   2. In addition to agenda items specified in Section 01 3100, review following:
      a. Identify location of required blocking.

1.4 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Show special components and installations not fully dimensioned or detailed in Manufacturer's Product data.

B. Informational Submittals:
   1. Test And Evaluation Reports:
      a. ATI, ICC or other Approved Testing Agency (active member) Evaluation Report.
   2. Manufacturer Instructions:
      a. Technical product data, installation instructions, and recommendations for each component of system.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. ICC approved.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Type One Acceptable Manufacturers:
      a. CEMCO, City of Industry, CA www.cemcosteel.com.
      b. ClarkDietrich Building Systems, West Chester, OH www.clarkdietrich.com.
      c. Any member of Steel Framing Industry Association (SFIA).
      d. Any member of Steel Stud Manufacturer's Association (SSMA).
      e. Equal as approved by Architect before bidding. See Section 01 6200.

B. Materials:
   1. Framing:
      a. General:
         1) 20 gauge minimum, unless noted greater on Drawings, meeting requirements of ASTM C645.
         2) Steel Sheet Components: Comply with ASTM C645 requirements for metal unless otherwise indicated.
         3) Steel Coating Requirement: Comply with ASTM C645 roll-formed from hot dipped galvanized steel complying with ASTM A1003/A1003M and/or ASTM A653/A653M G40 (Z120) or equivalent corrosion resistant coating. A40 galvannealed products are not acceptable.
            a) Coatings shall demonstrate equivalent corrosion resistance with evaluation report from approved testing agency.
      b. Steel Studs and Runners: Cold-formed galvanized steel C-studs, as per ASTM C645 for conditions indicated.
      c. Bridging, blocking, strapping, and other accessories shall be as described in Contract Documents or as required by Manufacturer's system.
      d. Type One Acceptable Products:
         1) 362DS20P by CEMCO.
         2) ProSTUD 20 by ClarkDietrich Building Systems.
         3) 20 Ga 3-5/8 SS Series by Steeler Inc.
         4) Any member of Steel Framing Industry Association (SFIA).
         5) Any member of Steel Stud Manufacturer's Association (SSMA).
         6) Equal as approved by Architect before bidding. See Section 01 6200.

2. Firestop Tracks:
   a. Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
3. Headers and Jambs - Heavy-Duty Stud:
   a. Shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges.

C. Fasteners:
1. Corrosion resistant coated, self-drilling, self-threading steel drill screws complying with ASTM C1513.

2.2 ACCESSORIES

A. Sill Sealer: Closed-cell polyethylene foam, 1/4 inch (6 mm) thick by width of plate.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work:
1. Coordinate with other Sections to provide blocking necessary for their work.
2. Coordinate with other Sections for location of blocking required for installation of equipment and building specialties.

B. Tolerances:
1. 1/4 inch (6 mm) in 20 feet (6 meters), non-cumulative in length of wall.
2. 1/8 inch (3 mm) in 10 feet (3 meters) with 1/4 inch (6 mm) maximum in height of wall.
3. Distances between parallel walls shall be 1/4 inch (6 mm) maximum along length and height of wall.

C. Framing:
1. Installation Standard: ASTM C754.
2. Specifications of Stud Wall Manufacturer shall govern this work unless more stringent requirements are required by Contract Documents.
3. Install specified sill sealer under sill plates of exterior walls and of acoustically insulated interior walls.
4. Stiffen metal-framed walls with 3/4 inch (19 mm) 1-1/2 inches (38 mm) cold formed channels placed horizontally approximately 48 inch (1 200 mm) on center and securely attach to each stud.
5. Similarly reinforce door and window openings at headers with reinforcing channel extending 18 inches (450 mm) minimum each side of opening.
6. Apply double framing members at openings. Wrap multiple, adjacent framing members with duct tape or otherwise secure to eliminate 'chattering'.
7. Use grommets at framing penetrations where unsecured items pass through.

END OF SECTION

SECTION 09 2900

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install gypsum board as described in Contract Documents, except behind ceramic tile.
   2. Furnish and install gypsum board finishing system as described in Contract Documents.

B. Related Requirements:
   1. Section 09 9413: 'Interior Textured Finishing'.

1.2 REFERENCES

A. Definitions:
   1. Accessories: Metal or plastic beads, trim, or moulding used to protect or conceal corners, edges, or abutments of the gypsum board construction.
   2. Drywall Primer: Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories and over skim coatings.
   3. Skim Coat: Either a thin coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer’s recommendations, over the entire surface.
   4. Texturing: Regular or irregular patterns typically produced by applying a mixture of joint compound and water, or proprietary texture materials including latex base texture paint, to a gypsum board surface previously coated with drywall primer.

B. Reference Standards:
   1. ASTM International:
      a. ASTM C11-18, ‘Standard Terminology Relating to Gypsum and Related Building Materials and Systems'.
      b. ASTM C475/C475M-17, ‘Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board'.
      c. ASTM C840-18a, 'Standard Specification for Application and Finishing of Gypsum Board'.
      d. ASTM C1002-18, 'Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs'.
      e. ASTM C1047-14a, ‘Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base'.
      f. ASTM C1178/C1178M-18, ‘Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel'.
      g. ASTM C1396/C1396M-17, ‘Standard Specification for Gypsum Board'.
      h. ASTM E84-18b, ‘Standard Test Method for Surface Burning Characteristics of Building Materials'.
      i. ASTM E119-18b, ‘Standard Test Method for Fire Tests of Building Construction and Materials'.
   2. Gypsum Association:

a. GA-214-15, ‘Recommended Levels of Gypsum Board Finish'.
b. GA-216-16: ‘Application and Finishing of Gypsum Panel Products'.
c. GA-600-15, ‘Fire Reference Design Manual'.
d. GA-801-2017, ‘Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors'.

3. International Building Code (IBC) (2018 or latest approved version):
   a. Chapter 25, ‘Gypsum Board And Plaster’.
4. Standards Council of Canada / Underwriters Laboratories of Canada:
   a. CAN/ULC-S102:2018: ‘Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies'.
5. Underwriters Laboratories, Inc.
   a. UL 263: ‘Test Method for Fire Tests of Building Construction and Materials' (14th Edition).
   b. UL 723: ‘Test for Surface Burning Characteristics of Building Materials; (11th Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Schedule MANDATORY pre-installation conference immediately before installation of gypsum wallboard.
   2. In addition to agenda items specified in Section 01 3100, review following:
      a. Finish requirements necessary for installation of finish materials over gypsum wallboard, and location and installation of ceramic tile backerboard.

1.4 SUBMITTALS

A. Informational Submittals:
   1. Test And Evaluation Reports:
      a. Fire test results or assembly diagrams and numbers confirming products used will provide required fire ratings with installation configurations used.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General:
   1. Following recommendations of GA-801 Guide for Handling and Storage of Gypsum Panel Products unless local, state or federal laws or agency rules differing from the recommendations shall take precedence.

B. Delivery And Acceptance Requirements:
   1. Deliver materials in original packages, containers, or bundles bearing brand name, applicable standard designation, and Manufacturer's name.

C. Storage And Handling Requirements:
   1. Store material under roof and keep dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack gypsum board flat to prevent sagging.

1.6 FIELD CONDITIONS

A. Ambient Conditions:
   1. Comply with ASTM C840 or GA-216 requirements, whichever are more stringent:
      a. Do not install interior products until installation areas are enclosed and conditioned.

1) Temperature shall be 50 deg F (10 deg C) and 95 deg F (35 deg C) maximum day and night during entire joint operation and until execution of Certificate of Substantial Completion.
2) Provide ventilation to eliminate excessive moisture.
3) Avoid hot air drafts that will cause too rapid drying.

b. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:
1. Manufacturer Contact List:
a. American Gypsum, Dallas, TX www.americangypsum.com.
b. CertainTeed Gypsum, Inc; Tampa, FL www.certainteed.com.
c. Georgia Pacific, Atlanta, GA www.gp.com.
d. National Gypsum, Charlotte, NC www.nationalgypsum.com.
e. Pabco Gypsum, Newark, CA www.pabcogypsum.com.
f. United States Gypsum Co, Chicago, IL www.usg.com.

B. Materials:
1. Interior Gypsum Board:
a. General:
1) Size:
a) Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
2) Class Two Quality Standard:
a) Core: Fire-resistant rated gypsum core.
b) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
c) Surface paper: Face paper suitable for painting.
d) Long edges: Tapered edge.
e) Overall thickness: 5/8 inch (15.9 mm).

2.2 ACCESSORIES

A. Manufacturers:
1. Manufacturer Contact List:
a. Kinetics Noise Control, Dublin, OH www.kineticsnoise.com.
b. Magnum Products, Lenaxa, KS www.levelcoat.com.
c. National Gypsum, Charlotte, NC www.nationalgypsum.com.
d. Soundproofing Co, San Marcos, CA www.soundproofing.org.
e. United States Gypsum Co, Chicago, IL www.usg.com.
f. Westpac Materials Inc, Orange, CA www.westpacmaterials.com.
g. Wm. Zinsser & Co, Somerset, NJ www.zinsser.com.
2. Gypsum Board Mounting Accessories:
a. Furring Channels:
1) Class Two Quality Standards. See Section 01 6200 for definitions:
a) Walls: Galvanized DWFC-25.
b) Ceilings: Galvanized DWFC-20.
2) Accessories as required by Manufacturer's fire tests to provide necessary fire ratings.
b. Corner And Edge Trim:
1) Metal, paper-faced metal, paper-faced plastic, or solid vinyl meeting requirements of ASTM C1047. Surfaces to receive bedding cement treated for maximum bonding.

c. Control Joint:
1) Bent zinc sheet with V-shaped slot, perforated flanges, covered with plastic tape meeting requirements of ASTM C1047.

3. Joint Compound:
a. Best grade or type recommended by Board Manufacturer and meeting requirements of ASTM C475/C475M.
1) Use Taping Compound for first coat to embed tape and accessories.
2) Use Taping Compound or All-Purpose Compound for subsequent coats except final coat.
3) Use Finishing Compound for final coat and for skim coat.

4. Joint Reinforcing:
a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.

5. Fasteners:
a. Bugle head screws meeting requirements of ASTM C1002:
1) Gypsum Board:
a) Type W: For fastening gypsum board to wood members, of length to penetrate wood framing 5/8 inch (15.9 mm) minimum.
b) Type S: For fastening gypsum board to steel framing and ceiling suspension members, of length to penetrate steel framing 3/8 inch (9.5 mm) minimum.
2) Glass Mat Gypsum Tile Backer:
a) Wood Framing: 11 ga (0.1233 in) (3.1318 mm), galvanized with 7/16 inch (11 mm) head, hot dipped. Screws: Type W or Type S Hi-Lo, bugle head, rust resistant.
b) Metal Framing:
(1) Light-gauge metal framing: Type S Hi-Lo, bugle or wafer head, self-tapping, rust resistant. Hi-Lo screws.
(2) Heavy-gauge metal framing: Type S-12 Hi-Lo, bugle or wafer head, rust resistant.

B. Primer / Surfacer On Surfaces To Receive Texturing:
1. Type Two Acceptable Products:
a. Sheetrock First Coat by USG.
b. Prep Coat by Westpac Materials.
c. Level Coat by Magnum Products.
d. Equal as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Examine substrate and verify framing is suitable for installation of gypsum board.
2. Examine gypsum board before installation. Reject panels that are wet, moisture damaged, and mold damaged.
3. Notify Architect of unsuitable conditions in writing.
a. Do not install board over unsuitable conditions.
4. Commencement of Work by installer is considered acceptance of substrate.

3.2 INSTALLATION

A. Interface With Other Work:
1. Coordinate with Division 06 for location of backblocking for edges and ends of gypsum board and for blocking required for installation of equipment and building specialties.
2. Do not install gypsum board until required blocking is in place.

B. General: Install and finish as recommended in ASTM C840 or GA-216 unless specified otherwise in this Section.

C. Mounting Accessories:
   1. Furring Channels: Apply with screws through flanges into each framing member.

D. Interior Gypsum Board:
   1. General:
      a. Install so trim and reinforcing tape are fully backed by gypsum board. No hollow spaces between pieces of gypsum board over 1/8 inch (3 mm) wide before taping are acceptable.
      b. Rout out backside of gypsum board to accommodate items that extend beyond face of framing, but do not penetrate face of gypsum board, such as metal door frame mounting brackets, etc.
      c. On walls over 108 inches (2 700 mm) high, apply board perpendicular to support
      d. Butt edges in moderate contact. Do not force in place. Shim to level.
      e. Leave facings true with joint, finishing flush. Vertical work shall be plumb and ceiling surfaces level.
      f. Scribe work closely:
         1) Keep joints as far from openings as possible.
         2) If joints occur near an opening, apply board so vertical joints are centered over openings.
         3) No vertical joints shall occur within 8 inches (200 mm) of external corners or openings.
      g. Install board tight against support with joints even and true. Tighten loose screws.
      h. Caulk perimeter joints in sound insulated rooms with specified acoustical sealant.
   2. Ceilings:
      a. Apply ceilings first using minimum of two (2) people.
      b. Use board of length to give minimum number of joints.
      c. Apply board perpendicular to support.
   3. Fastening:
      a. Apply from center of board towards ends and edges.
      b. Apply screws 3/8 inch (9.5 mm) minimum from ends and edges, one inch (25 mm) maximum from edges, and 1/2 inch (13 mm) maximum from ends.
      c. Spacing:
         1) Ends: Screws not over 7 inches (175 mm) on center at edges where blocking or framing occurs.
         2) Wood Framed Walls And Ceilings: Screws 7 inches (175 mm) on center in panel field.
         3) Metal Framed Walls: Screws 12 inches (300 mm) on center in panel field.
      d. Set screw heads 1/32 inch (0.8 mm) below plane of board, but do not break face paper. If face is accidentally broken, apply additional screw 2 inches (50 mm) away.
      e. Screws on adjacent ends or edges shall be opposite each other.
      f. Drive screws with shank perpendicular to face of board
   4. Trim:
      a. Corner Beads:
         1) Attach corner beads to outside corners.
            a) Attach metal corner bead with staples spaced 4 inches (100 mm) on center maximum and flat taped over edges of corner bead. Also, apply screw through edge of corner bead where wood trim will overlay corner bead.
            b) Set paper-faced trim in solid bed of taping compound.
      b. Edge Trim: Apply where gypsum board abuts dissimilar material. Hold channel and 'L' trim back from exterior window and door frames 1/8 inch (3 mm) to allow for caulking.
   5. Finishing:
      a. General:
         1) Tape and finish joints and corners throughout building as specified below to correspond with final finish material to be applied to gypsum board. When sanding, do not raise nap of gypsum board face paper or paper-faced trim.
         2) First Coat:

a) Apply tape over center of joint in complete, uniform bed of specified taping compound and wipe with a joint knife leaving a thin coating of joint compound. If metal corner bead is used, apply reinforcing tape over flange of metal corner bead and trim so half of tape width is on flange and half is on gypsum board.
b) Completely fill gouges, dents, and fastener dimples.
c) Allow to dry and sand lightly if necessary, to eliminate high spots or excessive compound.

3) Second Coat:
a) Apply coat of specified joint compound over embedded tape extending 3-1/2 inches (88 mm) on both sides of joint center. Use finishing compound only if applied coat is intended as final coat.
b) Re-coat gouges, dents, and fastener dimples.
c) Allow to dry and sand lightly to eliminate high spots or excessive compound.

4) Third Coat: Apply same as second coat except extend application 6 inches (150 mm) on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.

5) Fourth Coat: Apply same as second coat except extend application 9 inches (425 mm) on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.

a. Finishing Levels: Finish panels to levels indicated below and according to ASTM C840, GA-214 and GA-216:

1) Gypsum Board Surfaces to Receive: Painted Texturing - Section 09 9413: 'Interior Textured Finishing':
a) GA-214 Level 4: 'All and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Coat prepared surface with specified primer'.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work:
1. Remove and replace panels that are wet, moisture damaged, and mold damaged.
a. Indications that panels are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
b. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.4 CLEANING

A. Remove from site debris resulting from work of this Section including taping compound spills.

END OF SECTION

SECTION 09 3013

CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install ceramic tile and tile setting materials and accessories as described in Contract Documents.

B. Related Requirements:
   1. Section 09 2900: 'Gypsum Board' for installation of backerboard behind ceramic tile, except for joint reinforcing.
   2. Section 22 1319: 'Facility Sanitary Sewer Specialties' for floor drains installed in ceramic tile floors.

C. Products Installed But not Furnished Under This Section:
   1. Interior Ceramic Tile Joint Sealants:

D. Related Requirements:
   1. Section 07 9213: 'Elastomeric Joint Sealants'.

1.2 REFERENCES

A. Association Publications:
   1. American National Standard Specification (ANSI) for the Installation of Ceramic Tile.
   2. International Standards Organization (ISO) 13007, ‘Classification for Adhesives and Grout'.
   3. Tile Council of North America:
      a. TCNA Handbook, 'Handbook for Ceramic, Glass, and Stone Tile Installation, 2015'.

B. Definitions:
   1. Crack Isolation: Prevention of transfer of cracks from substrate through tile or stone when substrate is subjected to horizontal movement of cracks.
   2. Dynamic Coefficient of Friction (DCOF): Measures ratio of forces necessary to keep two surfaces sliding.
   3. Epoxy Grout: Mortar system employing epoxy resin and epoxy hardener portions.
   4. Grout: Rich or strong cementitious or chemically setting mix used for filling tile joints.
   5. ISO 13007 Standards Product Classifications:
      a. Adhesives:

Types	Classes	Special Characteristics
C = Cementitious (Thin-Set Mortars)	1 = Normal 2 = Improved	F = Fast-Setting T = Slip-Resistant E = Extended Open Time S1 = Deformable S2 = Highly Deformable P1 = Plywood Adhesion P2 = Improved Plywood Adhesion
D = Dispersion (Mastics)	1 = Normal 2 = Improved	F = Fast-Setting T = Slip-Resistant

		E = Extended Open Time
R = Reaction Resin (Epoxies)	1 = Normal 2 = Improved	T = Slip-Resistant

1) Cementitious Adhesive (C): Mixture of hydraulic binding agents (e.g. portland cement), aggregates, and organic additives (e.g. latex polymers, moisture retention additive, etc…) to be mixed with water or latex admix before mixing.
2) Dispersion Adhesive (D): Ready-to-use mixture of organic binding agents in the form of an aqueous polymer dispersion, organic additives and mineral fillers - mastic type products.
3) Reaction Resin Adhesive (R): Single or multi-component mixture of synthetic resin, mineral fillers and organic additives in which curing occurs by chemical reaction – epoxy or urethane based products.
4) Class 1 (1): Adhesive has passed minimum pass level tests that are mandatory for that adhesive type.
5) Class 2 (2): Adhesive has passed same tests as Class 1 and/or other applicable tests, but at higher pass levels.
6) Fast-Setting (F): Adhesive with accelerated cure time that must achieve minimum strength requirements of fast setting adhesive. This designation does not apply to reaction resin adhesives (R).
7) Slip-Resistance (T): Downward movement of a tile applied to combed adhesive layer on vertical surface must be ≤ 0.5mm for a C or D adhesive, and ≤ 5mm for a type R adhesive.
8) Extended Open Time (E): Maximum time interval after application at which tiles can be embedded in applied adhesive and meet tensile adhesion strength requirement must be ≥ 30 minutes. This designation does not apply to reaction resin adhesives (R).
9) Deformability (S): Capacity of hardened adhesive to be deformed by stresses between tile and substrate without damage to installed surface – to pass S1 requirements an adhesive must be able to deform ≥ 2.5mm but < 5mm; to pass S2 requirements an adhesive must be able to deform ≥ 5mm. This designation does not apply to reaction resin adhesives (R).
10) Exterior Glue Plywood (P): Adhesive with ability to bond tile or stone to exterior glue plywood substrates (interior only). This designation does not apply to reaction resin adhesives (R) or dispersion adhesives (D).

b. Grouts:

Types	Classes	Special Characteristics
CG = Cementitious Grout	1 = Normal 2 = Improved	F = Fast-Setting A = High Abrasion Resistance W = Reduced Water Absorption
RG = Reaction Resin Grouts	1 = Normal 2 = Improved	Higher performance characteristics than improved cementitious grouts

1) Cementitious Grout (CG): Mixture of hydraulic binding agents (e.g. portland cement), aggregates, inorganic and organic additives (e.g. latex polymers, moisture retention additive, etc…).
2) Reaction Resin Grout (RG): Single or multi-component mixture of synthetic resin, mineral fillers and organic additives in which curing occurs by chemical reaction – epoxy or urethane based products.
3) Class 1 (1): Grout has passed minimum pass level tests that are mandatory for cementitious grouts.
4) Class 2 (2): Cementitious grout has passed same tests as Class 1 and/or other applicable tests, but at higher pass levels.
5) Fast-Setting (F): Grout with accelerated cure time that must achieve minimum compressive strength requirements under normal conditions within twenty four (24) hours. This designation applies only to cementitious grouts (CG).

6) High Abrasion Resistance (A): Capability of grout to resist wear. This designation applies only to cementitious grouts (CG).
7) Reduced Water Absorption (W): Grout has lower water absorption rate than standard cementitious grout. This designation applies only to cementitious grouts (CG).

6. Latex/Polymer Modified Portland Cement Mortar: Latex/Polymer modified portland cement mortar is a mixture of portland cement, sand, and special latex/polymer additive that is used as a bond coat for setting tile.
7. Pavers: Unglazed porcelain or natural clay tile formed by dust-pressed method and similar to ceramic mosaics in composition and physical properties but relatively thicker with 6 inch - or more of facial area. (ASTM C242).
8. Sanded Cement Grout: Factory prepared mixture of cement, graded sand, and other ingredients to produce water-resistant, dense, uniformly colored material. Used for joints of 1/8 inch (3 mm) width or greater.
9. Static Coefficient of Friction (SCOF): Measures ratio of forces necessary to start two surfaces sliding (older measurement of friction replaced by dynamic coefficient of friction (DCOF)).
10. Unsanded Cement Grout: Factory prepared mixture of cement and additives that provide water retentivity. Used for joints of 1/8 inch (3 mm) or less.

C. Reference Standard:
1. American National Standards Institute:
a. ANSI A108/A118/A136.1, 'American National Standards Specifications for the Installation of Ceramic Tile', Version 2013.1 (compilation of standards):
1) Installation Standards:
a) A108.01, ‘General Requirements: Subsurfaces and Preparation by Other Trades'.
b) A108.02, ‘General Requirements: Materials, Environmental, and Workmanship'.
c) A108.05, ‘Installation of Ceramic Tile with Dry-Set Portland Cement Mortar of Latex-Portland Cement Mortar'.
d) A108.6, ‘Installation of Tile with Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy’.
e) A108.10, ‘Installation of Grout in Tilework'.
f) A108.17, ‘Installation of Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone'.
2) Material Specifications:
a) A118.1, ‘Dry-Set Portland Cement Mortar'.
b) A118.3. 'Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive'.
c) A118.4, ‘Latex Portland Cement Mortar'.
d) A118.6, 'Cement Grouts for Tile Installation'.
e) A118.7, ‘High-Performance Polymer Modified Latex/Portland Cement Grouts for Tile Installation’.
f) A118.10, ‘Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations'.
g) A118.12, ‘Crack Isolation Membranes for Thin-set Ceramic Tile and Dimension Stone Installations'.
b. ANSI A137.1, 'National Standard Specifications for Ceramic Tile'.
2. ASTM International:
a. ASTM A1064/A1064M-17, 'Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete'.
b. ASTM C144-11, ‘Standard Specification for Aggregate for Masonry Mortar'.
c. ASTM C150/C150M-17, ‘Standard Specification for Portland Cement'.
d. ASTM C206-14, ‘Standard Specification for Finishing Hydrated Lime'.
e. ASTM C207-06(2011), ‘Standard Specification for Hydrated Lime for Masonry Purposes'.
f. ASTM C242-15, ‘Standard Terminology of Ceramic Whitewares and Related Products’.
g. ASTM C373-16, 'Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products'.
h. ASTM C482--02(2014), 'Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste'.
i. ASTM C501-84(2015), 'Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser'.
j. ASTM C648-04(2014), 'Standard Test Method for Breaking Strength of Ceramic Tile'.

k. ASTM C847-14a, ‘Standard Specification for Metal Lath'.

3. International Organization for Standardization:
   a. ISO 13007-1-2013, ' Ceramic tiles - Grouts and adhesives - Part 1: Terms, definitions and specifications for adhesives'.
   b. ISO 13007-2-2013, ' Ceramic tiles - Grouts and adhesives - Part 2: Test methods for adhesives'.
   c. ISO 13007-3-2013, ' Ceramic tiles - Grouts and adhesives - Part 3: Terms, definitions and specifications for grouts'.
   d. ISO 13007-4-2013, ' Ceramic tiles - Grouts and adhesives - Part 4: Test methods for grouts'.
4. Tile Council of North America:
   a. TCNA F111-15, ‘On-Ground or Above-Ground Concrete, Unbonded Mortar Bed, Ceramic Tile’.
   b. TCNA F113-15, ‘On-Ground or Above Ground Concrete, Ceramic Tile (Direct Bond w/Optional Membrane).
   c. TCNA F115-15, ‘On-Ground Concrete, Ceramic Tile, Epoxy or Furan Grout’.
   d. TCNA F125a-15 ‘On Ground or Above Ground Concrete’ – Crack Isolation Membrane – Ceramic Tile’.
   e. TCNA W211-15, ‘Masonry or Concrete, Bonded Mortar Bed, Ceramic Tile’.
   f. TCNA W221-15, ‘Solid Backing, Mortar Bed, Ceramic Tile’.
   g. TCNA W244c-15, ‘Wood or Metal Studs, Cement Backer Board, Ceramic Tile’.
   h. TCNA W245-15, ‘Wood or Metal Studs, Coated Glass Mat Water-Resistant Gypsum Backer Board, Ceramic Tile’.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. In addition to agenda items specified in Section 01 3100, review following:
      a. Review installation scheduling, coordination with related work, and placement of tile.
      b. Review Manufacturer’s installation requirements, submittals, and Installers requirements to assure issuance of Manufacturer’s system warranty.
      c. Review surface preparation.
      d. Review water-proofing and crack isolation membrane requirements.
      e. Review tile base installation requirements.
      f. Review floor tile grout thickness requirements.

1.4 SUBMITTALS

A. Action Submittals:
   1. Samples:
      a. 24 inch (600 mm) square sample on specified tile backer showing all types of tile, grout, and colors specified in this Section. 1/2 of sample board shall show floor tile and 1/2 shall show wall tile.
      b. One sample of each type of base tile and trim piece to be used on Project.

B. Informational Submittals:
   1. Certificates:
      a. Master grade certificate.
         1) Conform to ANSI A137.1.
   2. Manufacturer’s Instructions:
      a. Provide instructions for installation of tile-setting materials.
   3. Source Quality Control Submittals:
      a. Provide Manufacturer documentation indicating proposed materials will satisfy requirements for Manufacturer's Warranty.
   4. Qualification Statement. See Section 01 4301 for qualifications:
      a. Installer:
         1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Operations and Maintenance Data:
1) Cleaning and maintenance instructions.
b. Warranty Documentation:
1) Include copy of final, executed warranty.
c. Record Documentation:
1) Manufacturers Documentation:
a) Source Quality Control Submittal documentation showing materials will satisfy requirements for Manufacturer's Warranty.
b) Manufacturer's cut sheets of materials used in installed system.
c) Tile color and pattern selections.

D. Maintenance Material Submittals:
1. Extra Stock Materials:
a. Twenty-five (25) wall tile and (25) accent tiles.

E. Source Of Materials:
1. Provide materials obtained from one (1) source for each type and color of tile, grout, and setting materials for Manufacture's system warranty.

F. Qualifications:
1. Installer: Requirements of Section 01 4301 applies, but not limited to following:
a. Minimum three (3) years' experience installing specified tile installations.
b. Minimum five (5) satisfactorily completed installations of comparable quality, scope, similar size, and complexity in past two (2) years before bidding.
c. Upon request, submit documentation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Deliver and store packaged materials in their original unopened containers with labels intact until time of use.

B. Storage and Handling Requirements:
1. Store and handle materials in a manner to prevent damage or contamination by water, freezing, or foreign matter.
2. Keep grade seals intact and cartons dry until tile are used.

1.6 FIELD CONDITIONS

A. Ambient Conditions:
1. Do not apply tile setting materials to surfaces that contain frost.
2. Keep ambient temperatures of area to receive tile work and surface temperatures of substrates at 50 deg F (10 deg C) minimum during preparation of mortar bed, laying of tile, and for seventy-two (72) hours after completion of tile work. Use electric heat to prevent discoloration of grout.
3. Temperature of substrate shall be 60 deg F (15.6 deg C) and rising for application of epoxy and furan unless otherwise specifically authorized by Manufacturer.
4. Maintain epoxy at stable temperature between 60 deg F (15.6 deg C) and 90 deg F (32 deg C) during curing period.

1.7 WARRANTY

A. Manufacturer Warranty:
1. Mortar Manufacturer's twenty-five (25) year minimum system warranty on tile-setting materials for surface preparation, setting materials and grouting materials; includes replacement of defective

materials and deterioration, including replacement of tile and labor and materials when products purchased are used within their shelf life and installed in accordance to Manufacturers written instructions and industry standard guidelines.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
1. Manufacturer's Contact List:
   a. Ardex Engineered Cements, Aliquippa, PA www.ArdexAmericas.com.
      1) Contact Information: Don Richards (206) 979-0401 www.Don.richards@ArdexAmericas.com.
   b. Custom Building Products, Seal Beach, CA www.custombuildingproducts.com.
      1) Contact Information: John Gallup (206) 718.6024 johng@cbpmail.net.
   c. Dal-Tile Corp., Div. of Mohawk Industries, Dallas, TX www.daltile.com.
   d. Interceramic Inc., Garland, TX www.interceramic.com.
   e. Laticrete International Inc., Bethany, CT www.laticrete.com.
   f. Mapei Americas Headquarters, Deerfield Beach, FL www.mapei.com.
      1) Contact Information: Bart A. Wilde (801) 467-2060 www.bwilde@mapei.com.
   g. Merkrete, by Parex USA, Inc., Anaheim, CA www.merkrete.com.
      1) Contact Information: Andy Townes (505) 873-1181 andy.townes@parexusa.com.
   h. Schulter Systems L.P., Plattsburgh, NY www.schluter.com.

B. Category Two National Contract Suppliers. See Section 01 6200 for definitions of Categories:
1. Contact following suppliers to procure components of tile assembly:
   a. Daltile And Stone, Salt Lake City, UT:
      1) LDS Project Coordinators:
         a) Russ Green and Larry McCleary, (801) 487-9901, cell (801) 301 1461, fax (801) 487-0345 larry.mccleary@daltile.com - www.daltileproducts.com or www.daltilegreenworks.com.
   b. Interceramic:
      1) LDS Project Coordinators:
         a) First Contact: Diego Chavez, phone (214) 503-5433, fax (877) 551-1979 dichavez@interceramic.com.
         b) Second Contact: Jose Valdez, phone (214) 503-5507, fax (877) 551-1979 jvaldez@interceramic.com.

C. Design Criteria:
1. General:
   a. Paver Tile: Standard grade porcelain tile, solid color throughout, graded in accordance with ANSI A137.1:
      1) Cove Base with external and internal corner pieces shall be standard grade.
   b. Ceramic Tile:
      1) Tile shall be standard quality, white or off-white body, square or cushion edge, graded in accordance with ANSI A137.1.
      2) Square edge, white body, lug type wall tile. Field wall tile shall have two lugs on each edge to assure uniform joint, approximately 0.040 inch (one mm).
      3) External and internal corner pieces shall be standard grade.
2. Capabilities:
   a. Paver Tile:
      1) Water Absorption when tested in accordance with ASTM C373: 0.1 to 0.5 percent.
      2) Abrasive Wear Resistance when tested in accordance with ASTM C501: 275 minimum.
      3) Breaking Strength when tested in accordance with ASTM C648: 300 lbs minimum.
      4) Bond Strength when tested in accordance with ASTM C482: 200 psi minimum.
      5) Coefficient of Friction: 0.42 minimum as measured by DCOF (Dynamic Coefficient of Friction) AcuTest method and requirements as per ANSI A137.1.

D. Description:
1. Ceramic Tile:
a. Wall Tile:
1) Walls Field Tile: 12 inches by 24 inches (200 mm) rectangle.
2) Walls Accent Tile: 3 inches by 6 inches rectangle.
b. Category Four Approved Color/Sheen:
1) Daltile: Rhetoric RT05
2) QTC: 3x6
3) Approved Colors:
a) Room Walls (Field Tile) - Color No 1:
(1) Aristotle White
b) Accent Color - Men Restroom: Color 2:
(1) QTC 3X6 Graphite QF08/Lapis QF46
c) Accent Color - Women Restroom: Color 3:
(1) QTC 3x6 Graphite QF08/Bordeaux QF47

E. Materials:
1. Wall Tile:
a. Category Four Approved Products. See Section 01 6200 for definition of Categories:
1) Semi-Gloss or Matte by Dal-Tile.
2. Mortar Bed:
a. Portland Cement: Meet requirements of ASTM C150/C150M, Type 1, designation shall appear on bag.
b. Hydrated Lime:
1) Meet Requirements of one of following:
a) ASTM C206.
b) ASTM C207, Type S (designation shall appear on bag).
c. Sand: Clean, washed, well-graded, meeting requirements of ASTM C144 with gradation of 100 percent passing No. 8 sieve with not over five (5) percent passing No. 100 sieve.
d. Latex Additive; in lieu of all water:
1) Design Criteria:
a) Meet material specification requirements of ANSI A118.4 or ANSI 118.11.
b) Meet ANSI installation specification requirements of ANSI A108.5.
c) Expansion joints complies with TCA method EJ171.
2) Type Two Acceptable Products:
a) ARDEX: Ardex E 90 Mortar Admix.
b) CUSTOM: Thin-Set Mortar Admix.
c) LATICRETE: 4237 Latex Additive with 211 Powder.
d) MAPEI: Planicrete AC.
e) MERKRETE: 150 Latex Admixture.
3. Metal Trim:
a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Tile / Carpet Junction: Schluter-RENO-AETK.
4. Joint Sealants:
a. Interior Ceramic Tile Joints are furnished in Section 07 9213 and installed in Section 09 3013 'Ceramic Tiling' including the following:
1) Ceramic and paver cove base inside corners.
2) Ceramic and paver tile joints.
b. Standard color to closely match grout joints as selected by Architect:
5. Backer Board Joint Reinforcing: 2 inch (50 mm) wide glass fiber mesh tape.
6. Tile Setting Products:
a. Use only products of same Manufacturer to validate warranty, unless otherwise acceptable to Ceramic Tile Supplier.
b. Use only products that meet Mortar Manufacturer’s twenty five (25) year system warranty requirements.
c. Latex-Portland Cement Mortar For Floors:
1) Design Criteria:
a) Meet ANSI material specification requirements of ANSI 118.4, ANSI 118.11, or ANSI A118.15.

b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and . C2ES1P2 performance requirements for adhesive.

2) Category Four Approved Products. See Section 01 62 00 for definitions of Categories:
   a) ARDEX: Ardex X77.
   b) CUSTOM: Megalite Crack Prevention Mortar or FlexBond Premium Crack Prevention Thin-set Mortar (no additives needed).
   c) LATICRETE: 254 Platinum Thinset.
   d) MAPEI: Ultraflex 3.
   e) MERKRETE: 735 Premium Flex.

d. Latex/Polymer Modified Portland Cement Mortar For Walls:
   1) Design Criteria:
      a) Meet ANSI material specification requirements of ANSI 118.4, ANSI 118.11, or ANSI A118.15.
      b) Meet ANSI installation specification requirements of ANSI A108.4 or ISO material specification ISO13007 installation material specification and C2ES1P2 performance requirements for adhesive.
   2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a) ARDEX: Ardex X77.
      b) CUSTOM: Megalite Thin-Set Mortar or FlexBond Fortified Thin-Set Mortar.
      c) LATICRETE: 254 Platinum Thinset.
      d) MAPEI: Ultraflex 3.
      e) MERKRETE: 735 Premium Flex.

e. Wall Grout (Modified Polymer):
   1) Design Criteria:
      a) Meet ANSI material specification requirements of ANSI A118.6 or ANSI A118.7.
      b) Meet ANSI installation specification requirements of ANSI 108.10 or ISO material specification ISO13007 C2ES1P2.
   2) Color:
      a) MAPEI: Platinum 115
   3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a) MAPEI: Keracolor-U Unsanded Polymer-Modified Grout.

f. Waterproofing Membrane:
   1) Design Criteria:
      a) Meet ANSI installation specification requirements of ANSI 108.10.
      b) ANSI installation specification requirements not required.
   2) Category Four Approved Products. See Section 01 6200 for definitions for Categories:
      a) Troweled applied, cement based:
         (1) ARDEX: Ardex 8+9.
         (2) MAPEI: Mapelastic 315.
      b) Liquid applied, latex based:
         (1) CUSTOM: RedGard Waterproofing or Crack Prevention Membrane or FractureFree Crack Prevention Membrane.
         (2) LATICRETE: Hydro Ban.
         (3) MAPEI: Mapelastic AquaDefense.
         (4) MERKRETE: Hydro-Guard SP-1.

g. Crack Isolation Membrane:
   1) Design Criteria:
      a) Meet ANSI installation specification requirements of ANSI 118.12.
      b) ANSI installation specification requirements not required.
   2) Category Four Approved Products. See Section 01 6200 for definitions for Categories:
      a) Flexible, thin, load-bearing, fabric-reinforced:
         (1) ARDEX: Ardex 8+9 with SK Mesh Tape.
         (2) CUSTOM: Crack Buster Pro Crack Prevention Mat Underlayment, with Peel & Stick Primer.
         (3) LATICRETE: Blue 92 Anti-Fracture Membrane.
         (4) MAPEI: Mapeguard 2, and Primer SM.
         (5) MERKRETE: Hydro-Guard SP-1.
      b) Liquid applied, latex based:

(1) CUSTOM: RedGard Waterproofing and Crack Prevention Membrane or FractureFree Crack Prevention Membrane.
(2) LATICRETE: Hydro Ban.
(3) MAPEI: Mapelastic AquaDefense.
(4) MERKRETE: Fracture Guard 5000.

h. Stone Thresholds:
1) Texture and color variation shall be within limits established by Architect's approved sample.
2) Free of defects that would materially impair strength, durability, and appearance.
3) Finish: 80 grit exterior hone.
4) White marble, one (1) piece, 7/8 inch (22 mm) thick by door jamb width by door opening width (see Contract Drawings). Cross-section to meet handicap accessibility requirements.

F. Mixes:
1. Mortar Beds:

	Portland Cement	Dry Sand	Damp Sand	Hydrated Lime*
Floor Mix	One Part	5 Parts	4 Part	1/10 Part
Wall Mix	One Part	- -	5-1/2 to 7 Parts	1/2 Part

* Optional

PART 3 - EXECUTION:

3.1 INSTALLERS

A. Approved Installers. See Section 01 4301:

B. Acceptable Installers. See Section 01 4301:
1. Meet Quality Assurance Applicator Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Verification Of Conditions:
1. Examine substrates where tile will be installed for compliance with requirements for installation tolerances and other conditions effecting performance of installed tile.
2. Verify tile substrate is well cured, dry, clean, and free from oil or waxy films, and curing compounds.
3. Notify Architect in writing if surfaces are not acceptable to install tile:
a. Do not lay tile over unsuitable surface.
b. Commencing installation constitutes acceptance of surfaces and approval of existing conditions.

3.3 PREPARATION

A. Surface Preparation:
1. Allow concrete to cure for twenty-eight (28) days minimum before application of mortar bed.
2. Repair and clean substrate in accordance with installation standards and manufacturer's instructions.

3.4 INSTALLATION

A. Interface With Other Work:

1. Grounds, anchors, plugs, hangers, door frames, electrical, mechanical, and other work in or behind tile shall be installed before tile work is started.

B. Special Techniques:
   1. Install in accordance with following latest TCNA installation methods:
      a. Flush Concrete Slabs with crack isolation membrane: TCNA F115.
      b. Mortar Bed on Concrete Slab: TCNA F111 with reinforcing.
      c. Framed Walls: TCNA W245 with waterproof membrane.
      d. Tile Cove Base: TCNA Flush style.

C. Tolerances:
   1. Plane of Vertical Surfaces:
      a. 1/8 inch in 8 feet (3 mm in 2.450 meters) from required plane shall be plumb and true with square corners.
   2. Variation In Slab Grade:
      a. Plus or minus 1/8 inch (3 mm) in any 10 feet (3.050 m) of floor slab and distance between high point and low point of slab of 1/2 inch (12.7 mm).
      b. Slab Testing Procedure:
         1) Place ends of straightedge on 3/8 inch (10 mm) high shims.
         2) Floor is satisfactory if 1/4 inch (6 mm) diameter steel rod rolled under straightedge will not touch anywhere along 10 foot (3.050 m) length and 1/2 inch (12.7 mm) diameter steel rod will not fit under straightedge anywhere along 10 foot (3.050 m) length.

D. General:
   1. Install tile in pattern indicated:
      a. Align joints when adjoining tiles on floor, base, walls, and trim are same size.
      b. Adjust to minimize tile cutting and to avoid tile less than half size.
      c. Center and balance areas of tile if possible.
   2. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruption:
   3. Maintain heights of tilework in full courses to nearest obtainable dimension where heights are given in feet and inches (meters and millimeters) and are not required to fill vertical spaces exactly.
   4. Install cut tile with cuts on outer edges of field:
      a. Provide straight cuts that align with adjacent materials.
      b. When possible, smooth cut edges of tile or use appropriate cutter or wet saw to produce smooth cuts.
      c. Do not install tile with jagged or flaked edges.
   5. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment:
      a. Fit tile closely where edges are to be covered by trim, escutcheons, or similar devices.
   6. Provide straight tile joints of uniform width, subject to variance in tolerance allowed in tile size:
      a. Make joints smooth and even, without voids, cracks, or excess mortar or grout.
   7. Use a beating block and hammer or rubber mallet so faces and edges of individual tiles are flush and level with faces and edges of adjacent tiles, and to reduce lippage.
   8. Accessories in tilework shall be evenly spaced, properly centered with tile joints, and level, plumb, and true to correct projection.
   9. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

E. Application Of Mortar:
   1. Do not spread more mortar than can be covered within ten (10) to fifteen (15) minutes:
      a. If 'skinning' occurs, remove mortar and spread fresh material.
      b. Spread mortar with notches running in one (1) direction, perpendicular to pressing, pushing and pulling of tile during placement.
   2. Install tile before mortar has started initial cure:
      a. For thin set mortar application, use notch trowel that will achieve the recommended coverage of mortar after tiles have been installed.
   3. Place tile in fresh mortar, press, push and pull tile slightly to achieve as near 100 percent coverage and contact of tile with setting material and substrate as possible:

a. Average contact area shall be not less than eighty (80) percent except on exterior or shower installations where contact area shall be ninety-five (95) percent when not less than three (3) tiles or tile assemblies are removed for inspection. The eighty (80) percent or ninety-five (95) percent coverage shall be sufficiently distributed to give full support of the tile.
b. Support corners and edges with mortar leaving no hollow corners or edges.

4. Install so there is 1/8 inch (3 mm) of mortar between tile and substrate after proper bedding:
   a. Periodically remove sheets or individual tiles to assure proper bond coverage consistent with industry specifications.
   b. If coverage is found to be insufficient, use a larger size notch trowel.

F. Application Of Grout:
1. Firmly set tile before applying grout:
   a. This requires forty-eight (48) hours minimum.
2. Before grouting:
   a. Remove all paper and glue from face of mounted tile.
   b. Remove spacers or ropes before applying grouting:
3. Mixing Grout:
   a. Use clean buckets and mixing tools:
      1) Use sufficient pressure and flow grout in progressively to avoid air pockets and voids.
   b. Machine mixing of grout is preferred to assure uniform blend. To prevent trapping air bubbles into prepared grout, use slow speed mixer.
   c. Slake for fifteen (15) minutes.
   d. Water or latex additives used for mixing with dry grout shall be measured accurately.
4. Before grouting entire area, do a test area to assure there will be no permanent staining or discoloration of tile and to verify that excess grout can be easily removed from tile surface:
   a. If necessary, pre-coat exposed surfaces of tile with a grout release recommended by Grout Manufacturer to facilitate removal of excess grout.
5. Installing Grout:
   a. Use caution, when grouting glazed ceramic tiles to prevent scratching or damaging surface of tile.
   b. Dampen dry joints prior to grouting with sand-portland cement grout, standard sanded cement grout, standard unsanded cement grout, polymer modified sanded tile grout, and polymer modified unsanded tile grout. Do not leave puddles of water in joints before grouting.
   c. Keep an adequate joint depth open for grouting. Force maximum amount of grout into joints.
   d. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps
      1) Fill joints of cushion edge tile to depth of cushion.
      2) Fill joints of square edge tile flush with surface.
      3) Fill joint between wall tile and bull-nosed paver tile base with floor grout.
   e. Install floor tile with grout thickness of 3/16 inch (4.76 mm) maximum.
   f. Remove excess grout from surface of tile before it loses its plasticity or begins to set.
   g. Finished grout shall be uniform in color, smooth, and without voids, pin holes, or low spots.

G. Curing:
1. Keep installation at 65 to 85 deg F (18 to 30 deg C) during first eight (8) hours of cure. Shade area completely from sun during this period.

H. Application of Joint Sealants:
1. Apply joint sealants after grout has cured:
   a. This requires forty-eight (48) hours minimum.
2. Before applying sealant:
   a. Remove spacers or ropes before applying joint sealants.
   b. Apply backer rod and joint sealants at expansion joints.

3.5 FIELD QUALITY CONTROL

A. Non-Conforming Work:
1. Correct any work found cracked, chipped, broken, unbounded and otherwise defective or not complying with contract document requirements at no additional cost to the Owner.

3.6 CLEANING

A. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter:
   1. If a grout haze or residue remains, use a suitable grout haze remover or cleaner.
   2. Flush surface with clean water before and after cleaning.

3.7 PROTECTION

A. Close to traffic areas where tile is being set and other tile work being done:
   1. Keep closed until tile is firmly set.
   2. Before, during, and after grouting, keep area clean, dry, and free from foreign materials and airflow that will interfere with setting and curing of grout.

B. Newly tiled floors shall not be walked on nor worked on without using kneeling boards or equivalent protection of tiled surface.

C. After cleaning, provide protective covering and maintain conditions protecting tile work from damage and deterioration:
   1. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, cover protective covering with 1/4 inch (6 mm) hardboard, plywood, or similar material.

END OF SECTION

SECTION 09 6513

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished and Installed Under this Section:
   1. Resilient base as described in Contract Documents.

1.2 REFERENCES

A. Definitions:
   1. Flame Spread: Propagation of flame over a surface.
   2. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.
   3. Resilient Wall Base Classification:
      a. Type:
         1) TS: Rubber, vulcanized thermoset.
         2) TP: Rubber, thermoplastic.
         3) TV: Vinyl, thermoplastic.
      b. Group:
         1) Group 1: Solid (homogeneous).
         2) Group 2: Layered (multiple layers).
      c. Styles:
         1) Style A: Straight.
         2) Style B: Cove.
         3) Style C: Butt-to.
   4. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84 or UL 723.

B. Reference Standards:
   1. ASTM International:
      a. ASTM E84-18b, ‘Standard Test Method for Surface Burning Characteristics of Building Materials'.
      b. ASTM F1861-16, ‘Standard Specification for Resilient Wall Base'.
   2. Underwriters Laboratories, Inc.:
      a. UL 723: ‘Standard for Safety Test for Surface Burning Characteristics of Building Materials'; (2010 - Tenth Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate completion of resilient base and accessories installation with other trades.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheet on base and adhesive.
      b. Color selection.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Fire-Test-Response Characteristics:
a. Surface-Burning Characteristics:
1) Base shall have Class B flame spread rating in accordance with ASTM E84 or UL 723.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage And Handling Requirements:
1. Store materials in dry space protected from weather at not less than 55 deg F (12.8 deg C) or more than 85 deg F (29.4 deg C) or as per Manufacturer's recommendation.
2. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Store materials at not less than 70 deg F (21 deg C) for at least twenty four (24) hours before installation.
2. Do not apply in temperatures below 70 deg F (21 deg C).

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

A. Manufacturers:
1. Category One Approved Manufacturers:
a. Roppe Corporation, Fostoria, Fostoria, OH www.roppe.com.

B. Materials:
1. Wall Base:
a. General:
1) Size:
a) Minimum body thickness: 1/8 inch by 4 inch (3 mm by 100 mm). Verify to match existing height.
b) Length: not less than normal.
2) Corners:
a) Use preformed, molded external corners for both inside and outside corners.
b) Butt joint interior corners.
c) Corners must meet same height and thickness requirements as wall base.
b. Design Criteria:
1) Meet requirements of ASTM F1861, Type TP or TS, Group 1 (solid), Style B (cove).
2) Free from objectionable odors, blisters, cracks, and other defects affecting appearance or serviceability of rubber, and not containing fabric.
3) Style: Coved.
c. Approved Colors:
1) General:
a) Color pigments used shall be highly fade-resistant, insoluble in water, and resistant to light, alkali, and cleaning agents.
2) Wall Base (all areas unless otherwise noted):

a) Dark Gray by Roppe. Verify to match existing color.

d. Category One Approved Products. See Section 01 6200 for definitions of Categories:
1) Rubber Wall Base by Roppe.

2. Adhesive:
a. Use products recommended by Manufacturer for conditions of use.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Inspect surfaces for conditions not suitable for installation. Surface to receive specified items shall be sound, clean, free from foreign matter, tightly nailed, and dry.
2. Notify Architect of unsuitable conditions in writing:
a. Do not start work until defects are corrected.
3. Commencement of Work by installer is considered acceptance of substrate.

3.2 PREPARATION

A. Surface Preparation:
1. Remedy cracks and minor irregularities in substrate in accordance with Manufacturer's recommendations.

3.3 INSTALLATION

A. Base:
1. Install in manner to produce smooth, even finished surfaces tightly jointed and accurately aligned.
2. Fit specified items tightly. Use fillers where necessary. Fit neatly against projections, piping, electrical service outlets, etc.
3. Secure specified items with specified adhesive. Cement substantially to vertical surfaces including rubber base to cabinet work base.
4. Line up top and bottom lines of base throughout.
5. Do not stretch base during installation.
6. Roll until firm bond has been established. Leave level, free from buckles, cracks, and projecting edges.
7. In wall runs longer than 12 inches (300 mm), install no lengths of base shorter than 12 inches (300 mm) long.

3.4 FIELD QUALITY CONTROL

A. Non-Conforming Work:
1. Replace damaged materials at no additional cost to Owner.
2. Damaged materials are defined as having cuts, gouges, scrapes or tears, and not fully adhered.

3.5 CLEANING

A. General:
1. Base:
a. Clean all exposed surfaces of base of adhesive spatter before it sets in accordance with Manufacturer’s cleaning instructions.
b. Damp-mop surfaces to remove marks and soil.
2. Adjacent Work:

a. Clean all exposed surfaces of adjoining areas of adhesive spatter before it sets.

3.6 PROTECTION

A. Base:
1. Cover material until Substantial Completion.
2. Keep traffic away until adhesive has set.

END OF SECTION

SECTION 09 6720

SEAMLESS EPOXY QUARTZ FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes, but not limited to:
   1. Coordination, sequencing, scheduling, and installation of fluid applied epoxy quartz flooring and cove base, as described in contract documents.
      a. Coordinate with Section 09 0503 for testing agency of alkalinity and concrete moisture of concrete slab before Pre-Installation Conference.
      b. Schedule Pre-Installation Conference.
      c. Maintain building ambient conditions including normal levels of humidity, lighting, heating, and air conditioning for substrate preparation and flooring installation.

B. Flooring assembly consist of the following labor, products, equipment and services necessary for resinous flooring work in accordance with the Contract Drawings covering the following components:
   1. Primer
   2. Epoxy Mortar
   3. Grout Coat
   4. Top Coat
   5. Urine resistant finish coat

C. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary' for:
      a. Alkalinity and Concrete Moisture of concrete slab.
   2. Section 01 3100: 'Project Management and Coordination' for pre-installation conference.
   3. Section 01 4523: 'Testing and Inspecting Services' for testing and Inspection, and testing laboratory services for materials, products, and construction methods.
   4. Section 03 0100 'Concrete Rehabilitation
   5. Section 03 3111: 'Cast-In-Place Structural Concrete' for provision of acceptable concrete substrate.
   6. Section 03 3900 'Concrete Curing'.
   7. Section 07 2616: 'Below Grade Vapor Retarders' for installation of below grade vapor retarder.
   8. Section 09 0503: 'Floor Substrate Preparation'.

1.2 REFERENCES

A. Association Publications:
   1. American Concrete Institute Farmington Hills, MI www.concrete.org. Abstracts of ACI Periodicals and Publications.
      a. ACI 302.2R-06, Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials (August 15, 2006).

B. Reference Standards:
   1. ASTM International:
      a. ASTM C579, Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
      b. ASTM F710-11, 'Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.'
      c. ASTM F2170-16b, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.'

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate installation and completion of flooring with other trades.

B. Pre-Installation Conference:
1. Participate in MANDATORY pre-installation conference.
2. Schedule conference after substrate preparation and one (1) week minimum before installation of flooring system.
3. In addition to agenda items specified in Section 01 3100, review the following:
   a. Review testing agency testing report of alkalinity and concrete moisture of concrete slab.
      1). Follow testing agency report regarding alkalinity and concrete moisture of concrete slab as specified in Section 09 0503 'Floor Substrate Preparation'.
4. Review schedule for installation of epoxy flooring and cove base.
5. Review flooring manufacturer's installation conditions verification procedure and requirements.
6. Review building ambient conditions including normal levels of humidity, lighting, heating, and air conditioning for acceptability for beginning floor preparation and installation.
7. Review high moisture remediation options when high moisture exists based on moisture testing specified in Section 09 0503 Flooring Substrate Preparation.

C. Sequencing:
1. Testing agency to provide testing for alkalinity and concrete moisture as specified in Section 09 0503 'Floor Substrate Preparation' before Pre-Installation conference.
2. Notify flooring installer when building ambient conditions requirements are met before installation of flooring system.

D. Scheduling:
1. Testing agency to provide testing for alkalinity and concrete moisture of concrete slab as specified in Section 090503 'Floor Substrate Preparation'.
2. Notify flooring installer when building ambient condition requirements are met before installation of flooring system.

1.4 SUBMITTALS

A. Action Submittals;
1. Product Data:
   a. Flooring manufacturer's literature or cut sheet for each component of system.
   b. Maintenance instructions.
   c. Color and style selection.
   d. Installation methods.
   e. Manufacturer's Safety Data Sheet for each product being used.

B. Selection Samples: For each finished product specified, submit two samples 4 x 4 inches in size illustrating color, chip size and variation, and matrix color.

C. Verification Samples: For each finish product specified, submit two samples 4 x 4 inches in size in color, chip size and variation, and matrix color, representing actual product scheduled.

D. Closeout Submittals:
1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
   a. Record Documentation:
      1) Manufacturers documentation:
         a) Manufacturer's literature
         b) Color and style selection.
      2) Testing and Inspection Reports:
         a) Testing agency test reports of alkalinity and concrete moisture testing.

E. Maintenance Instructions; Submit manufacturer's maintenance instructions.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installation shall be performed by an applicator approved by the manufacturer of the floor surfacing materials. The Contractor shall furnish a letter from manufacturer certifying they are an approved applicator for that manufacturer's flooring products.
   1. Each bidder for this project shall be pre-qualified and approved in writing by the material manufacturer.
   2. Applicator Experience: Each bidder must have a minimum of 5 years experience in the application of the type of system specified. Contractor shall submit a list of five projects of similar size, scope and complexity.

B. Mock-Up: Provide a 100 sf mock-up of each type and color of resinous flooring in location acceptable to Architect/Engineer to demonstrate quality of finished system, complying with manufacturer's instructions.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect. Obtain written acceptance before proceeding with installation.
   3. Refinish mock-up area as required to produce acceptable work. Upon acceptance, mock-up shall serve as a minimum standard of quality for the balance of the work of this section. Mock-up shall remain for the duration of the installation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the job site in manufacturer's original unopened containers and packaging, with labels clearly identifying product name and manufacturer, batch or lot number, and date of manufacturer.

B. Store and handle materials in accordance with the manufacturer's instructions.
   1. Store materials in dry, enclosed area with adequate protection from moisture.
   2. Keep containers sealed until ready for use.

C. Storage Temperature: Store between 65 degrees (18 degrees C) and 90 degrees F (32 degrees C) F.

D. Record material lot number and quantity delivered to jobsite/storage.

1.7 FIELD CONDITION

A. Roof shall be complete and building enclosed prior to flooring commencement.

B. Precondition material for at least 24 hours between 65° to 75° F (18° to 24°C) 24 hours before, during and after installation of flooring.

C. Substrate Temperature: Minimum/Maximum 50° / 85° F (10° / 30° C). Substrate temperature must be at least 5° F (3° C) above measured Dew Point.

D. Mixing and Application attempted at Material, Ambient and/or Substrate Temperature conditions less than 65° F (18° C) will result in a decrease in product workability and slower cure rates.

E. Substrate Moisture:
   1. Moisture content of concrete substrate must be +/- 4% by mass as measured with a Tramex CME/CMExpert type concrete moisture meter.
   2. Additionally, relative humidity test may be conducted per ASTM F2170 and values must be +/- 85%.
   3. If moisture content of concrete substrate is greater than 4% by mass as measured with Tramex CME/CMExpert type and/or if relative humidity test per ASTM F2170 exceed values plus 85%, consider moisture mitigation systems or moisture tolerant primer.

4. Utilities, including electricity, water, HVAC and permanent lighting to be provided by General Contractor.
5. Erect suitable barriers and post legible signs at points of entry to prevent traffic and trades from entering the work area during application and cure period of the floor.
6. Protection of finished floor from damage by subsequent trades shall be the responsibility of the General Contractor.
7. Insure adequate ventilation and air flow.

1.8 WARRANTY

A. Provide a one (1) year manufactures warranty under provisions of Section 01770.

B. Warranty: Include coverage for delamination (separating of layers) of floor and cove base materials and degradation of surface finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer:
1. Flooring Manufacturer shall be certified under ISO 9001: 2008. All liquid materials, including primers, resins, curing agents, finish coats, and sealants are manufactured and tested under an ISO 9001:2008 registered quality system.

B. Approved Manufacturers:
1. Sika Corporation, Industrial Flooring, 201 Polito Ave, Lyndhurst, NJ 07071; 201-933-8800. www.sikafloorusa.com
2. As approved by Architect before bidding.

2.2 MATERIALS

A. A resin rich, seamless, epoxy based, decorative aggregate filled, resinous floor with high density and compressive strength for exceptional durability. Typically applied between 1/8” – 1/4” (3-6 mm) thick. System to consist of the following components:
1. Primer: 8 mils two-part epoxy resin for priming.
   a. Sikafloor 161 Primer.
2. Epoxy Mortar: Three-component, high solids epoxy, decorative aggregate filled, floor coating system with integral cove base. Epoxy mortar will be finished by hand troweling or power troweling at 1/8” –1/4” thick as required to refinish substrate conditions.
   a. Sikafloor Ducodur, Flake FX Understated style, color Genius.
3. Grout Coat and Top Coat: 8-12 mil thick, coat(s) of high performance clear epoxy.
   a. Sikafloor
4. Optional Top Coat: 4 – 5 mils of urine resistant, low viscosity, aliphatic polyurethane top coat.
   a. Sikafloor 315N: A high performance, uric acid resistant, abrasion resistant, aliphatic polyurethane clear sealer.
5. Cove Base:
   a. Sikafloor Ducodor, Flake FX Understated Style, color Genius.
6. Color: Genius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. General – Do not begin installation until substrates have been properly prepared.
   1. Verify that substrate is ready to receive flooring system. Notify Architect/General Contractor if surfaces are not acceptable. Do not begin surface preparation or application if surfaces are not acceptable. Do not apply to substrate treatments for moisture, repair, or leveling not of the same Manufacturer.
   2. Concrete hydrostatic, capillary or moisture pressure must be no greater than 3.0 lbs/1000 square feet/24 hours (4% part by weight as measured by Tramex CME/CMExpert type concrete moisture meter). Substrates in contact with the ground must have a properly installed, functioning and effective vapor retarder to help prevent potential problems resulting from hydrostatic, capillary or moisture vapor emission. Concrete must contain less than 3% moisture when tested per ASTM D1864.
   3. Maintain minimum concrete surface temperature between 55° and 85° F., and relative humidity below 80% for a minimum of 48 hours before, during and after installation, or until cured. Surface temperature must be 5° F, above dew point.
   4. Beginning work constitutes acceptance of substrate.
   5. Flooring system shall not be applied to asphaltic of bitumen membranes, soft wood, aluminum copper or fiberglass reinforced polyester ester composites.
   6. Application to glazed or vitrified brick or tile, structural wood, steel shall only be permitted with Manufacturer's written recommendation.

B. If substrate preparation and testing is the responsibility of another trade or installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 SURFACE PREPARATION

A. Substrate Requirements:
   1. Unless otherwise required, the General Contractor to provide positive drainage to floor drains.
   2. Gaps between wall sheathing and substrate shall be filled prior to commencement of flooring installation and per manufacturer's requirements.
   3. FRP and any other wall finish should terminate with J-molding or other trim at least 6 inches (152 mm) above finished floor.
   4. The substrate shall be clean, dry and sound. Remove dust, laitance, grease, curing compounds, waxes, foreign particles and any previous applied potentially no-compatible coatings by shot blasting or equivalent mechanical means. (CSP level as per ICRI guidelines and manufacturers written recommendation). Chemical Surface Preparation (acid etching) is unacceptable and will void Manufacturer's warranty.
   5. Concrete: New concrete must cure for at least 28 days at 70° F (21° C) and have been free from water for at least 7 days. Older floors should be scarified and thoroughly cleaned. If badly cracked, crumbling, punky or deeply contaminated with oil or fat, a new concrete topping of proper thickness and strength should be installed. Swollen areas should be chipped out and any cracks, spalls, joints or other depressions filled with proper grout. The concrete should be at least 3500 psi. Concrete hydrostatic, capillary or moisture pressure must be no greater than 3.0 lbs./1000 sf/24 hours.

3.3 APPLICATION

A. Mix and apply flooring in accordance with flooring manufacturer's instructions.

B. Do not apply while ambient and substrate temperatures are rising.

C. Apply resinous flooring with care to ensure that no laps, voids, trowel marks or irregularities are visible, and with an appearance of uniform color, sheen and texture, all within limitations of materials and areas concerned.

D. Finish to smooth level surface sloped to floor drains.

E. Install cove base 6” high with minimum 3/4” radius in accordance with manufacturers written instructions.

3.4 CLEAN-UP

A. Disposal of this product, solution and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional or local authority. Empty containers should be taken to an approved waste handling site for recycling or disposal.

3.5 PROTECTION

A. Freshly applied material should be protected from dampness, condensation and water for at least 72 hours.

B. Beware of air flow and changes in air flow. Introduction of dust, debris, and particles etc. may result in surface imperfections and other defects.

C. Follow manufacturer’s written recommendations with respect to cure, wait time and return to service.

END of SECTION

SECTION 09 9001

COMMON PAINTING AND COATING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common procedures and requirements for field-applied painting and coating.

B. Related Requirements:
   1. Section 07 9213: 'Elastomeric Joint Sealants' for quality of Elastomeric Joint Sealants.
   2. Sections under 09 9000 heading ‘Paints and Coatings’.
      a. Pre-Installation conferences held jointly with Section 09 9001.

1.2 REFERENCES

A. Definitions:
   1. Damage Caused By Others: Damage caused by individuals other than those under direct control of Painting Applicator (MPI(a), PDCA P1.92).
   2. Gloss Levels:
      a. Specified paint gloss level shall be defined as sheen rating of applied paint, in accordance with following terms and values, unless specified otherwise for a specific paint system.

Gloss Level ‘1’	Traditional matte finish - flat	0 to 5 units at 60 degrees to 10 units maximum at 85 degrees.
Gloss Level ‘2’	High side sheen flat - 'velvet-like' finish	10 units maximum at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level ‘3’	Traditional 'eggshell-like finish	10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
Gloss Level ‘4’	'Satin-like' finish	20 to 35 units at 60 degrees and 35 units minimum at 85 degrees.
Gloss Level ‘5’	Traditional semi-gloss	35 to 70 units at 60 degrees.
Gloss Level ‘6’	Traditional gloss	70 to 85 units at 60 degrees.
Gloss Level “7’	High gloss	More than 85 units at 60 degrees.

   3. Properly Painted Surface:
      a. Surface that is uniform in appearance, color, and sheen and free of foreign material, lumps, skins, runs, sags, holidays, misses, strike-through, and insufficient coverage. Surface free of drips, spatters, spills, and overspray caused by Paint Applicator. Compliance will be determined when viewed without magnification at a distance of 5 feet (1.50 m) minimum under normal lighting conditions and from normal viewing position (MPI(a), PDCA P1.92).
   4. Latent Damage: Damage or conditions beyond control of Painting Applicator caused by conditions not apparent at time of initial painting or coating work.

B. Reference Standards:
   1. The latest edition of the following reference standard shall govern all painting work:
      a. MPI(a), 'Architectural Painting Specification Manual' by Master Painters Institute (MPI), as issued by local MPI Accredited Quality Assurance Association having jurisdiction.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Schedule painting pre-installation conference after delivery of paint or coatings and before or at same time as application of field samples.
      a. Coordinate pre-installation conferences of all related painting and coating Sections under 09 9000 heading 'Paints and Coatings'.
      b. Schedule conference before preparation of control samples as specified in Sections under 09 9000 heading 'Paints and Coatings'.
      c. Conference to be held at same time as Section 09 2900 to review gypsum board finish preparation.
   2. In addition to agenda items specified in Section 01 3100, review following:
      a. Review Quality Assurance for Approval requirements.
      b. Review Quality Assurance Field Sample requirements.
      c. Review Submittal requirements for compliance for MPI Approved Products.
      d. Review Design Criteria requirements.
      e. Review Cleaning requirements.
      f. Review painting schedule.
      g. Review safety issues.
   3. Review additional agenda items from Sections under 09 9000 heading 'Paints and Coatings'.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Include following information for each painting product, arranged in same order as in Project Manual.
         1) Manufacturer's cut sheet for each product indicating ingredients and percentages by weight and by volume, environmental restrictions for application, and film thicknesses and spread rates.
         2) Provide one (1) copy of 'MPI Approved Products List' showing compliance for each MPI product specified.
            a) MPI Information is available from MPI Approved Products List using the following link: http://www.paintinfo.com/mpi/approved/index.shtml.
         3) Confirmation of colors selected and that each area to be painted or coated has color selected for it.
   2. Samples: Provide two 4 inch by 6 inch (100 mm by 150 mm) minimum draw-down cards for each paint or coating color selected for this Project.

B. Informational Submittals:
   1. Manufacturer Instructions:
      a. Manufacturer's substrate preparation instructions and application instruction for each painting system used on Project.
   2. Qualification Statement:
      a. Applicator:
         1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Manufacturer's documentation:
            a) Manufacturer's cut sheet for each component of each system.
            b) Schedule showing rooms and surfaces where each system was used.

D. Maintenance Materials Submittals:
   1. Extra Stock Materials:

a. Provide painting materials in Manufacturer's original containers and with original labels in each color used. Label each can with color name, mixture instructions, date, and anticipated shelf life.
b. Provide one (1) gallon of each finish coat, primer, and undercoat in each color used.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approval:
1. Conform to work place safety regulations and requirements of those authorities having jurisdiction for storage, mixing, application and disposal of all paint and related hazardous materials.
2. Paint and painting materials shall be free of lead and mercury and have VOC levels acceptable to local jurisdiction.
3. Master Painters Institute (MPI) Standards:
a. Products: Comply with MPI standards indicated and listed in 'MPI Approved Products List'.
b. Preparation and Workmanship: Comply with requirements in 'MPI Architectural Painting Specification Manual' for products and coatings indicated.

B. Qualifications:
1. Applicator: Requirements of Section 01 4301 applies, but not limited to following:
a. Minimum five (5) years experience in painting installations.
b. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
c. Maintain qualified crew of painters throughout duration of the Work.
d. Upon request, submit documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Deliver specified products in sealed, original containers with Manufacturer's original labels intact on each container.
2. Deliver amount of materials necessary to meet Project requirements in single shipment.

B. Storage And Handling Requirements:
1. Store materials in single place.
2. Keep storage area clean and rectify any damage to area at completion of work of this Section.
3. Maintain storage area at 55 deg F (13 deg C) minimum.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
1. Perform painting operations at temperature and humidity conditions recommended by Manufacturer for each operation and for each product for both interior and exterior work.
2. Apply painting systems at lighting level of 540 Lux (50 foot candles) minimum on surfaces to be painted.
a. Inspection of painting work shall take place under same lighting conditions as application.
b. If painting and coating work is applied under temporary lighting, deficiencies discovered upon installation of permanent lighting will be considered latent damage as defined in MPI Manual, PDCA P1-92.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Performance:
   1. Design Criteria:
      a. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
      b. All materials, preparation and workmanship shall conform to requirements of 'Architectural Painting Specification Manual' by Master Painters Institute (MPI).
      c. All paint manufacturers and products used shall be as listed under Approved Product List section of MPI Painting Manual.
      d. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.
      e. Where specified paint system does not have Premium Grade, provide Budget Grade.
      f. Provide products of same manufacturer for each coat in coating system.
      g. Where required to meet LEED (Leadership in Energy and Environmental Design) program requirements, use only MPI listed materials having an "L" rating designation.
      h. Color Levels:
         1) Color Level II:
            a) Number and placement of interior and exterior paint colors and gloss levels shall be as defined by Color Level II from MPI Manual, PDCA P3-93 as modified in following paragraph.
            b) No more than one paint color or gloss level will be selected for same substrate within designated interior rooms or exterior areas.

B. Materials:
   1. Materials used for any painting system shall be from single manufacturer unless approved otherwise in writing by painting system manufacturers and by Architect. Include manufacturer approvals in Product Data submittal.
   2. Linseed oil, shellac, turpentine, and other painting materials shall be pure, be compatible with other coating materials, bear identifying labels on containers, and be of highest quality of an approved manufacturer listed in MPI manuals. Tinting color shall be best grade of type recommended by Manufacturer of paint or stain used on Project.

PART 3 - EXECUTION

3.1 APPLICATORS

A. Acceptable Applicators. See Section 01 4301:
   1. Meet Quality Assurance Applicator Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Verification Of Conditions:
   1. Directing applicator to begin painting and coating work will indicate that substrates to receive painting and coating materials have been previously inspected as part of work of other Sections and are complete and ready for application of painting and coating systems as specified in those Sections.

B. Pre-Installation Testing:
   1. Before beginning work of this Section, examine, and test surfaces to be painted or coated for adhesion of painting and coating systems.

2. Report in writing to Architect of conditions that will adversely affect adhesion of painting and coating work.
3. Do not apply painting and coating systems until party responsible for adverse condition has corrected adverse condition.

C. Evaluation And Assessment:
1. Report defects in substrates that become apparent after application of primer or first finish coat to Architect in writing and do not proceed with further work on defective substrate until such defects are corrected by party responsible for defect.

3.3 PREPARATION

A. Protection Of In-Place Conditions:
1. Protect other finish work and adjacent materials during painting. Do not splatter, drip, or paint surfaces not intended to be painted. These items will not be spelled out in detail but pay special attention to the following:
a. Do not paint finish copper, bronze, chromium plate, nickel, stainless steel, anodized aluminum, or monel metal except as explicitly specified.

B. Surface Preparation:
1. Prepare surfaces in accordance with MPI requirements and requirements of Manufacturer for each painting system specified, unless instructed differently in Contract Documents. Bring conflicts to attention of Architect in writing.
2. Fill minor holes and cracks in wood surfaces to receive paint or stain.
3. Surfaces to be painted shall be clean and free of loose dirt. Clean and dust surfaces before painting or finishing.
4. Do no exterior painting while surface is damp, unless recommended by Manufacturer, nor during rainy or frosty weather. Interior surfaces shall be dry before painting. Moisture content of materials to be painted shall be within tolerances acceptable to Paint Manufacturer.
5. Sand woodwork smooth in direction of grain leaving no sanding marks. Clean surfaces before proceeding with stain or first coat application.

3.4 APPLICATION

A. Interface With Other Work:
1. Coordinate with other trades for materials and systems that require painting before installation.
2. Schedule painting and coating work to begin when work upon which painting and coating work is dependent has been completed. Schedule installation of pre-finished and non-painted items, which are to be installed on painted surfaces, after application of final finishes.

B. Paint or finish complete all surfaces to be painted or coated as described in Contract Documents.

C. Apply sealant in gaps 3/16 inch (5 mm) and smaller between two substrates that are both to be painted or coated. Sealants in other gaps furnished and installed under Section 07 9213.

D. On wood to receive a transparent finish, putty nail holes in wood after application of stain using natural colored type to match wood stain color. Bring putty flush with adjoining surfaces.

E. In multiple coat paint work, tint each succeeding coat with slightly lighter color, but approximating shade of final coat, so it is possible to check application of specified number of coats. Tint final coat to required color.

F. Spread materials smoothly and evenly. Apply coats to not less than wet and dry film thicknesses and at spreading rates for specified products as recommended by Manufacturer.

G. Touch up suction spots after application of first finish coat.

H. Paint shall be thoroughly dry and surfaces clean before applying succeeding coats.

I. Use fine sandpaper between coats as necessary to produce even, smooth surfaces.

J. Make edges of paint adjoining other materials or colors clean, sharp, and without overlapping.

K. Finished work shall be a 'Properly Painted Surface' as defined in this Section.

3.5 FIELD QUALITY CONTROL

A. Non-Conforming Work:
   1. Correct deficiencies in workmanship as required to leave surfaces in conformance with 'Properly Painted Surface,' as defined in this Section.
   2. Correction of 'Latent Damage' and 'Damage Caused By Others,' as defined in this Section, is not included in work of this Section.

3.6 CLEANING

A. General:
   1. As work proceeds and upon completion of work of any painting Section, remove paint spots from floors, walls, glass, or other surfaces and leave work clean, orderly, and in acceptable condition.

B. Waste Management:
   1. Remove rags and waste used in painting operations from building each night. Take every precaution to avoid danger of fire.
   2. Paint, stain and wood preservative finishes and related materials (thinners, solvents, caulking, empty paint cans, cleaning rags, etc.) shall be disposed of subject to regulations of applicable authorities having jurisdiction.
   3. Remove debris caused by work of paint Sections from premises and properly dispose.
   4. Retain cleaning water and filter out and properly dispose of sediments.

END OF SECTION

ATTACHMENTS

PART 4 - PAINT COLOR SCHEDULE

A. Related Requirements:
   1. Section 09 9123 'Interior Painted Gypsum Board-Plaster'.

B. Category Four Colors. See Section 01 6200 for definitions of Categories:
   1. Interior:
      a. Interior Walls And Ceilings:
         1) Match existing building standard colors.
      b. Interior Door Frames: Match existing door frames. (See Section 09 9124):

SECTION 09 9123

INTERIOR PAINTED GYPSUM BOARD, PLASTER

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing, priming, and finish painting new interior gypsum board and plaster surfaces as described in Contract Documents.

B. Related Requirements:
   1. Section 09 2900: ‘Gypsum Board’ for:
      a. Priming new interior gypsum board surfaces to receive sheet wall covering system or texturing.
      b. Pre-installation conference.
   2. Section 09 9001: 'Common Painting And Coating Requirements':
      a. Pre-installation conference for Sections under 09 9000 heading ‘Paints and Coatings’.
      b. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.
   3. Section 09 9413: 'Interior Textured Finishing' for textured finishes.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference as specified in Section 09 2900.
      a. In addition to agenda items specified in Section 01 3100 and Section 09 2900, review following:
         1) Review finish level requirements of gypsum wallboard as specified in Section 09 2900.
   2. Participate in pre-installation conference as specified in Section 09 9001.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Category Four Approved Manufacturers and Products. See Section 01 6200 for definitions of Categories.
      a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.

B. Description:
   1. Rest Rooms And Custodial Rooms:
      a. New Surfaces: Use MPI(a) INT 9.2F Waterborne Epoxy Finish system.
   2. All Other:
      a. New Surfaces: Use MPI(a) INT 9.2B Latex Finish system.

C. Performance:
   1. Design Criteria:
      a. New Surfaces: MPI Premium Grade finish requirements.
      b. Gloss / Sheen Required:

1) Rest Rooms And Custodial Rooms: Gloss Level 6.
2) Remaining Painted Surfaces: Gloss Level 5.

D. Materials:
1. Primers:
a. MPI Product 50, 'Primer Sealer, Latex, Interior'.
2. Finish Coats:
a. Rest Rooms:
1) Buildings with only Gypsum Board surfaces in rooms:
a) MPI Product 115, 'Epoxy-Modified Latex, Interior, Gloss (MPI Gloss Level 6)'.
b. Remaining Painted Surfaces:
1) MPI Product 141, 'Latex, Interior, High Performance Architectural, Semi-Gloss (MPI Gloss Level 5)'.

PART 3 - EXECUTION

3.1 APPLICATION

A. General: See appropriate paragraphs of Section 09 9001.

B. New Surfaces:
1. Primer: Apply primer to be covered with other paint coats with roller only, or with spray gun and back-rolled.

END OF SECTION

SECTION 09 9124

INTERIOR PAINTED METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Preparing and painting new interior metal surfaces as described in Contract Documents.

B. Related Requirements:
   1. Section 05 5871: 'Metal Brackets'.
   2. Section 09 9001: 'Common Painting And Coating Requirements':
      a. Pre-installation conference for Sections under 09 9000 heading ‘Paints and Coatings’.
      b. 'Attachment: Paint Color Schedule' for Deseret Industries Projects.
   3. Section 23 0553: 'I. D. For HVAC Piping And Equipment’ for field painting requirements of HVAC piping and equipment.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference as specified in Section 09 9001.

B. Sequencing:
   1. Paint brackets furnished under Section 05 5871 before installation of bracket.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Category Four Approved Products and Manufacturers. See Section 01 6200 for definitions of Categories.
      a. Products listed in edition of MPI Approved Product List current at time of bidding and later are approved, providing they meet VOC requirements in force where Project is located.

B. Description:
   1. Ferrous Metal:
      a. New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system.

C. Performance:
   1. Design Requirements:
      a. New Surfaces: MPI Premium Grade finish requirements.
      b. Gloss / Sheen Level Required: Gloss Level 5.

D. Materials:
   1. Primers:
      a. Ferrous Metal: MPI Product 107, ‘Primer, Rust-Inhibitive, Water Based’.
      b. Galvanized Metal: MPI Product 134: ‘Primer, Galvanized, Water Based’.
      c. Aluminum: MPI Product 95: ‘Primer, Quick Dry, for Aluminum’.
   2. Finish Coats: MPI Product 153: ‘Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)’.

PART 3 - EXECUTION

3.1 APPLICATION

A. General:
   1. See appropriate paragraphs of Section 09 9001.
   2. Systems specified are in addition to prime coats furnished under other Sections.

B. New Surfaces: Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.

END OF SECTION

SECTION 09 9413

INTERIOR TEXTURED FINISHING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and apply texturing on walls and ceilings as described in Contract Documents.

B. Related Requirements:
   1. Section 09 2900: 'Gypsum Board' for priming.
   2. Section 09 9001: 'Common Painting And Coating Requirements' for:
      a. Pre-installation conference for Sections under 09 9000 heading ‘Paints and Coatings’.
   3. Section 09 9123: 'Interior Painted Gypsum Board, Plaster' for finish painting.

1.2 REFERENCES

A. Definitions:
   1. Drywall Texture: Compound rolled, sprayed, or troweled onto sheetrock after taping and floating of joints is complete. Uses same material as joint compound, but thinned down with water and applied to wall surface:
      a. Orange Peel: Sprayed texture leaves light splatter on walls. Resembles peel of orange. If done with fine spray, can be one of the lightest, least noticeable of the texture styles.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in pre-installation conference as specified in Section 09 9001.
   2. In addition to agenda items specified in Section 01 3100 and Section 09 9001, review following:
      a. Review control samples.

1.4 SUBMITTALS

A. Action Submittals:
   1. Samples:
      a. Orange Peel Texture:
         1) Provide minimum of three (3) 24 inch (600 mm) square control samples on primed gypsum wallboard of ‘orange peel’ texture to show possible variations. Match existing adjacent walls.
      b. Knockdown Texture:
         1) Provide minimum of three (3) 24 inch (600 mm) square control samples on primed gypsum wallboard of ‘knockdown’ texture to show possible variations. Match existing adjacent walls.

1.5 QUALITY ASSURANCE

A. Field Samples:
   1. Before performing work of this Section, prepare control samples.

2. Architect will inspect control sample at pre-installation conference following preparation of control sample. When sample is approved, work of this Section may proceed. Approved samples will be kept at site at all times work of this section is being performed.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Manufacturer Contact List:
      a. National Gypsum, Charlotte, NC www.nationalgypsum.com.
      b. U S Gypsum Co, Chicago, IL www.usg.com.

B. Materials:
   1. Class Two Quality Standards: See Section 01 6200.
      a. ProForm Perfect Spray EM/HF by National Gypsum.
      b. Sheetrock Wall & Ceiling Texture by U S Gypsum.

PART 3 - EXECUTION

3.1 APPLICATION

A. Location:
   1. Walls:
      a. Match existing texture.
   2. Ceilings:
      a. Smooth.

END OF SECTION

SECTION 10 2113

METAL TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install metal toilet compartments as described in Contract Documents.

B. Related Requirements:
   1. Section 06 1100: 'Wood Framing' for blocking in wood framing for compartment installation and door bumper.
   2. Section 09 2216: 'Non-Structural Metal Framing' for blocking in non-load-bearing metal framing for compartment installation and door bumper.
   3. Section 10 2813: 'Commercial Toilet Accessories'.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A484/A484M-18a, 'Standard Specification for General Requirements for Stainless Steel Bars, Billets, and Forgings'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Color selection.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Final, executed copy of Warranty.
      b. Record Documentation:
         1) Manufacturers documentation:
            a) Manufacturer's literature or cut sheet.
            b) Color selection.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage And Handling Requirements:
   1. Store and handle in compliance with Manufacturer's instructions and recommendations.

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Type One Acceptable Manufacturers:
1. Accurate Partitions Inc, Lyons, IL www.accuratepartitions.com.
2. AMPCO Products Inc, Miami, FL www.ampco.com.
3. Columbia Partitions, Columbia, SC www.psisc.com.
4. Flush-Metal Partition Corp, Maspeth, NY www.flushmetal.com.
5. Global Steel Products Corp, Eastanollee, GA www.globalpartitions.com.
6. Hadrian Inc, Mentor, OH www.hadrian-inc.com.
7. Knickerbocker Partitions Corp, Freeport, NY www.knickerbockerpartition.com.
8. Metpar, Westbury, NY www.metpar.com.
9. Equal as Approved by Architect before bidding. See Section 01 6200.

2.2 MANUFACTURED UNITS

A. Toilet And Miscellaneous Partitions:
1. Floor-mounted, overhead-braced.
2. Panels:
   a. Galvanized bonderized steel sheets (minimum 0.00015 inch (0.004 mm) zinc coating).
   b. Edges bound interlocked with drawn molding welded on corners.
   c. Corners welded and ground smooth.
   d. Sound deadening honeycomb core.
   e. Provide privacy panels and doors with gap fillers that cover the gaps between panels and doors.
   f. Provide wood blocking on all panels that have grab bars.
   g. Gauge:
      1) Doors: 22 ga (0.08 mm) minimum.
      2) Panels: 22 ga (0.08 mm) minimum.
      3) Pilasters: 22 ga (0.08 mm) minimum.
      4) Screens: 22 ga (0.08 mm) minimum.
3. Posts:
   a. 20 ga (one mm) minimum of same construction and finish as panels.
4. Headrails:
   a. Aluminum.
   b. 20 ga (one mm) minimum of same construction and finish as panels.
   c. Anti-grip design.
5. Plinths:
   a. 20 ga (one mm) Type 304 stainless steel, Number 4 finish.
   b. 3 inch (76 mm) minimum high, secured with concealed clips.
   c. All fasteners used to attach Plinths, Posts and Pilasters to the floor shall be Type 304 stainless steel.
6. Anchorages and fasteners:
   a. Concealed: Non-corrosive, protective finish.
   b. Tamper resistant Torx Head with pin screws.
7. Hardware:
   a. Each door:
      1) Gravity type hinges with double handed, nylon bottom cam, adjustable for partial door closing position, bottom hinge finished flush with door bottom.
      2) Sliding or concealed door bolt with emergency access.
      3) Latch with exterior indicator for vacant (green) and engaged (red) locking status.
      4) Door strike and keeper with rubber bumper.
      5) Coat hook / door bumper.
   b. Finish: Chrome plated.
   c. Meet requirements of ASTM B86, Alloy AG 40A.

B. Urinal Partition:
   1. Basic construction same as panels above, floor mounted.

2.3 FINISHES

A. Finish And Color:
   1. Powder-coated paint finish.
   2. Color Quality Standard: See Section 01 6200.
      a. Hadrian: Light Gray 535

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Field verify dimensions.
   2. Verify that necessary blocking has been installed in framed walls for partition installation and for place where coat hook / door bumper will strike wall.

3.2 INSTALLATION

A. Install pilasters rigid, plumb, and level. Maintain proper door openings. Anchor pilaster to floor with Type 304 stainless steel fasteners embedded 2 inches (50 mm) into concrete slab below setting bed.

B. Secure panels to walls with two stirrup brackets minimum attached near top and bottom of each panel. Use fasteners of length to provide one-inch (25 mm) embedment into blocking or masonry.

C. Secure overhead brace to face sheets with two fasteners minimum per face. Set door tops parallel with brace. Set door bottom 12 inches (300 mm) above floor.

D. Plinth to be level with and snug to floor.

3.3 FIELD QUALITY CONTROL

A. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Correct any work found defective or not complying with contract document requirements at no additional cost to the Owner.
   2. Replace damaged or severely scratched materials with new materials at no additional cost to the Owner.

3.4 ADJUSTING

A. Lubricate hardware as recommended by Manufacturer.

B. Set hinges on out-swinging doors to return to nearly closed position.

C. Perform final adjustments to pilaster leveling devices, door hardware, and other operating parts of partition assembly just before Substantial Completion.

3.5 CLEANING

A. Remove protective masking. Clean exposed surfaces of partitions, hardware, fittings, and accessories.

B. Touch-up minor scratches and other finish imperfections using materials and methods recommended by Manufacturer.

END OF SECTION

SECTION 10 2613

CORNER GUARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install corner guards as described in Contract Documents.

1.2 REFERENCES

A. Definitions:
   1. Flame Spread: The propagation of flame over a surface.
   2. Flame Spread Index: The numerical value assigned to a material tested in accordance with ASTM E84.
   3. Smoke-Developed Index: The numerical value assigned to a material tested in accordance with ASTM E84.

B. Reference Standards:
   1. ASTM International:
      a. ASTM D256-10(2018), 'Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics'.
      b. ASTM D543-14, 'Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents'.
      c. ASTM E84-18b, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
   2. Underwriters Laboratories / American National Standards Institute:
      a. UL/ANSI 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials' 11th Edition).

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data: Color selections.
   2. Shop Drawings:
      a. Show locations, extent and installation details.
      b. Show method of attachment.
   3. Sample:
      a. Provide 12 inches (305 mm) sample show color, texture, pattern, and guard.

B. Informational Submittals:
   1. Test And Evaluation Reports:
      a. Copies of Quality Assurance requirements for 'Class A' flame spread rating.
   2. Qualification Statement:
      a. Installer:
         1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Maintenance, and cleaning instructions.
      b. Record Documentation:

1) Manufacturers documentation:
   a) Manufacturer's literature.
   b) Color selection.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. System shall be recognized for intended use by applicable building codes.
   2. Fire Test Response Characteristics:
      a. UL classified conforming to NFPA Class A fire rating with surface burning characteristics as tested materials in accordance with UL 723 (ASTM E84).
         1) Flame Spread: 10.
         2) Smoke Developed: 350 to 450.
      b. 20 ft/lbs/ per square inch as tested in accordance with ASTM D256, Notched Izod Test.

B. Qualifications:
   1. Installers:
      a. Installer shall have performed at least three (3) installations of similar size, scope, and complexity in each of the past two (2) years.
      b. Provide documentation if requested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
   1. Deliver materials in sealed containers with Manufacturer’s labels intact.

B. Storage And Handling Requirements:
   1. Store materials in protected area in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to elements. Minimum room temperature of 40 deg F (4.4 deg C) and a maximum of 100 deg F (37.8 deg C) should be maintained.
   2. Material must be stored flat.

1.6 FIELD CONDITIONS

A. Ambient Conditions:
   1. Material must be acclimated in an environment of 65 deg F to 75 deg F (18 deg C to 24 deg C) for at least twenty-four (24) hours prior to beginning installation.
   2. Installation areas must be enclosed and weatherproofed before installation commences.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers:
   1. Stainless Steel Corner Guards:
      a. Type Two Acceptable Manufacturers:
         1) Acrovyn, Div Construction Specialties Group, Muncy, PA www.c-sgroup.com.
         2) American Floor Products Co, Rockville, MD www.afco-usa.com.
         3) IPC Door and Wall Protection Systems, Muskego, WI www.inprocorp.com.
         4) Pawling Corp, Pawling, NY www.pawling.com.
         5) Equal as approved by Architect before installation. See Section 01 6200.
      b. Type One Acceptable Manufacturers:
         1) Koroseal Wall Protection Systems, Fairlawn, OH www.korogard.com.

2) Equal as approved by Architect before bid. See Section 01 6200.

B. Materials:
1. Stainless Steel Corner Guards:
a. 16-ga (1.6 mm) stainless steel with finish equal to US32D Satin Stainless Steel.
b. Size:
1) Wall Corners: 3-1/2 inches (89 mm) by 3-1/2 inches (89 mm) by custom height to match tile wainscot.

C. Fabrication:
1. Fabricate wall protection systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes.

2.2 ACCESSORIES

A. Adhesive: As supplied or recommended by Corner Guard Manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
1. Examine substrate and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.
2. Notify Architect of unsuitable conditions in writing.
3. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation:
1. Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.

B. Protection:
1. Take all necessary steps to prevent damage to material during installation as required in manufacturer’s installation instructions.

3.3 INSTALLATION

A. Acceptable Installers:
1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

B. Install the Work of this section in strict accordance with manufacturer’s recommendations, using only approved mounting hardware, and locating all components firmly into position, level and plumb.

C. Maintain ambient conditions for at least forth eight (48) hours.

D. Apply adhesive carefully to insure continuous contact between wall and guard. Take care to avoid soiling or leaving visible adhesive on wall or base.

3.4 CLEANING

A. General:
   1. Immediately upon completion of installation, clean guards and accessories in accordance with manufacturer's recommended cleaning method.
   2. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION

SECTION 10 2813

COMMERCIAL TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Included But Is Not Limited To:
   1. Selected accessories for Rest Rooms:
      a. Grab Bars.
      b. Hand Dryer.
      c. Mirrors.
      d. Recessed Waste Receptacle and Cabinet.
      e. Sanitary Napkin Disposal Container.
      f. Single Robe Hook.
      g. Automatic touchless towel dispensers.

B. Related Requirements:
   1. Section 06 1100: 'Wood Framing' for blocking.
   2. Section 06 2001: 'Common Finish Carpentry Requirements' for installation.

C. Products Furnished But Not Installed Under This Section:
   1. Selected accessories for Rest Rooms:
      a. Soap dispensers.
      b. Toilet tissue dispensers.
      c. Toilet seat cover dispensers

D. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary' soap dispensers, toilet seat cover dispensers, and toilet tissue dispensers furnished by Owner (FM Group).

1.2 REFERENCES

A. Association Publications:
   1. United States Access Board:
      a. Americans with Disabilities Act (ADA):
         1) ADA Standards:
            a) ADA Accessibility Guidelines (ADAAG) (2004 or latest version).

B. Reference Standards:
   1. ASTM International:
      a. A153/A153M-16a, 'Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware'.
      b. ASTM A653/A653M-17, 'Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process'.
      c. ASTM A666-15, 'Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar'.
      d. ASTM C1036-18, 'Standard Specification for Flat Glass'.
      e. ASTM F446-85(2009), 'Standard Consumer Safety Specification for Grab Bars and Accessories Installed in the Bathing Area'.
   2. International Code Council / American National Standards Institute:
      a. ICC/ANSI A117.1-2017, 'Accessible and Usable Buildings and Facilities'.
   3. International Standard Organization:
      a. ISO 25537:2008, 'Glass in Building - Silvered Flat Glass Mirror.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's product data sheets indicating operating characteristics, materials and finishes.
      b. Mounting requirements and rough-in dimensions.
   2. Shop Drawings:
      a. Schedule showing items used, location where installed, and proper attaching devices for substrate.

B. Informational Submittals:
   1. Manufacturers' Instructions:
      a. Provide operation, care and cleaning instructions.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Hand Dryer:
            a) Manufacturer’s service and parts manual.
      b. Warranty Documentation:
         1) Final, executed copy of Warranty for each product.
      c. Record Documentation:
         1) Manufacturers documentation:
            a) Manufacturer's literature or cut sheets.

1.4 QUALITY ASSURANCE

A. Source Limitations:
   1. For products listed together in same Part 2 articles, obtain products from single source from single manufacturer.

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard warranty.

B. Special Mirror Warranty:
   1. Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage or frame corrosion defects within specified warranty period:
      a. Warranty Period: fifteen (15) years from date of Substantial Completion.

C. Hand Dryer:
   1. Manufacturer’s Warranty to be free from defects for period of five (5) years. Warranty includes labor performed at factory as well as repair or exchange of defective parts, at Manufacturer’s option.

PART 2 - PRODUCTS

2.1 OWNER FURNISHED PRODUCTS

A. Category One Approved Products (Furnished and Installed by Owner):
   1. Soap dispensers.
   2. Toilet tissue dispensers.
   3. Toilet seat cover dispensers.

2.2 MANUFACTURED UNITS

A. Manufacturers:
1. Manufacturer Contact List:
a. AJW Architectural Products, A&J Washroom Accessories, Inc., New Windsor, NY www.ajwashroom.com.
b. American Specialties Inc (ASI), Yonkers, NY www.americanspecialties.com.
c. Bobrick Washroom Equipment Inc, North Hollywood, CA www.bobrick.com or Bobrick Washroom Equipment of Canada Ltd, Scarborough, ON (416) 298-1611.
d. Bradley Corp, Menomonee Falls, WI www.bradleycorp.com.
e. Excel Dryer Inc., East Longmeadow, MA www.exceldryer.com.
f. General Accessory Manufacturing Co (GAMCO), Durant, OK www.gamcousa.com.

B. Materials:
1. Design Criteria:
a. Stainless Steel: ASTM A666 Type 304 (18-8); satin finish exposed surfaces unless otherwise indicated.
b. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
c. Fasteners:
1) Exposed: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant.
2) Concealed: Galvanized Steel.
2. Rest Rooms:
a. Mirrors:
1) Channel-Frame Mirror:
a) Frame: Type 304 or Type 430, 20 gauge stainless steel channel frame.
b) Roll-formed one piece construction.
c) Exposed surfaces have #4 satin finish.
d) Edges and corners are burr free.
e) Glass: 1/4 inch (6.4 mm) silver coated and hermetically sealed. Guaranteed for 15 years against silver spoilage. Mirrors meet ASTM C1036 requirements.
f) Concealed surface mounted wall hanger.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) AJW Architectural Products: Model U711.
b) American Specialties (ASI): Model 0620.
c) Bobrick: Model B-165.
d) Bradley: Model 781.
e) General Accessory (GAMCO): Model C Series.
b. Sanitary Napkin Disposal Container:
1) Design Criteria:
a) Surface mounted type 304, 22 gauge stainless steel with #4 satin finish. Seamless construction with radius and hemmed edges.
b) Stainless steel piano hinge.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) AJW Architectural Products: Model U590.
b) American Specialties (ASI): Model 0852.
c) Bobrick: Model B-270.
d) Bradley: Model 4781-15.
e) General Accessory (GAMCO): Model ND-1.
c. Single Robe Hook:
1) Surface mounted type 304, 22 gauge stainless steel with #4 satin finish.
2) Concealed mounting bracket.
3) Stainless steel locking setscrew on bottom.
4) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) AJW Architectural Products: Model UX110SF.
b) American Specialties (ASI): Model 7340-S.
c) Bobrick: Model B6717.
d) Bradley: Model 9114.
e) General Accessory (GAMCO): Model 76717.

d. Grab Bars:
   1) Configuration shown on Contract Drawings. Include center support for longer lengths when required:
   2) Design Criteria:
      a) Comply with ADA guidelines and ADAAG accessible design for structural strength and local and state codes.
      b) Concealed mount.
      c) 18 ga (1.27 mm), type 304 stainless steel tubing.
      d) 1-1/2 inch (38 mm) diameter.
      e) Provide center support when required.
      f) Snap-on flange covers.
      g) Peened (non-slip) finish.
      h) Sustain loads in excess of 900 lbs (408 kg).
   3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a) AJW Architectural Products: Model UG3 Series.
      b) American Specialties (ASI): Model 3800 Series.
      c) Bobrick: Model B-6806 Series.
      d) Bradley: Model 812 Series.
      e) General Accessory (GAMCO): Model 150 Series.

e. Recessed Waste Receptacle and Cabinet:
   1) Design Criteria:
      a) Cabinet: Type 304 stainless steel. Welded construction, exposed surfaces to be satin finish.
      b) Flange: Type 304 stainless steel 22 gauge (0.788 mm) with satin finish.
      c) Waste Receptacle: Type 304 stainless steel 22 gauge (0.788 mm) with satin finish and 18 gallon (68 liter) capacity.
   2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a) Bobrick: Model 3947, Semi-Recessed with 18 gallon (68 liter) option (part no. 368-60). Do not include Roll Towel Dispenser Module.

f. Hand Dryer:
   1) Design Criteria:
      a) Power source: 110/120 volt, 12.5 amp, 60 Hz.
      b) Semi-recess mounted.
      c) Sensor activated.
      d) Provide ‘noise reduction nozzle’ option.
      e) Provide ‘speed and sound control’ option.
      f) Color: Stainless steel.
   2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a) Xlerator by Excel Dryer, Model XL-SB-110.

g. Automatic Touchless Towel Dispensers:
   1) Mount Towel Dispenser in ‘Recessed Waste Receptacle Cabinet’.
   2) Category One Approved Products. See Section 01 6200 for definitions of Categories: Georgia-Pacific Pro enMotion model no. 69466A:
      a) Size: 14.8 inches (376 mm) wide x 9.75 inches (248 mm) deep x 16.75 inches (425 mm) high.
      b) Power source: Battery.
      c) Color: Stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with ADA Accessibility Guidelines and installation heights as shown on Contract Drawings.

B. Assemble fixtures and associated fittings and trim in accordance with manufacturer's instructions.

C. Install using mounting devices proper for base structure.

D. Install equipment level, plumb, and firmly in place in accordance with manufacturer's rough-in drawings.

E. Where possible, mount like items in adjoining compartments back-to-back on same partition.

F. Grab Bars:
   1. Install as per Manufacturers written installation instructions.
   2. Install grab bars to withstand downward force of not less than 250 lbf (1112 N) per ASTM F446.

3.2 REPAIR

A. Repair or replace defective work, including damaged equipment and components.

B. Repair or replace malfunctioning equipment, or equipment with parts that bind or are misaligned.

3.3 CLEANING

A. Clean unit surfaces, and leave in ready-to-use condition.

3.4 ADJUSTING

A. Test each piece of equipment provided with moving parts to assure proper operation, freedom of movement, and alignment. Install new batteries in battery-powered items.

3.5 CLOSEOUT ACTIVITIES

A. Turn over keys, tools, maintenance instructions, and maintenance stock to Owner.

END OF SECTION

SECTION 10 2814

BABY-CHANGING STATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes But Is Not Limited To:
   1. Coordination and sequencing of Owner-Furnished baby-changing station as described in Contract Documents.

B. Products Installed But Not Supplied Under This Section:
   1. Baby-changing station.

C. Related Sections:
   1. Section 01 6400: 'Owner-Furnished Products', Owner will furnish baby-changing station. PART 2 PRODUCTS of this Section establish quality of materials for information of Contractor, Architect, and Owner's representatives.
   2. Section 06 1100: ‘Wood Framing’ for blocking in wood stud framed walls for baby-changing stations.
   3. Section 09 2216: 'Non-Structural Metal Framing' for blocking in metal framed walls for baby-changing stations.

1.2 REFERENCES

A. Reference Standards:
   1. American National Standards Institute:
      a. ANSI Z535.4-2011. ‘Product Safety Signs and Labels’.
   2. ASTM International:
      a. ASTM G21-15, ‘Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi’.
      b. ASTM F2285-04(2016), ‘Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use’.
   3. International Code Council / American National Standards Institute:
      a. ICC/ANSI A117.1-2009, ‘Accessible and Usable Buildings and Facilities'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the efforts of various trades affected by Work of this Section.
   2. Coordinate completions of solid blocking in walls.

B. Sequencing:
   1. Install baby-changing stations after following has been completed:
      a. Adjacent walls and ceilings are finished and painted.

1.4 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Provide product literature or cut sheet on baby-changing station.

B. Informational Submittals:
   1. Certificates:
      a. Manufacturer to provide $10,000,000 minimum 'Certificate of Liability Insurance' policy.
         1) Policy on file at Church Headquarters. For questions, notify Mark Douglass at markdouglass@ldschurch.org.
   2. Manufacturer Instructions:
      a. Printed installation instructions.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Include copy of final, executed warranty for defects in material and workmanship.
      b. Record Documentation:
         1) Manufacturers Documentation:
            a) Manufacturer's literature or cut sheets.

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard warranty for baby-changing station to be free from defects in material and workmanship under normal use and service, with proper maintenance, for five (5) years.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS

A. Category Two Approved Manufacturer. See Section 01 6200 for definition of Categories:
   1. Koala, Denver, CO www.koalabear.com.

B. Baby Changing Station:
   1. Description:
      a. Molded high impact polyethylene with integral straps for securing baby.
   2. Design Criteria:
      a. Manufacture to provide 'Certificate of Liability Insurance' policy.
      b. Antimicrobial bed surface
      c. Support 200 lbs (90 kg) with minimal deflection.
      d. Meet ADA regulations of ICC/ANSI A117.1 when properly installed.
      e. Conform to ANSI Z535.4 for safety signs and labels, ASTM G21 for antifungal standards, and ASTM F2285 for consumer safety performance standard.
   3. Approved Products. See Section 01 6200 for definition of Categories:
      a. Horizontal: Koala Kare model number KB200 by Koala.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:
   1. Verify that solid blocking has been installed in wall framing where changing station is to be installed.
   2. Do not install unit by any other means other than screws or lag bolts into solid blocking.

3.2 INSTALLATION

A. Install items in accordance with Manufacturer's submitted, written instructions for screws or lag bolts into solid substrate capable of supporting 200 lbs (90 kg). Install using mounting devices proper for base structure.

END OF SECTION

SECTION 10 4400

FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under This Section:
   1. Fire extinguisher cabinet.

B. Related Requirements:
   1. Section 06 2001: 'Common Finish Carpentry Requirements' for installation.
   2. Section 09 2216: 'Non-Structural Metal Framing' for blocking in metal-framed walls.

1.2 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's literature or cut sheets for cabinets and extinguishers.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Include copy of final, executed warranty.
      b. Record Documentation:
         1) Testing and Inspection Reports:
            a) Testing Agency Inspecting Reports of Drilled-In Mechanical Anchors / Adhesive Anchors / Screw Anchors.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Fire extinguishers shall be inspected and have annual inspection tag attached before Substantial Completion.

1.4 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard, written warranty on fire extinguisher.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Manufacturers:
   1. Cabinets And Brackets:
      a. Type One Acceptable Manufacturers:
         1) J L Industries, Bloomington, MN www.jlindustries.com.
         2) Larsen's Manufacturing Co, Minneapolis, MN www.larsensmfg.com.
         3) Modern Metal Products / Technico, Owatonna, MN www.modern-metal.com.

4) National Fire Equipment Ltd, Scarborough, ON www.nationalfire.com.
5) Potter-Roemer, Cerritos, CA www.potterroemer.com.
6) Samson Products Inc, City of Commerce, CA www.samsonproducts.com.
7) Seton Inc, Richmond Hill, ON (905) 764-1122.
8) Equal as approved by Architect before bidding. See Section 01 6200.

B. Type One Acceptable Distributors:
1. W.W. Grainger, Inc., Lake Forest, IL www.grainger.com.
2. Equal as approved by Architect before bidding. See Section 01 6200.

C. Fire Extinguisher Cabinets:
1. Design Criteria:
a. Two-piece, semi-recessed or flush type depending on wall thickness, and have white baked enameled steel tubs with white baked enamel return trim and doors, clear acrylic glazing, 'Safe-T-Lock,' and cylinder locks.
2. Type One Acceptable Manufacturers:
a. Basis of Design Product: Ambassador 1017 G10 by J L Industries.
b. Equal as approved by Architect before bidding from Acceptable Manufacturer's equivalent product. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Special Techniques:
1. Securely mount cabinets plumb with wall surfaces.
2. Trim for cabinets shall be neat in appearance.

END OF SECTION

SECTION 21 1313

WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Modify existing wet-pipe fire sprinkler system as specified in Contract Documents.

1.2 REFERENCES

A. Association Publications:
   1. Underwriters Laboratories, Inc.:
      a. UL Directory B, 'Fire Protection Equipment, Directory B' (2011).

B. Reference Standards:
   1. American Society of Mechanical Engineers:
      a. ASME B1.20.1-2013 ‘Pipe Threads, General Purpose, Inch’.
      b. ASME B16.1-2015, ‘Grey Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250’.
      c. ASME B16.3-2016, ‘Malleable Iron Threaded Fittings:: Classes 150 and 300’.
      d. ASME B16.4-2016, 'Gray Iron Threaded Fittings: Classes 125 and 250’.
      e. ASME B16.5-2017, ‘Pipe Flanges and Flanged Fittings’.
   2. American Water Works Association:
      a. AWWA C606-15, ‘Grooved and Shouldered Joints’.
   3. American Welding Society:
      a. AWA B2.1/B2.1M-2014, ‘Specification for Welding Procedure and Performance Qualification', (5th Edition).
   4. ASTM International:
      a. ASTM A53/A53M-18, ‘Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless’.
      b. ASTM A135/A135M-09(2014), ‘Standard Specification for Electric-Resistance-Welded Steel Pipe’.
      c. ASTM A234/A234M-17, ‘Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service’.
      d. ASTM A395/A395M-99(2018), ‘Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures’.
      e. ASTM A536-84(2014), ‘Standard Specification for Ductile Iron Castings’.
      f. ASTM A795/A795M-13, ‘Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use’.
   5. National Fire Protection Association:
      a. NFPA 13: 'Standard for the Installation of Sprinkler Systems' (2019 or most recent edition adopted by AHJ).
      b. NFPA 24 'Standard for the Installation of Private Fire Service Mains and Their Appurtenances' (2019 or most recent edition adopted by AHJ.
      c. NFPA 25, 'Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems' (2017 or most recent edition adopted by AHJ).
      d. NFPA 101: ‘Life Safety Code' (2018 or most recent edition adopted by AHJ).

1.3 SUBMITTALS

A. Action Submittals:

B. Informational Submittals:
   1. Certificates:
      a. Provide one (1) copy of completed NFPA 13 'Contractor's Material and Test Certification for Aboveground Piping' as specified in 'Field Quality Control' in Part 3 of this specification:
   2. Qualification Statement:
      a. Licensed fire protection engineer or fire protection system designer:
         1) Licensed for area of Project.
         2) Certified by NICET to level three minimum.
         3) Provide Qualification documentation if requested by Fire Sprinkler Consultant or Owner’s Representative.
      b. Installer:
         1) Provide Qualification documentation if requested by Fire Sprinkler Consultant or Owner’s Representative.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:
         1) Maintenance and instructions.
            a) List of system components used indicating name and model of each item.
            b) Manufacturer's maintenance instructions for each component installed in Project.
            c) Instructions shall include installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.
      b. Warranty Documentation:
         1) Include copies of required warranties.
      c. Record Documentation:
         1) Include copies of approved shop drawings.
         2) Provide master index showing items included.
         3) Provide name, address, and phone number of Architect, Fire Sprinkler Consultant, General Contractor, and Fire Protection subcontractor.
         4) Provide operating instructions to include:
            a) General description of fire protection system.
            b) Step by step procedure to follow for shutting down system or putting system into operation.
         5) Provide signed copy of NFPA 13 'Contractor's Material and Test Certification for Aboveground Piping'.
   2. Instruction of Owner (as specified in Part 3 of this specification):
      a. Provide Owner with latest version of NFPA 25.

D. Maintenance Material Submittals:
   1. Extra Stock Materials:
      a. Spare sprinkler heads in the quantity recommended by NFPA 13 selected in representative proportion to quantity used in Project and in accordance with NFPA 13 (Six (6) spare sprinkler heads minimum). Do not include dry barrel Pendent and dry barrel Sidewall sprinkler heads.
      b. Provide spare heads in cabinet with sprinkler head wrench for each type of head used. After approval of cabinet and contents, mount cabinet in convenient location in Riser Room.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. Unless noted otherwise, system shall conform to:
      a. NFPA 13, 'Light & Ordinary Hazard Occupancies’.
      b. NFPA 24, 'Service Mains and Their Appurtenances, Private’.
      c. NFPA 25, ‘Inspection, Testing, and Maintenance.
      d. NFPA 101, 'Life Safety Code’.
      e. Requirements of local water department and local authority having jurisdiction for fire protection.

f. Underwriters Laboratories Publication, UL Directory B, 'Fire Protection Equipment Directory', current edition at time of Pre-Bid Meeting.
g. Comply with backflow prevention requirements and, if required, include device in hydraulic calculations.
h. Applicable rules, regulations, laws, and ordinances.

B. Qualifications:
1. Licensed fire protection engineer or fire protection system designer certified by NICET to level three minimum and engaged in design of fire protection systems. Engineer / designer shall:
a. Licensed for area of Project.
b. Minimum five (5) years experience in fire protection system installations.
c. Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
d. Be responsible for overseeing preparation of shop drawings, hydraulic calculations where applicable, and system installation.
e. Make complete inspection of installation.
f. Provide corrected record drawings to Owner with letter of acceptance.
g. Certify that installation is in accordance with Contract Documents.
h. Upon request, submit documentation.
2. Installer:
a. Licensed for area of Project.
b. Minimum five (5) years experience in fire protection system installations.
c. Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
d. Upon request, submit documentation.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
1. Manufacturer Contact List:
a. Croker Corp, Elmsford, NY www.croker.com.
b. Gruvlock by Anvil International, Portsmouth, NH www.anvilintl.com.
c. HO Trerice Company, Oak Park, MI www.hotco.com.
d. Kennedy Valve, Elmira, NY www.kennedyvalve.com.
e. Milwaukee Valve Co, New Berlin, WI www.milwaukeevalve.com.
f. Mueller Company, Decatur, IL www.muellerflo.com.
g. Nibco Inc, Elkhart, IN www.nibco.com.
h. Notifier by Honeywell, Northford, CT www.notifier.com.
i. Potter Electric Signal Company, St. Louis, MO www.pottersignal.com.
j. Potter-Roemer, Cerritos, CA www.potterroemer.com.
k. Prinzing, Milwaukee, WI www.prinzing.com.
l. Reliable Automatic Sprinkler Co, Mount Vernon, NY www.reliablesprinkler.com.
m. System Sensor, St Charles, IL www.systemsensor.com.
n. TYCO Fire & Building Products, Lansdale, PA www.tyco-fire.com.
o. Victualic Company of America, Easton, PA or Victualic Company of Canada, Rexdale, ON www.victaulic.com.
p. Viking Corp, Hastings, MI www.vikingcorp.com.

B. Components:
1. General: Use only domestically manufactured cast iron pipe fittings, valves, sprinkler heads, and other components.
a. Pipe of foreign manufacture that meets ASTM Standards is acceptable.
b. Ductile iron fittings of foreign manufacture are acceptable.
2. Pipe:

a. Schedule 40 Welded Steel:
1) Exterior, Above Ground: Schedule 40 hot-dip galvanized welded steel meeting requirements of ASTM A53/A53M, ASTM A135/A135M or ASTM A795/A795M.
2) Interior, Above Ground: Schedule 40 black welded steel meeting requirements of ASTM A53/A53M, ASTM A135/A135M or ASTM A795/A795M.
3) Connections:
a) 2 inches (50 mm) And Smaller: Screwed, flanged, or roll grooved coupling system.
b) 2-1/2 inches (64 mm) And Larger: Flanged or roll grooved coupling system.

3. Fittings:
a. Usage:
1) 2 inches (50 mm) And Smaller: Welded, screwed, flanged, or roll grooved coupling system. For use with schedule 40 carbon steel pipe.
2) 2-1/2 inches (64 mm) And Larger: Welded, flanged, or roll grooved coupling system.
b. Types And Quality:
1) Screwed:
a) Cast iron meeting requirements of ANSI B16.4 or ductile iron meeting requirements of ANSI B16.3 and ASTM A536, Grade 65-45-12.
b) Threaded fittings and pipe shall have threads cut to ANSI B1.20.1.
c) Do not extend pipe into fittings to reduce waterway.
d) Ream pipe after cutting to remove burrs and fins.
2) Flanged: Steel meeting requirements of ANSI B16.5.
3) Welded:
a) Carbon steel meeting requirements of ASTM A234/A234M.
b) Weld pipe using methods complying with AWS B2.1, level AR-3. Welding procedures and performance of welders shall comply with AWS B2.1, level AR3.
4) Roll Grooved Pipe Coupling System:
a) Ductile iron meeting requirements of ASTM A395/A395M and ASTM A536, and UL listed.
b) Grooved products used on Project shall be from same manufacturer. Grooving tools shall be as recommended by manufacturer of grooved products.
c) Category Four Approved Products: See Section 01 6200 for definition of Categories:

	Gruvlok	Tyco (Grinnell)	Victaulic
Rigid Couplings	7401	772	Style 005
Flexible Couplings [1]	7000	705	Style 75
Flange Adaptors [2]	7012	71	Style 744
Grooved Coupling Gaskets [3]	'E' EPDM	Grade 'E' EPDM	'E' EPDM [4]

[1] Use in locations where vibration attenuation, stress relief, thermal expansion, or seismic design is required / needed.
[2] Class 125 or 150.
[3] Temperature rated 30 to 150 deg F (minus one to plus 65 deg C). NSF-61 certified.
[4] Grade 'A'.

c. Use of saddle or hole cut type mechanical tees is **NOT APPROVED**.

4. Valves:
a. Butterfly Valves:
1) Design Criteria:
a) UL / CASA approved.
b) Indicating type.
2) Category Four Approved Products: See Section 01 6200 for definitions of Categories:
a) Milwaukee:
(1) Model BB-SCS02 threaded ends with tamper switch one inch (25 mm) to 2 inches (50 mm).
(2) Model BBVSCS02 Grooved ends with tamper switch 2 inches (50 mm) to 2-1/2 inch (64 mm).
b) Nibco:

(1) Model WD3510-8 Wafer type with valve tamper switch.
(2) Model GD4765-8N Grooved type with valve tamper switch, 2-1/2 inches (64 mm) to 8 inches (200 mm).

c) Tyco (Grinnell):
(1) Model BFV-N wafer.
(2) Model BFV-N grooved.

d) Victaulic: Series 705W Grooved end type with internal supv. switches.

e) Kennedy:
(1) Model 01W wafer.
(2) Model G300 grooved.

5. Sprinkler Heads:
a. Concealed Pendant:
1) Design Criteria:
a) Adjustable cover.
b) UL / CASA listed and approved.
c) Concealed Cover Finish: White.
2) Type One Acceptable Products:
a) Wet Pendant, Flat Profile:
(1) Reliable: F4FR.
(2) Victaulic: Model 3802.
(3) Viking: Model VK462.
(4) Tyco (Grinnell): Model RF11.
(5) Equal as approved by Fire Sprinkler Consultant before bidding. See Section 01 6200.

2.2 ACCESSORIES

A. Manufacturers:
1. Manufacturer Contact List:
a. Anvil International, Portsmouth, NH www.anvilintl.com.
b. Eaton, Highland, IL www.cooperbline.com.

B. Hangers, Rods, And Clamps:
1. Design Criteria:
a. Galvanized, unless specified otherwise, and UL/CASA listed and labeled for service intended.
b. Hanger supports for sprinkler piping to conformance with NFPA 13.
2. Class One Quality Standard:
a. Hangers and accessories shall be Anvil numbers specified or equals by B-Line by Eaton.
b. Pipe Ring Hangers: Equal to Anvil Fig 69.
c. Riser Clamps: Equal to Anvil Fig. 261.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Acceptable Installers. See Section 01 4301:
1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 INSTALLATION

A. Install sprinkler systems in accordance with requirements of latest edition of NFPA 13 and as specified below:
1. Provide maintenance access to equipment.

2. Conceal sprinkler lines installed in occupied areas. In Mezzanine areas, route pipe to side or underneath Mezzanine walkway. Do not impede egress from Mezzanine or Roof.
3. Install to enable drainage of system. Drain trapped piping in accordance with NFPA 13.
   a. Install main drain from riser.
4. Install piping system, except for dry heads, so it will not be exposed to freezing temperatures.
5. Do not use dropped, damaged, or used sprinkler heads.
6. Brace and support system to meet seismic zone requirements for building site.

B. Flush system at full design flow rate for minimum five minutes. Route water to outside of building. Protect landscaping and other exterior elements from damage during flow tests.

3.3 FIELD QUALITY CONTROL

A. Field Tests:
   1. Pressure Test:
      a. Hydrostatically test system to 200 psi (1.38 MPa) minimum for two (2) hours as required by 'Contractor's Material And Testing certificate for Aboveground Piping':
         1) NFPA 13 (2010), Figure 24.1.
         2) NFPA 13 (2013), Figure 25.1.
         3) NFPA 13 (2016), Figure 25.1.
   2. Water Flow Test:
      a. Test to determine static and residual pressures and corresponding flow rate at point of connection to utility water main.
      b. Adjust water flow test data for seasonal fluctuations and future growth as recommended by Water Utility and AHJ.
      c. At point of connection to utility water main, combine inside and outside hose stream allowances.
   3. Check piping in relation to building's thermal envelope to be certain piping is within insulation envelope and protected from freezing temperatures. Report unsatisfactory conditions to Fire Sprinkler Consultant.

END OF SECTION

SECTION 22 0501

COMMON PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common requirements and procedures for plumbing systems.
   2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
   3. Furnish and install sealants relating to installation of systems installed under this Division.
   4. Furnish and install Firestop Penetration Systems for plumbing systems penetrations as described in Contract Documents.

B. Products Furnished But Not Installed Under This Section:
   1. Sleeves, inserts, supports, and equipment for plumbing systems installed under other Sections.

C. Related Requirements:
   1. Section 03 3111: 'Cast-In-Place Structural Concrete' for exterior concrete pads and bases for mechanical equipment.
   2. Section 05 0523: 'Metal Fastening' for quality and requirements for welding.
   3. Section 07 8400: 'Firestopping' for quality of penetration firestop systems to be used on Project and submittal requirements.
   4. Section 07 9213: 'Elastomeric Joint Sealant' for quality at building exterior.
   5. Sections Under 09 9000 Heading: 'Paints And Coatings' for painting of plumbing items requiring field painting.
   6. Section 22 0548: 'Vibration And Seismic Control for Plumbing Piping and Equipment'.
   7. Division 26: 'Electrical' for raceway and conduit, unless specified otherwise, and line voltage wiring.
   8. Division 33: 'Utilities' for piped utilities.
   9. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.

1.2 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's catalog data for each manufactured item.
         1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
         2) Include name, address, and phone number of each supplier.

B. Informational Submittals:
   1. Qualification Statement:
      a. Plumbing Subcontractor:
         1) Provide Qualification documentation if requested by Architect or Owner.
      b. Installer:
         1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
        1) At beginning of PLUMBING section of Operations And Maintenance Manual, provide master index showing items included:
            a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and Plumbing subcontractor.
            b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
                (1) List of plumbing equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
                (2) Manufacturer’s maintenance instructions for each piece of plumbing equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance instructions.
            c) Provide operating instructions to include:
                (1) General description of fire protection system.
                (2) Step by step procedure to follow for shutting down system or putting system into operation.
    b. Warranty Documentation:
        1) Include copies of warranties required in individual Sections of Division 22.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. Perform work in accordance with applicable provisions of Plumbing Codes applicable to Project. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
2. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
3. Identification:
    a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.

B. Qualifications. Requirements of Section 01 4301 applies, but not limited to following:
1. Plumbing Subcontractor:
    a. Company specializing in performing work of this section.
        1) Minimum five (5) years experience in plumbing installations.
        2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
    b. Upon request, submit documentation.
2. Installer:
    a. Licensed for area of Project.
    b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
    c. Upon request, submit documentation.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Accept valves on site in shipping containers with labeling in place.
2. Provide temporary protective coating on cast iron and steel valves.
3. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

B. Storage And Handling Requirements:

1. In addition to requirements specified in Division 01, stored material shall be readily accessible for inspection by Architect until installed.
2. Store items subject to moisture damage in dry, heated spaces.

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Provide certificates of warranty for each piece of equipment made out in favor of Owner.

B. Special Warranty:
   1. Guarantee plumbing systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
   2. If plumbing sub-contractor with offices located more than 150 miles (240 km) from Project site is used, provide service / warranty work agreement for warranty period with local plumbing sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.

B. Pipe And Pipe Fittings:
   1. Weld-O-Let and Screw-O-Let fittings are acceptable.

C. Sleeves:
   1. General:
      a. Two sizes larger than bare pipe or insulation on insulated pipe.
   2. In Concrete And Masonry:
      a. Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.
   3. In Framing And Suspended Floor Slabs:
      a. Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga (2 mm) galvanized sheet metal.

D. Valves:
   1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Approved Installers. See Section 01 4301:

B. Acceptable Installers. See Section 01 4301:
   1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Drawings:
   1. Plumbing Drawings show general arrangement of piping, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
   2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing Drawings.
   3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

B. Verification Of Conditions:
   1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which plumbing work is dependent for efficiency and report work that requires correction.
   2. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.
   3. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.
   4. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

3.3 PREPARATION

A. Changes Due To Equipment Selection:
   1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings showing proposed installations.
   2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
   3. Provide additional motors, valves, controllers, fittings, and other equipment required for proper operation of systems resulting from selection of equipment.
   4. Be responsible for proper location of rough-in and connections provided under other Divisions.

3.4 INSTALLATION

A. Interface With Other Work:
   1. Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
   2. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and confirm that they are properly installed.

B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

C. Locating Equipment:
   1. Arrange pipes and equipment to permit ready access to valves, cocks, unions, traps, and to clear openings of doors and access panels.

2. Adjust locations of pipes, equipment, and fixtures to accommodate work to interferences anticipated and encountered.
3. Install plumbing work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
4. Determine exact route and location of each pipe before fabrication.
    a. Right-Of-Way:
        1) Lines that pitch shall have right-of-way over those that do not pitch. For example, plumbing drains shall normally have right-of-way.
        2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
    b. Offsets, Transitions, and Changes in Direction:
        1) Make offsets, transitions, and changes in direction in pipes as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
        2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.

D. Penetration Firestops:
1. Install Penetration Firestop System appropriate for penetration at plumbing systems penetrations through walls, ceilings, roofs, and top plates of walls.

E. Sealants:
1. Seal openings through building exterior caused by penetrations of elements of plumbing systems.
2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.

F. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus:
1. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper installation of plumbing systems.
2. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings:
    a. Arrange so as to facilitate removal of tube bundles.
    b. Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
        1) Make connections of dissimilar metals with di-electric unions.
        2) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
    c. Do not use reducing bushings, bull head tees, close nipples, or running couplings. Street elbows are allowed only on potable water pipe 3/4 inch (19 mm) in diameter and smaller.
    d. Install piping systems so they may be easily drained
    e. Install piping to insure noiseless circulation.
    f. Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
3. Do not install piping in shear walls.
4. Cut piping accurately to measurements established at site. Remove burr and cutting slag from pipes.
5. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
6. Make changes in direction with proper fittings.
7. Expansion of Thermoplastic Pipe:
    a. Provide for expansion in every 30 feet (9 meters) of straight run.
    b. Provide 12 inch (300 mm) offset below roof line in each vent line penetrating roof.
8. Expansion of PEX Pipe: Allow for expansion and contraction of PEX pipe as recommended by Pipe Manufacturer.

G. Sleeves:
1. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete slabs on grade.
2. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Seal sleeves with specified sealants. Follow Pipe Manufacturer's recommendations for PEX pipe penetrations through studs and floor slabs.
3. Sleeves through floors shall extend 1/4 inch (6 mm) above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
4. Sleeves through floors and foundation walls shall be watertight.

H. Escutcheons:
1. Provide spring clamp plates where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.

3.5 REPAIR / RESTORATION

A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it:
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
2. Surface finishes shall exactly match existing finishes of same materials.

3.6 FIELD QUALITY CONTROL

A. Field Tests:
1. Perform tests on plumbing piping systems. Furnish devices required for testing purposes.

B. Non-Conforming Work:
1. Replace material or workmanship proven defective with sound material at no additional cost to Owner.
2. Repeat tests on new material, if requested.

3.7 CLEANING

A. Remove dirt, grease, and other foreign matter from each length of piping before installation:
1. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
2. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
3. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.

B. Clean exposed piping, equipment, and fixtures. Remove stickers from fixtures and adjust flush valves.

3.8 CLOSEOUT ACTIVITIES

A. Instruction of Owner:
1. Instruct building maintenance personnel and Facility Manager in operation and maintenance of plumbing systems utilizing Operation And Maintenance Manual when so doing.
2. Conduct instruction period after Substantial Completion inspection when systems are properly working and before final payment is made.

3.9 PROTECTION

A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

END OF SECTION

SECTION 22 0529

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common hanger and support requirements and procedures for plumbing systems.

B. Products Installed But Not Furnished Under This Section:
   1. Paint identification for gas piping used in HVAC equipment.

C. Related Requirements:
   1. Section 05 0523: 'Metal Fastening' for quality and requirements for welding.
   2. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.
   3. Sections Under 09 9000 Heading: Painting of mechanical items requiring field painting.
   4. Slots and openings through floors, walls, ceilings, and roofs provided under other Divisions in their respective materials.
   5. Section 23 0529: 'Hangers And Supports For HVAC Piping And Equipment' for gas piping used with HVAC equipment.
   6. Section 23 0553: 'Identification For HVAC Piping And Equipment' for paint identification of gas piping used with HVAC equipment.

1.2 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's catalog data for each manufactured item.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Anvil International, Portsmouth, NH www.anvilintl.com.
      b. Cooper B-Line, Highland, IL www.b-line.com.
      c. Unistrut, Wayne, MI www.tyco-unistrut.com.

B. Materials:
   1. Hangers, Rods, And Inserts
      a. Galvanized and UL approved for service intended.
      b. Support horizontal piping from hangers or on roller assemblies with channel supports, except where trapeze type hangers are explicitly shown on Drawings. Hangers shall have double nuts.
         1) Support insulated pipes 2 inches (50 mm) in diameter and smaller with adjustable swivel ring hanger with insulation protection shield. Gauge and length of shield shall be in accordance with Anvil design data.
            a) Type Two Acceptable Products:
               (1) Swivel Ring Hanger: Anvil Fig. 69.

(2) Insulation Protection Shield: Anvil Fig. 167.
(3) Equals by Cooper B-Line.

2) Support insulated pipes 2-1/2 inches (64 mm) in diameter and larger with clevis hanger or roller assembly with an insulation protection shield. Gauge and length of shield shall be according to Anvil design data.
a) Type Two Acceptable Products:
(1) Clevis Hanger: Anvil Fig. 260.
(2) Roller Assembly: Anvil Fig. 171.
(3) Insulation Protection Shield: Anvil Fig. 167.
(4) Equals by Cooper B-Line.

3) Support uninsulated copper pipe 2 inches (50 mm) in diameter and smaller from swivel ring hanger, copper plated and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from swivel ring hanger.
a) Type Two Acceptable Products:
(1) Swivel Ring Hanger For Copper Pipe: Anvil Fig. CT-69.
(2) Swivel Ring Hanger For Other Pipe: Anvil Fig. 69.
(3) Equals by Cooper B-Line.

4) Support uninsulated copper pipe 2-1/2 inches (64 mm) in diameter and larger from clevis hanger, copper plated hangers and otherwise fully suitable for use with copper tubing. Support non-copper uninsulated pipes from clevis hanger.
a) Type Two Acceptable Products:
(1) Clevis Hanger For Copper Pipe: Anvil Fig. CT-65.
(2) Clevis Hanger For Other Pipe: Anvil Fig. 260.
(3) Equals by Cooper B-Line.

c. Support rods for single pipe shall be in accordance with following table:

Rod Diameter	Pipe Size	Rod Diameter	Pipe Size
3/8 inch	2 inches and smaller	10 mm	50 mm and smaller
1/2 inch	2-1/2 to 3-1/2 inches	13 mm	64 mm to 88 mm
5/8 inch	4 to 5 inches	16 mm	100 mm to 125 mm
3/4 inch	6 inches	19 mm	150 mm
7/8 inch	8 to 12 inches	22 mm	200 mm to 300 mm

d. Support rods for multiple pipe supported on steel angle trapeze hangers shall be in accordance with following table:

Rods		Number of Pipes per Hanger for Each Pipe Size						
Number	Diameter	2 Inch	2.5 Inch	3 Inch	4 Inch	5 Inch	6 Inch	8 Inch
2	3/8 Inch	Two	0	0	0	0	0	0
2	1/2 Inch	Three	Three	Two	0	0	0	0
2	5/8 Inch	Six	Four	Three	Two	0	0	0
2	5/8 Inch	Nine	Seven	Five	Three	Two	Two	0
2	5/8 Inch	Twelve	Nine	Seven	Five	Three	Two	Two

Rods		Number of Pipes per Hanger for Each Pipe Size						
Number	Diameter	50mm	64mm	75mm	100mm	125mm	150mm	200mm
2	10 mm	Two	0	0	0	0	0	0
2	13 mm	Three	Three	Two	0	0	0	0
2	16 mm	Six	Four	Three	Two	0	0	0
2	19 mm	Nine	Seven	Five	Three	Two	Two	0
2	22 mm	Twelve	Nine	Seven	Five	Three	Two	Two

1) Size trapeze angles so bending stress is less than 10,000 psi (69 MPa).

e. Riser Clamps For Vertical Piping:
1) Type Two Acceptable Products:
a) Anvil Fig. 261.
b) Equals by Cooper B-Line.

f. Concrete Inserts:
1) Individual Inserts:
a) Suitable for special nuts size 3/8 inch (9.5 mm) through 7/8 inch (22 mm) with yoke to receive concrete reinforcing rods, and with malleable iron lugs for attaching to forms.
b) Type Two Acceptable Products:
(1) Anvil Fig. 282.
(2) Equals by Cooper B-Line.
2) Continuous Inserts:
a) Class Two Quality Standard: Equal to Unistrut P-3200 series.
g. Steel Deck Bracket:
1) Class Two Quality Standard: Equal to Unistrut P1000 with clamp nut, minimum 6 inch (150 mm) length.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Piping:
1. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
a. Except for underground pipe, suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps. Do not hang pipe from other pipe, equipment, or ductwork. Laying of piping on any building element is not allowed.
b. Supports For Horizontal Piping:
1) Support metal piping at 96 inches (2 400 mm) on center maximum for pipe 1-1/4 inches (32 mm) or larger and 72 inches (1 800 mm) on center maximum for pipe 1-1/8 inch (29 mm) or less.
2) Support thermoplastic pipe at 48 inches (1 200 mm) on center maximum.
3) Support PEX pipe at 32 inches (800 mm) minimum on center.
4) Provide support at each elbow. Install additional support as required.
c. Supports for Vertical Piping:
1) Place riser clamps at each floor or ceiling level.
2) Securely support clamps by structural members, which in turn are supported directly from building structure.
3) Provide clamps as necessary to brace pipe to wall.
d. Attach Unistrut to structural steel roof supporting structure. Spacing and support as described above.
e. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.
2. Gas piping Identification:
a. Apply paint identification for gas piping used with HVAC equipment as specified in Section 23 0553.

END OF SECTION

SECTION 22 0719

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install insulation on hot and cold water lines, fittings, valves, and accessories as described in Contract Documents.

B. Related Requirements:
   1. Section 22 1116: 'Domestic Water Piping'.
   2. Section 22 1400: 'Facility Storm Drainage'.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Armacell, Mebane, NC www.armaflex.com.
      b. Childers Products Co, Eastlake, OH www.fosterproducts.com.
      c. IMCOA, Youngsville, NC www.nomacokflex.com.
      d. Johns-Manville, Denver, CO www.jm.com.
      e. Knauf, Shelbyville, IN www.knauffiberglass.com.
      f. Manson, Brossard, PQ, Canada www.isolationmanson.com.
      g. Nomaco Inc, Yopungsville, NC www.nomacokflex.com.
      h. Owens-Corning, Toledo, OH www.owenscorning.com.
      i. Speedline Corp, Solon, OH www.speedlinepvc.com.

B. Materials:
   1. Above Grade Metal Piping:
      a. Insulation For Piping:
         1) Snap-on glass fiber or melamine foam pipe insulation, or heavy density pipe insulation with factory vapor jacket.
         2) Insulation Thickness:

Service Water Temperature	Pipe Sizes Up to 1-1/4 In	1-1/2 to 2 In	Over 2 In
170 - 180 Deg F	One In	1-1/2 In	2 In
140 - 160 Deg F	1/2 In	One In	1-1/2 In
45 - 130 Deg F	1/2 In	1/2 In	One In

Service Water Temperature	Pipe Sizes Up to 32 mm	38 to 50 mm	Over 50 mm
77 - 82 Deg C	25 mm	38 mm	50 mm
60 - 71 Deg C	13 mm	25 mm	38 mm
7 - 54 Deg C	13 mm	13 mm	25 mm

         3) Performance Standards: Fiberglas ASJ by Owens-Corning.
         4) Type One Acceptable Manufacturers:

a) Childers Products.
b) Knauf.
c) Manson.
d) Owens-Corning.
e) Johns-Manville.
f) Equal as approved by Architect before bidding. See Section 01 6200.

b. Fitting, Valve, And Accessory Covers:
1) PVC.
2) Performance Standard: Zeston by Johns-Manville.
3) Type One Acceptable Manufacturers:
a) Knauf.
b) Speedline.
c) Johns-Manville.
d) Equal as approved by Architect before bidding. See Section 01 6200.

2. Below Grade Metal Piping:
a. Insulation:
1) 1/2 inch (13 mm) thick.
2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
a) SS Tubolit by Armacell.
b) ImcoLock by Imcoa.
c) Nomalock or Therma-Cel by Nomaco.
b. Joint Sealant:
1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
a) Armacell 520.
b) Nomaco K-Flex R-373.

3. Pex Piping, Above And Below Grade:
a. Insulation:
1) 1/2 inch (13 mm) thick.
2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
a) SS Tubolit by Armacell.
b) ImcoLock by Imcoa.
c) Nomalock or Therma-Cel by Nomaco.
b. Joint Sealant:
1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
a) Armacell 520.
b) Nomaco K-Flex R-373.
c)

4. PP-R Piping, Above And Below Grade:
a. Insulation:
1) 1/2 inch (13 mm) thick.
2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
a) SS Tubolit by Armacell.
b) ImcoLock by Imcoa.
c) Nomalock or Therma-Cel by Nomaco.
b. Joint Sealant:
1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
a) Armacell 520.
b) Nomaco K-Flex R-373.

5. PVC or ABS Piping, Above And Below Grade - Facility Storm Drain:
a. Insulation:
1) 1/2 inch (13 mm) thick.
2) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
a) SS Tubolit by Armacell.
b) ImcoLock by Imcoa.
c) Nomalock or Therma-Cel by Nomaco.
b. Joint Sealant:
1) Category Four Acceptable Products. See Section 01 6200 for definition of Categories:
a) Armacell 520.
b) Nomaco K-Flex R-373.

PART 3 - EXECUTION

3.1 APPLICATION

A. Above Grade Piping:
1. Apply insulation to clean, dry piping with joints tightly butted.
2. Install insulation in manner to facilitate removal for repairs. Place sections or blocks so least possible damage to insulation will result from inspection or repairs of piping or equipment.
3. Piping up to 1-1/4 inch (32 mm) Diameter:
   a. Adhere 'factory applied vapor barrier jacket lap' smoothly and securely at longitudinal laps with white vapor barrier adhesive.
   b. Adhere 3 inch (76 mm) wide self-sealing butt joint strips over end joints.
4. Piping 1-1/2 inches (38 mm) Diameter And Larger:
   a. Use broken-joint construction in application of two-layer covering.
   b. Fill cracks and depressions with insulating cement mixed to thick plastic paste.
      1) Apply by hand in several layers to make up total specified thickness.
      2) Final layer shall have smooth uniform finish before application of covering.
5. Fittings, Valves, And Accessories:
   a. Do not apply insulation over flanged joints or victaulic couplings until piping has been brought up to operating temperature and flange bolts have been fully tightened. Insulate valves so wheel, stem, and packing nut are exposed.
   b. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
   c. Piping Up To 1-1/4 Inch (32 mm) Diameter:
      1) Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
      2) Alternate Method:
         a) Insulate fittings, valves, and accessories with one inch of insulating cement and vapor seal with two 1/8 inch (3 mm) wet coats of vapor barrier mastic reinforced with glass fabric extending 2 inches (50 mm) onto adjacent insulation.
   d. Piping 1-1/2 inches (38 mm) To 2 Inches (50 mm):
      1) Insulate with hydraulic setting insulating cement or equal, to thickness equal to adjoining pipe insulation.
      2) Apply final coat of fitting mastic over insulating cement.
   e. Piping 2-1/2 inch (64 mm) And Larger:
      1) Insulate with segments of molded insulation securely wired in place and coated with skim coat of insulating cement.
      2) Apply fitting mastic, fitting tape and finish with final coat of fitting mastic.
6. Pipe Hangers:
   a. Do not allow pipes to come in contact with hangers.
   b. Pipe Shield:
      1) Provide schedule 40 PVC by 6 inch (150 mm) long at each clevis and/or unistrut type hanger.
      2) Provide 16 ga (1.64 mm) by 6 inch (150 mm) long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.
      3) Provide 22 ga (0.85 mm) by 6 inch (150 mm) long galvanized shield at each pipe hanger to protect insulation from crushing by Unistrut type hanger.
   c. At Pipe Hangers:
      1) Provide rigid calcium silicate insulation (100 psi (690 kPA) compressive strength) at least 2 inches (50 mm) beyond shield.
7. Protect insulation wherever leak from valve stem or other source might drip on insulated surface, with aluminum cover or shield rolled up at edges and sufficiently large in area and of shape that dripping will not splash on surrounding insulation.

B. Below Grade Piping:
1. Slip underground pipe insulation onto pipe and seal butt joints.
2. Where slip-on technique is not possible, slit insulation, apply to pipe, and seal seams and joints.

END OF SECTION

SECTION 22 1116

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Perform excavating and backfilling required by work of this Section.
   2. Furnish and install potable water piping complete with necessary valves, connections, and accessories inside building and connect with outside utility lines 5 feet (1 50 m) from building perimeter as described in Contract Documents.

B. Related Requirements:
   a. Pre-installation conference held jointly with other concrete related sections.
   2. Section 22 0501: 'Common Piping Requirements'.
   3. Section 22 0719: 'Plumbing Piping Insulation'.
   4. Section 31 2316: 'Excavation' for criteria for performance of excavation.
   5. Section 31 2323: 'Fill' for criteria for performance of backfill.
   6. Section 33 1116: 'Site Water Utility Distribution Piping' for domestic water piping from 5 feet (1 50 m) from building perimeter to main.

1.2 REFERENCES

A. Reference Standards:
   1. American National Standards Institute / American Society of Sanitary Engineers:
      a. ANSI/ASSE 1003-2009, 'Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems'.
      b. ANSI/ASSE 1017-2009, ‘Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems'.
      c. ANSI/ASSE 1070-2015, ‘Performance Requirements for Water Temperature Limiting Devices'.
   2. American Water Works Association:
      a. AWWA C904-16, ‘Cross-Linked Polyethylene (PEX) Pressure Pipe, 1/2 inch (12 mm) Through 3 inch (76 mm) for Water Service’.
   3. ASTM International:
      a. ASTM B88-16, 'Standard Specification for Seamless Copper Water Tube'.
      b. ASTM E84-18b, ‘Standard Test Method for Surface Burning Characteristics of Building Materials’.
      c. ASTM F876-17, ‘Standard Specification for Crosslinked Polyethylene (PEX) Tubing’.
      d. ASTM F877-18a, ‘Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems’.
      e. ASTM F1807-18a, ‘Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing’.
      f. ASTM F2023-15, ‘’Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water’.
   4. NSF International Standard:
      a. NSF P171, 'Protocol for Chlorine Resistance of Plastic Piping Materials' (1999).
   5. NSF International Standard / American National Standards Institute:
      a. NSF/ANSI 14-2018, 'Plastic Piping System Components and Related Materials'.
      b. NSF/ANSI 61-2017, 'Drinking Water System Components - Health Effects'.
      c. NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.

1.3 SUBMITTALS

A. Informational Submittals:
   1. Test And Evaluation Reports:
      a. Written report of sterilization test.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
   2. California only: California Assembly Bill 1953 (AB1953) Compliant for Lead Free

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's Warranty covering property damage caused by defective product including renovation costs or replacement costs.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Acorn Controls, City of Industry, CA www.acorneng.com
      b. Cash Acme, Cullman, AL www.cashacme.com
      c. Chicago Faucets, Des Plaines, IL, www.chicagofaucets.com.
      d. Cla-Val Company, Costa Mesa, CA or Cla-Val Canada Ltd, Beamsville, ON www.cla-val.com.
      e. Conbraco Industries Inc, Matthews, NC www.conbraco.com or Conbraco (Honeywell Ltd), Scarborough, ON (416) 293-8111.
      f. Hammond Valve, New Berlin, WI www.hammondvalve.com.
      g. Handy & Harmon Products Div, Fairfield, CT www.handyharmon.com or Handy and Harmon of Canada Ltd, Rexdale, ON (800) 463-1465 or (416) 675-1860.
      h. Harris Products Group, Cincinnati, OH www.harrisproductsgroup.com.
      i. Honeywell Inc, Minneapolis, MN www.honeywell.com.
      j. Milwaukee Valve Co, New Berlin, WI www.milwaukeevalve.com.
      k. Nibco Inc, Elkhart, IN www.nibco.com.
      l. Rehau, Leesburg, VA www.rehau-na.com.
      m. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
      n. Spence Engineering Co, Walden, NY www.spenceengineering.com.
      o. Symmons Industries, Braintree, MA www.symmons.com.
      p. Uponor Inc, Apple Valley, MN www.uponor-usa.com.
      q. Viega ProPress, Wichita, KS www.viega-na.com.
      r. Watts Regulator Co, Andover, MA www.wattsreg.com.
      s. Wilkins (Zurn Wilkins), Paso Robles, CA www.zurn.com.
      t. Zurn PEX, Inc., Commerce, TX www.zurnpex.com.

B. Materials:
   1. Design Criteria:

a. All drinking water products, components, and materials above and below grade used in drinking water systems must meet NSF International Standards for Lead Free.
b. No CPVC allowed.

2. Pipe:
   a. Copper:
      1) Above-Grade:
         a) Meet requirements of ASTM B88, Type L.
      2) Below-Grade:
         a) Meet requirements of ASTM B88, Type K. 3/4 inch (19 mm) minimum under slabs.
         b) 2 inches (50 mm) And Smaller: Annealed soft drawn.
         c) 2-1/2 inches (64 mm) And Larger: Hard Drawn.
3. Fittings:
   a. For Copper Pipe: Wrought copper.
4. Connections For Copper Pipe:
   a. Above-Grade:
      1) Sweat copper type with 95/5 or 96/4 Tin-Antimony solder, Bridgit solder, or Silvabrite 100 solder. Use only lead-free solder.
      2) Viega ProPress System
   b. Below Grade:
      1) Brazed using following type rods:
         a) Copper to Copper Connections:
            (1) AWS Classification BCuP-4 Copper Phosphorus (6 percent silver).
            (2) AWS Classification BCuP-5 Copper Phosphorus (15 percent silver).
      2) Copper to Brass or Copper to Steel Connections: AWS Classification BAg-5 Silver (45 percent silver).
      3) Do not use rods containing Cadmium.
      4) Brazing Flux:
         a) Approved Products:
            (1) Stay-Silv white brazing flux by Harris Product Group.
            (2) High quality silver solder flux by Handy & Harmon.
      5) Joints under slabs acceptable only if allowed by local codes.
5. Ball Valves:
   a. Use ball valves exclusively unless otherwise specified. Ball valves shall be by single manufacturer from approved list below.
   b. Valves shall be two-piece, full port for 150 psi (1.03 MPa) SWP.
      1) Operate with flow in either direction, suitable for throttling and tight shut-off.
      2) Body: Bronze, 150 psig (1.03 MPa) wsp at 350 deg F (177 deg C) and 400 psig (2.76 MPa) wog.
      3) Seat: Bubble tight at 100 psig (0.69 MPa) under water.
   c. Class One Quality Standard: Nibco T585 or S585.
      1) Equal by Conbraco 'Apollo,' Hammond, Milwaukee, or Watts.
6. Combination Pressure Reducing Valve / Strainer:
   a. Integral stainless steel strainer, or separate 'Y' strainer installed upstream of pressure reducing valve.
   b. Meet ANSI/ASSE 1003 requirements.
   c. Built-in thermal expansion bypass check valve.
   d. Class One Quality Standard: Watts LFU5B:
      1) Equal by Cash Acme, Cla-Val Hi Capacity, Conbraco 36C, Honeywell-Braukmann, Spence Hi Capacity, Watts, or Wilkins. See Section 01 6200.
7. Mixing Valve:
   a. Solid brass construction and CSA B125 certified.
   b. Includes integral check valves and inlet screen. Features advanced paraffin-based actuation technology.
   c. Flow of 11 GPM (41.58 LPM) with maximum 10 psi (69 kPA) pressure drop. Perform to minimum flow of 0.5 GPM (1.89 LPM) in accordance with ASSE 1017.
   d. Set for 110 deg F (43 deg C) Service.
   e. Class One Quality Standard: Powers LFMM430. See Section 01 6200.
   f. Acceptable Manufacturers: Acorn, Chicago Faucets, Leonard, Powers, Sloan, Symmons, and Watts.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate cold water lines a minimum of 6 inches (150 mm) from hot water line.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
   1. Before pipes are covered, test systems in presence of Architect/Engineer at 125 psig (0.86 MPa) hydrostatic pressure for four (4) hours and show no leaks.
   2. Disconnect equipment not suitable for 125 psig (0.86 MPa) pressure from piping system during test period.

3.3 CLEANING

A. Sterilize potable water system with solution containing 200 parts per million minimum of available chlorine and maintaining pH of 7.5 minimum. Introduce chlorinating materials into system in manner approved by Architect/Engineer. Allow sterilization solution to remain for twenty-four (24) hours and open and close valves and faucets several times during that time.

B. After sterilization, flush solution from system with clean water until residual chlorine content is less than 0.2 parts per million.

C. Water system will not be accepted until negative bacteriological test is made on water taken from system. Repeat dosing as necessary until such negative test is accomplished.

END OF SECTION

SECTION 22 1119

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install miscellaneous potable water piping specialties as described in Contract Documents.

B. Related Requirements:
   1. Section 22 0501: 'Common Plumbing Requirements'.

1.2 REFERENCES

A. Reference Standards:
   1. NSF International Standard / American National Standards Institute:
      a. NSF/ANSI 61-2014a, 'Drinking Water System Components - Health Effects'.
      b. NSF/ANSI 372-2011, 'Drinking Water System Components - Lead Content'.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Ashcroft, Stratford, CT www.ashcroftinc.com.
      b. H O Trerice, Oak Park, MI www.hotco.com.
      c. IPS Corporation, Compton, CA www.ipscorp.com.
      d. Josam Co, Michigan City, IN www.josam.com.
      e. Jay R. Smith Maufacturing Co, Montgomery, AL www.jrsmith.com.
      f. Mifab Manufacturing Inc, Chicago, IL www.mifab.com.
      g. Oatey, Cleveland, OH www.oatey.com.
      h. Powers, North Andover, MA or Burlington ON www.powers.com.
      i. Precision Plumbing Products (PPP), Portland, OR www.pppinc.net.
      j. Prier Products, Inc., Grandview, MD www.prier.com.
      k. Proset Systems Inc., Lawrenceville, GA www.prosetsystems.com.
      l. Sioux Chief Manufacturing Co, Peculiar, MO www.siouxchief.com.
      m. Sure Seal, Tacoma, WA www.thesureseal.com.
      n. Wade (Division of Tyler Pipe), Tyler, TX www.wadedrains.com.
      o. Watts Drainage, Spindale, NC www.watts.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.

p. Weiss Instruments, Inc., Holtsville, NY www.weissinstruments.com.
q. Woodford Manufacturing, Colorado Springs, CO www.woodfordmfg.com.
r. Zurn Cast Metals, Erie, PA or Zurn Industries Limited, Mississauga, ON www.zurn.com.

B. Materials:
1. Trap Guard Trap Seal:
a. Design Criteria:
1) Not required to meet NSF International Standards for Lead Free.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Trap Guard by Proset:
a) Install per Manufacturer's recommendations.
2) Sure Seal by Sure Seal:
a) Install per Manufacturer's recommendation.
c. Brass Gauge Cocks:
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) 1092 by Ashcroft.
b) 865 by H O Trerice.
2. Water Hammer Arrestors:
a. Design Criteria:
1) Meet NSF International Standards for Lead Free.
2) Nesting type, air pre-charged bellows with casing.
3) Bellows constructed of stabilized 18-8 stainless steel.
b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Josam: 75003.
2) Jay R. Smith: 5020.
3) Sioux Chief: 650 Series.
4) Wade: 20.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Gauges: Connect to pipe with 1/4 inch (6 mm) connections utilizing gauge cocks.

END OF SECTION

SECTION 22 1313

FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install soil, waste, and vent piping systems within building.
   2. Perform excavation and backfill required by work of this Section.

B. Related Requirements:
   1. Section 22 0501: ‘Common Plumbing Requirements’.
   2. Section 22 1319: 'Facility Sanitary Sewer Specialties' for furnishing of sewer specialties.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: Participate in pre-installation conference specified in Section 03 3111.

1.3 REFERENCES

A. Reference Standards:
   1. American National Standards Institute / American Water Works Association:
      a. ANSI/AWWA C110/A21.10-12, ‘Ductile-Iron and Gray-Iron Fittings'.
      b. ANSI/AWWA C111/A21.11-17, ‘Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings'.
      c. ANSI/AWWA C115/A21.15-11, ‘Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges'.
      d. ANSI/AWWA C116/A21.16-15, ‘Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service'.
      e. ANSI/AWWA C150/A21.50-14, ‘Thickness Design of Ductile-Iron Pipe'.
      f. ANSI/AWWA C151/A21.51-17, ‘Ductile-Iron Pipe, Centrifugally Cast, for Water'.
      g. ANSI/AWWA C153/A21.53-11, ‘Ductile-Iron Compact Fittings for Water Service'.
   2. American Water Works Association (AWWA):
      a. AWWA M41, ‘Ductile-Iron Pipe and Fittings' (3rd Edition).
   3. ASTM International:
      a. ASTM A74-17, ‘Standard Specification for Cast Iron Soil Pipe and Fittings'.
      b. ASTM A888-18a, ‘Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications'.
      c. ASTM C564-14, ‘Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings'.
      d. ASTM D2235-04(2016), ‘Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings'.
      e. ASTM D2321-18, ‘Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications'.
      f. ASTM D2564-12(2018), ‘Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems'.
      g. ASTM D3034–16, ‘Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings'.
      h. ASTM F628–12, ‘Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core'.
      i. ASTM F656–15, ‘Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings'.

j. ASTM F891–16, ‘Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core'.

4. Cast Iron Soil Pipe Institute:
   a. CISPI Standard 301-09, ‘Standard Specification for Hubless Cast Iron Soil Pipe End Fittings for Sanitary & Storm Drain, Waste, and Vent Piping Applications'.
   b. CISPI 310-11, 'Standard Specification for Couplings for use in connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
   c. CISPI Handbook. 'Cast Iron Soil Pipe and Fittings Handbook' (2006).
5. International Code Council:
   a. ICC IPC-2018, 'International Plumbing Code'.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. American Brass & Iron (AB&I), Oakland, CA www.abifoundry.com.
      b. Clamp-All Corp, Haverhill, MA www.clampall.com.
      c. Anaco-Husky, Corona, CA www.anaco-husky.com.
      d. Josam Co, Michigan City, IN www.josam.com.
      e. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
      f. MG Piping Products Co, Stanton, CA www.mgcoupling.com.
      g. Mifab Manufacturing Inc, Chicago, IL www.mifab.com.
      h. Mission Rubber Co., Corona, CA www.missionrubber.com.
      i. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
      j. Watts Drainage, Spindale, NC www.watts.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
      k. Zurn Cast Metals, Erie, PA or Zurn Industries Limited, Mississauga, ON www.zurn.com.

B. Performance:
   1. Design Criteria:

C. Materials:
   1. Piping And Fittings: PVC Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F891, joined using cement primer meeting requirements of ASTM F656 and pipe cement meeting requirements of ASTM D2564.
      a. Furnish wall cleanouts with chrome wall cover and screw.
   2. Piping And Fittings: ABS Schedule 40 cellular core plastic pipe and pipe fittings meeting requirements of ASTM F628, joined with pipe cement meeting requirements of ASTM D2235.
      a. Furnish wall cleanouts with chrome wall cover and screw.
   3. Buried Piping:
      a. Approved Types: Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A74.
      b. Joint Material:
         1) Single-Hub: Rubber gaskets meeting requirements of ASTM C564.
         2) No-Hub:
            a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
            b) American Brass & Iron: SuperGrip 304.
            c) Anaco-Husky: Husky SD 4000 coupling.
            d) Clamp-All: Neoprene gaskets with type 304 stainless steel clamp and 24 ga type 304 stainless steel housing.
            e) Mission Rubber: Heavy weight coupling.
            f) MG Piping: MG Coupling.

g) Mifab: MI-XHUB – Heavy duty shielded coupling type 301 or 304 stainless steel.

4. Above Grade Piping And Vent Lines:
   a. Approved Types:
      1) Service weight, single-hub or no-hub type cast iron soil pipe meeting requirements of ASTM A74.
      2) Vent lines 2-1/2 inches (64 mm) or smaller may be Schedule 40 galvanized steel.
   b. Joint Material:
      1) Single-Hub: Rubber gaskets meeting requirements of ASTM C564.
      2) No-Hub Pipe: Neoprene gaskets with stainless steel cinch bands.
5. Fittings:
   a. Cast Iron Pipe: Hub and spigot, except fittings for no-hub pipe shall be no-hub, and meet requirements of ASTM A74.
      1) Joint Material: Rubber gaskets meeting requirements of ASTM C564.
      2) Galvanized Pipe: Screwed Durham tarred drainage type.
   b. Traps installed on cast iron bell and spigot pipe shall be service weight cast iron. Traps installed on threaded pipe shall be recess drainage pattern type.
   c. P-Traps:
      1) Trap shall have clean out plug if installed in other than slab on grade.
      2) Type Two Acceptable Products.
         a) JR Smith: 7220 deep seal cast iron.
         b) Mifab: MI-950.
         c) Zurn: Zurn Z-1000.
         d) Equal as approved by Architect before installation. See Section 01 6200.
6. Cleanouts:
   a. Furnish wall cleanouts with chrome wall cover and screw.
   b. Type Two Acceptable Products:
      1) Finish Floors:
         a) Josam: 56010.
         b) J. R. Smith: 4023.
         c) Mifab: C1100C-R-1.
         d) Wade: W-6000.
         e) Watts: CO-200-R.
         f) Zurn: Z-1402.
      2) Resilient Flooring:
         a) Josam: 56010-12.
         b) J. R. Smith: 4140.
         c) Mifab: C1100C-T-1.
         d) Wade: W-6000-T.
         e) Watts: CO-200-T.
         f) Zurn: Z-1400.
      3) Finished Wall:
         a) Josam: 58790.
         b) J. R. Smith: 4530.
         c) Mifab: C1460RD.
         d) Wade: W8560E.
         e) Watts: CO-460-RD.
         f) Zurn: Z-1446.
      4) Exposed Drain Lines:
         a) Josam: 58910.
         b) J. R. Smith: 4510.
         c) Mifab: C1460.
         d) Wade: W8560B.
         e) Watts: CO-460.
         f) Zurn: Z-1440.
      5) General Purpose:
         a) Josam: 58900.
         b) J. R. Smith: 4400.
         c) Mifab: C1300-MF
         d) Wade: W8550E.

e) Watts: CO-380.
f) Zurn: Z-1440.
6) Equal as approved by Architect before installation. See Section 01 6200.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Excavate and backfill as specified in Sections 31 2316 and 31 2323 with following additional requirements:
1. Runs shall be as close as possible to those shown on Drawings.
2. Excavate to required depth and grade to obtain fall required. Grade soil and waste lines within building perimeter 1/4 inch (6 mm) fall in one foot (300 mm) in direction of flow.
3. Bottom of trenches shall be hard. Tamp as required.
4. Remove debris from trench before laying of pipe.
5. Do not cut trenches near footings without consulting Architect.

B. Metal Pipe And Fittings:
1. Provide depression under bell of each joint to maintain even bearing of sewer pipe.
2. Connect to street main as required by local authorities.
3. Use jacks to make-up gasketed joints.
4. Do not caulk threaded work.
5. Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.

C. Thermoplastic Pipe And Fittings:
1. General: Piping and joints shall be clean and installed according to Manufacturer's recommendations. Break down contaminated joints, clean seats and gaskets and reinstall.
2. Above Grade: Locate pipe hangers every 4 feet (1.2 m) on center maximum and at elbows.
3. Below Grade:
a. Install in accordance with Manufacturer's recommendations and ASTM D2321.
b. Stabilize unstable trench bottoms.
c. Bed pipe true to line and grade with continuous support from firm base.
1) Bedding depth: 4 to 6 inches (100 to 150 mm).
2) Material and compaction to meet ASTM standard noted above.
d. Excavate bell holes into bedding material so pipe is uniformly supported along its entire length. Blocking to grade pipe is forbidden.
e. Trench width at top of pipe:
1) Minimum: 18 inches (450 mm) or diameter of pipe plus 12 inches (300 mm), whichever is greater.
2) Maximum: Outside diameter of pipe plus 24 inches (600 mm).
f. Do not use backhoe or power equipment to assemble pipe.
g. Initial backfill shall be 12 inches (300 mm) above top of pipe with material specified in referenced ASTM standard.
h. Minimum cover over top of pipe not under building slab:
1) 36 inches (900 mm) before wheel loading.
2) 48 inches (1 200 mm) before compaction.

D. Install piping so cleanouts may be installed as follows:
1. At every 135 degrees of accumulative change in direction for horizontal lines.
2. Every 100 feet (30 meters) of horizontal run.
3. Extend piping to accessible surface. Do not install piping so cleanouts must be installed in carpeted floors. In such locations, configure piping so wall type cleanouts may be used.

E. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system so gasses pass freely to atmosphere with no pressure or siphon condition on water seal.

F. Vent entire waste system to atmosphere. Join lines together in fewest practicable numbers before projecting above roof. Set back vent lines so they will not pierce roof near edge or valley. Vent line terminations shall be:
   1. 6 inches (150 mm) minimum above roof and 12 inches (300 mm) minimum from any vertical surface.
   2. Same size as vent pipe.
   3. In areas where minimum design temperature is below 0 deg F (minus 18 deg C) or where frost or snow closure may be possible:
      a. Vent line terminations shall be same size as vent pipe, except no smaller than 2 inches (50 mm) in diameter.
      b. Vents shall terminate 10 inches (250 mm) minimum above roof or higher if required by local codes.

G. Furnish and install firestopping at penetrations of fire-rated structures as required under Sections 07 8400 and 22 0501.

H. If test Tees are used for testing, plug Tees so wall finish can be installed. Do not leave as exposed cleanouts.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
   1. Conduct tests for leaks and defective work. Notify Architect before testing.
   2. Metal Pipe System: After backfilling and compacting of trenches is complete but before placing floor slab, fill waste and vent system with water to roof level or 10 feet (3 meters) minimum, and show no leaks for two hours. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.
   3. Thermoplastic Pipe System:
      a. Before backfilling and compacting of trenches, Fill waste and vent system with water to roof level or 10 feet (3 meters) minimum, and show no leaks for two hours. Correct leaks and defective work.
      b. After backfilling and compacting of trenches is complete but before placing floor slab, re-test as specified above. Uncover pipe and correct leaks and defective work. Re-backfill and compact and re-test.

END OF SECTION

SECTION 22 1319

FACILITY SANITARY SEWER SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Products Furnished But Not Installed Under this Section as described in Contract Documents.

B. Related Requirements:
1. Section 09 3013: 'Ceramic Tile' for floor drains in ceramic tile floors.
2. Section 22 0501: 'Common Plumbing Requirements'.
3. Section 22 1119: 'Domestic Water Piping Specialties'.
4. Section 22 1313: 'Facility Sanitary Sewers' for installation of miscellaneous sanitary sewer specialties.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
1. Manufacturer Contact List:
   a. H-M Company, Cincinnati, OH www.draintroughs.com.
   b. Josam Co, Michigan City, IN www.josam.com.
   c. Jay R. Smith Manufacturing Co, Montgomery, AL www.jrsmith.com.
   d. Mifab Manufacturing Inc, Chicago, IL www.mifab.com.
   e. Precision Plumbing Products (PPP), Portland, OR www.pppinc.net.
   f. Sioux Chief Manufacturing Co, Peculiar, MO www.siouxchief.com.
   g. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
   h. Watts Drainage, Spindale, NC www.watts.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
   i. Zurn Industries, LLC, Erie PA www.zurn.com. or Zurn Industries Ltd, Mississuaga, ON (905) 795-8844.

B. Performance:
1. Design Criteria:
   a. All materials NOT required to be low lead compliant.

C. Components:
1. Drains And Drain Accessories:
   a. Floor Drain FD-1:
      1) Approved types with deep seal trap and chrome plated strainer.
      2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         a) Josam: 30000-50-Z-5A.
         b) J. R. Smith: 2010-A.
         c) Mifab: F-1100-C.
         d) Sioux Chief: 832.
         e) Wade: 1100.
         f) Watts: FD-200-A.
         g) Zurn: Z-415.

PART 3 - EXECUTION: Not Used

END OF SECTION

SECTION 22 4213

COMMERCIAL WATER CLOSETS AND URINALS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install plumbing fixtures as described in Contract Documents.

B. Related Requirements:
   1. Section 07 9213: 'Elastomeric Joint Sealants' for sealants used between fixtures and other substrates.
   2. Section 22 0501: 'Common Plumbing Requirements'.
   3. Section 22 1116: 'Domestic Water Piping'.

1.2 REFERENCES

A. Definitions:
   1. High-Efficiency Toilet (HET): Toilets with effective flush volume of 1.28 gallons (4.8 liters) or less.
   2. Maximum Performance (MaP): Toilet testing that rates toilet efficiency and flush performance by measuring number of grams of solid waste (soybean paste and toilet paper) that a toilet can flush and remove completely from fixture in single flush represented as a scale or score. 1000 grams is highest score possible (www.map-testing.com).

B. Reference Standards:
   1. American Society of Mechanical Engineers / CSA Group (Canadian Standards Association):
      a. ASME A112.19.2-2018/CSA B45.1-18, 'Ceramic Plumbing Fixtures'.

1.3 SUBMITTALS

A. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operation and Maintenance Data:
         1) Sensor Operated operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
   1. Manufacturer Contact List:
      a. American Standard Brands, Piscataway, NJ www.americanstandard-us.com or American Standard Canada, Mississauga, ON www.americanstandard.ca.
      b. AMTC - Advanced Modern Technologies Corp, Woodland Hills, CA www.amtcorporation.com.
      c. Bemis Manufacturing Co, Sheboygan Falls, WI www.bemismfg.com.
      d. Beneke by Sanderson Plumbing Products, Columbus, MS www.sppi.com.
      e. Church Seat Co, Sheboygan Falls WI www.churchseats.com.

f. Delany Flush Valves, Charlottesville, VA www.delanyproduct.com.
g. Delta Faucet Co, Indianapolis, IN www.deltafaucet.com or Delta Faucet Canada, London, ON (519) 659-3626.
h. Dearborn Brass, Cleveland, OH www.dearbornbrass.com.
i. Gerber Plumbing Fixtures LLC, Woodridge, IL www.gerberonline.com.
j. Josam Co, Michigan City, IN www.josam.com.
k. Jay R. Smith Mfg. Co, Montgomery, AL www.jrsmith.com.
l. Kohler Co Plumbing Div, Kohler, WI www.us.kohler.com.
m. McGuire Manufacturing Co, Cheshire, CT www.mcguiremfg.com.
n. Mifab Manufacturing Inc, Amherst, NY www.mifab.com.
o. Moen Incorporated, North Olmsted, OH, or Moen Canada, Oakville, ON www.moen.com.
p. Olsonite Corp, Newnan, GA www.olsonite.net or Olsonite Co Ltd, Tilbury, ON (519) 682-1240.
q. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
r. South Fork Manufacturing, Coalville, UT (801) 953-3001 www.dirt-grabber.com.
s. Toto U.S.A., Inc., Morrow, GA www.totousa.com
t. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
u. Watts Drainage, Spindale, NC www.wattsdrainage.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
v. Zurn Industries, LLC, Erie PA www.zurn.com. or Zurn Industries Ltd, Mississuaga, ON (905) 795-8844.

B. Performance:
1. Design Criteria:
a. Meet or exceed ASME A112.19.2/CSA B45.1 for Vitreous China Plumbing Fixtures.
b. Interior exposed pipe, valves, and fixture trim, including trim behind custom casework doors, shall be chrome plated.
c. All materials NOT required to be low lead compliant.
d. Do not use toilets with effective flush volume of less than 1.28 gallons (4.8 liters).

C. Materials:
1. Water Closets:
a. Floor Mounted (Top Spud) with matched Flush Valve:
1) Standard Fixture:
a) Water usage of 1.6 gallons (6 liters) per flush.
b) Battery operated.
c) MaP Score of 1000 grams.
d) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) American Standard: Madera FloWise Elongated 3451.00 (water closet) with American Standard 6065.161.002 (flush valve) battery.
(2) Kohler: Wellworth K-4406 with Tripoint DC 1.6 GPF WC Flushometer K-10957-SV.
(3) Sloan ST-2009-A with flushometer Sloan G2 OPTIMA Plus 8111-1.6.
2) Handicap Accessible Fixture (WC-1):
a) Water usage of 1.6 gallons (6 liters) per flush.
b) 18 inch (450 mm) maximum rim height.
c) Battery operated.
d) MaP Score of 1000 grams.
e) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) American Standard: Madera FloWise Elongated 3461.001 with Flushometer American Standard 6065.161.002.
(2) Kohler: Highline EL ADA K-4405 with Tripoint DC 1.6 GPF WC Flushometer K-10957-SV.
(3) Sloan ST-2029-A with flushometer Sloan G2 OPTIMA Plus 8111-1.6.
2. Water Closet Accessories:
a. Flush Valves:

1) Water Closets must have required flush valves.
2) Proximity sensor type with battery.

b. Seats:
1) Provide split front type with check hinge.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) Standard And Handicap Accessible Fixtures:
(1) American Standard: 5905.100SS.
(2) Bemis: 1655SSC.
(3) Beneke: 527 SS.
(4) Church: 9500SSC.
(5) Kohler: K-4731-C.
(6) Olsonite: 95SSC.
(7) Toto SC534.

c. Flush Valve Filter:
1) Required in following flush valves:
a) Sloan.
b) Zurn.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) SFDG1 'Dirt Grabber' by South Fork Manufacturing.

3. Urinals:
a. Standard Fixture (wall mounted Flush Valve, mount standard height or ADA mounting height):
1) Water usage of 1.0 gallons (3.8 liters) per flush.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) American Standard: Washbrook FloWise 6590.001.
b) Gerber: Monitor 27-780or 27-730.
c) Kohler: Bardon K-4904-ET.
d) Sloan SU-1006-1.0.
e) Toto: UT447E.

4. Urinal Accessories:
a. Carrier / Support:
1) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) Josam.
b) Jay R. Smith.
c) Mifab.
d) Wade.
e) Zurn.

b. Flush Valve:
1) HEU (High-Efficiency Urinal) - Standard:
a) Proximity sensor type with battery.
b) Low flow, 0.5 gallon (1.9 liters) per flush maximum.
c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Zurn: ZER6003AV-EWS with maintenance override button.

c. Flush Valve Filter:
1) Required in following flush valves:
a) Sloan.
b) Zurn.
2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
a) SFDG1 'Dirt Grabber' by South Fork Manufacturing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install each fixture with separate vent line. Do not circuit vent.

B. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.
   1. Seal wall-mounted fixtures around edges to wall with sealant specified in Section 07 9213 'Elastomeric Joint Sealants'.
   2. Attach wall-hung fixtures to carriers.
   3. Support fixture hanger or arm free of finished wall.

C. Adjust flush valves for proper flow.

D. Provide each individual fixture supply with accessible chrome-plated stop valve with hand wheel.

E. Urinals: Install with accessible stop or control valve in each branch supply line.

F. Mounting:
   1. Urinals:
      a. Standard: 24 inches (610 mm) from floor to bottom lip.
      b. Handicap Accessible: 17 inches (432 mm) maximum from floor to bottom lip.

G. Water Closets:
   1. Floor or Wall Fixtures:
      a. Make fixture connections with approved brand of cast iron flange, soldered or caulked securely to waste pipe. Make joints between fixtures and flanges tight with approved fixture setting compound or gaskets. Caulk between fixtures with sealant specified in Section 07 9213. Point edges.

H. Flush Valve Filters:
   1. Install in Sloan and Zurn only flush valves.
   2. Install after water lines have been flushed out, but before turning water into flush valve.

3.2 CLEANING

A. Polish chrome finish at completion of Project.

END OF SECTION

SECTION 22 4216

COMMERCIAL LAVATORIES AND SINKS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install plumbing fixtures as described in Contract Documents.

B. Related Requirements:
   1. Section 07 9213: 'Elastomeric Joint Sealants' for sealants used between fixtures and other substrates.
   2. Section 22 0501: 'Common Plumbing Requirements'.
   3. Section 22 1116: 'Domestic Water Piping'.

1.2 REFERENCES

A. Reference Standard:
   1. American National Standards Institute / International Code Council:
      a. ANSI/ICC A117.1-2017, 'Standard for Accessible and Usable Buildings and Facilities'.
   2. American Society of Mechanical Engineers / Canadian Standards Association (CSA Group):
      a. ASME A112.18.1-2018/CSA B125.1-18, ‘Plumbing Supply Fittings’.
      b. ASME A112.6.7-2010 (R2015), ‘Sanitary Floor Sinks’.
      c. ASME A112.19.1-2018/CSA B45.2-18, 'Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures’.
      d. ASME A112.19.3-2017/CSA B45.4-17, ‘Stainless steel plumbing fixtures’.
   3. NSF International Standard / American National Standards Institute:
      a. NSF/ANSI 61-2017, 'Drinking Water System Components - Health Effects'.
      b. NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
   2. California only: California Assembly Bill 1953 (AB1953) Compliant for Lead Free.

1.4 SUBMITTALS

A. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Warranty Documentation:
         1) Final, executed copy of Warranty.

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Manufacturer's standard Warranty against material or Manufacturing defects.

PART 2 - PRODUCTS

2.1 ASSEMBLIES

A. Manufacturers:
1. Manufacturer Contact List:
   a. American Standard Brands, Piscataway, NJ www.americanstandard-us.com or American Standard Canada, Mississauga, ON www.americanstandard.ca.
   b. Brocar Products Inc, Cincinnati, OH www.brocar.com.
   c. CECO, Huntington Park, CA www.cecosinks.com.
   d. Chicago Faucet Co, Des Plaines, IL www.chicagofaucets.com.
   e. Dearborn Brass, Tyler, TX www.dearbornbrass.com.
   f. Delta Faucet Co, Indianapolis, IN www.deltafaucet.com or Delta Faucet Canada, London, ON (519) 659-3626.
   g. Engineered Brass Co. (EBC) (Just Manufacturing Co.), Franklin Park, IL www.justmfg.com.
   h. Elkay Manufacturing Co, Oak Brook, IL www.elkay.com.
   i. Gerber Plumbing Fixtures LLC, Woodridge, IL www.gerberonline.com.
   j. Josam Co, Michigan City, IN www.josam.com.
   k. Jay R. Smith Maufacturing Co, Montgomery, AL www.jrsmith.com.
   l. Just Manufacturing Co, Franklin Park, IL www.justsinks.com.
   m. Keeney Manufacturing Co, Newington, CT www.keeneymfg.com.
   n. Kindred USA, Midland, ON www.kindred-sinkware.com.
   o. Kohler Co Plumbing Div, Kohler, WI www.us.kohler.com.
   p. McGuire Manufacturing Co, Cheshire, CT www.mcguiremfg.com.
   q. Mifab Manufacturing Inc, Amherst, NY www.mifab.com.
   r. Moen Incorporated, North Olmsted, OH, or Moen Canada, Oakville, ON www.moen.com.
   s. Omni Flow Controls, Harbor City, CA www.chronomite.com or www.omniflowcontrols.com.
   t. Plumberex Specialty Products, Palm Springs, CA www.plumberex.com.
   u. Sloan Valve Co, Franklin Park, IL www.sloanvalve.com.
   v. Speakman Company, New Castle, DE www.speakmancompany.com.
   w. Symmons, Braintree, MA www.symmons.com.
   x. T & S Brass & Bronze Works Inc, Travelers Rest, SC www.tsbrass.com.
   y. TrueBro Inc, Collierville, TN www.truebro.com.
   z. Wade Div Tyler Pipe, Tyler, TX www.wadedrains.com.
   aa. Watts Drainage, Spindale, NC www.wattsdrainage.com or Watts Industries, Burlington, ON, Canada www.wattscda.com.
   bb. Zurn Commercial Brass, Sanford, NC www.zurn.com or Zurn Industries Ltd, Mississuaga, ON (905) 795-8844.
   cc. Zurn Cast Metal, Erie, PA www.zurn.com.

B. Performance:
1. Design Criteria:
   a. Interior exposed pipe, valves, and fixture trim, including trim behind custom casework doors, shall be chrome plated.
   b. Faucets and other fixture fittings shall conform to requirements of ASME A112.18.1/CSA B125.1.
   c. Lavatories shall conform to requirements of:
      1) Enamelled cast iron and enamelled steel fixtures.
         a) ASME A112.19.1/CSA B45.2.
         b) CSA B45.2/ASME A112.19.1.

C. Components:
1. Lavatories And Fittings:
   a. Standard and Handicap Accessible Self Supporting Lavatories:
      1) Size: 20 by 18 inches (500 by 450 mm) nominal.
      2) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         a) American Standard: Lucern 0355.012.
         b) Kohler: Greenwich K-2032.
      3) Carrier / Support:

a) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Josam: 17100.
(2) Jay R. Smith: 0700.
(3) Mifab: MC-41.
(4) Wade: 520-M36.

b. Lavatory Fittings:
1) Faucet and Drain:
a) Design Criteria:
(1) Meet NSF International Standards for Lead Free.
(2) Battery-operated automatic faucet.
b) Accessories:
(1) Cast brass spout.
(2) 4 inches (100 mm) cover plate.
(3) Single supply configuration.
(4) Solenoid valve.
(5) Control module and transformer.
(6) Hermetically sealed electronics.
(7) In-line filter.
c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Chicago: 116.405.21.1 with 4” CC E-tronic and 327A strainer.
(2) Delta: 591T0250 WITH 33T260 grid strainer and R2900 mixing valve.
(3) Gerber: 44-804-4 with 43-970 grid strainer.
(4) Moen: 8305 with McGuire 155A grid strainer.
(5) Sloan: EBF-650 with ETF-460A strainer.
(6) Speakman: S-8710 with S-3440 grid drain.
(7) Symmons: S-6080-G with grid strainer.
(8) Zurn: Z6913-SSH with grid strainer.
2) Flow Control Fitting:
a) Design Criteria:
(1) Meet NSF International Standards for Lead Free.
b) Accessories:
(1) Provide vandal-proof type in place of aerator. Flow shall be 0.5 gpm.
c) Category Four Approved Product. See Section 01 6200 for definitions of Categories:
(1) Omni L-200 Series by Chronomite Laboratories.
3) Supply pipes with stops:
a) Design Criteria:
(1) Meet NSF International Standards for Lead Free.
b) Accessories:
(1) Provide chrome plated quarter-turn brass ball valve, 12 inches (305 mm) long braided stainless steel riser, and chrome-plated steel flange.
c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) McGuire: BV2165CC.
(2) Zurn: Z8804 LRQ-PC.
4) Trap:
a) Description:
(1) 17 gauge (1.4 mm) tube 'P' trap, chrome plated.
b) Design Criteria:
(1) Not required to meet NSF International Standards for Lead Free.
c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
(1) Dearborn.
(2) Engineered Brass Company (EBC).
(3) Keeney Manufacturing.
(4) McGuire.
(5) Zurn.
5) Safety Covers for Handicap Accessible Lavatories:

a) Description:
   (1) Provide protection on water supply pipes and on trap.
b) Design Criteria:
   (1) Not required to meet NSF International Standards for Lead Free.
c) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
   (1) Trapwrap by Brocar Products Inc.
   (2) Pro Wrap by McGuire Products.
   (3) Lav Guard 2 by TrueBro.
   (4) Pro Extreme by Plumberex.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install each fixture with separate vent line. Do not circuit vent.

B. Ensure provisions are made for proper support of fixtures and that rough-in piping is accurately set and protected from movement and damage.

C. Seal wall-mounted fixtures around edges to wall and counter top fixtures to countertop with sealant specified in Section 07 9213.

D. Unless otherwise noted, provide each individual fixture supply with chrome-plated stop valve with hand wheel.

E. Install fixtures with accessible stop or control valve in each hot and cold water branch supply line.

F. Self-Supporting Lavatories: Install using carriers. Support carrier free of finished wall.

G. Install Safety Covers on all under sink / lavatories with exposed water supply pipes and traps.

H. Install Handicap Accessible Lavatories as per ADA height mounting requirements.

3.2 CLEANING

A. Polish chrome finish at completion of Project.

END OF SECTION

SECTION 22 4700

DRINKING FOUNTAINS AND WATER COOLERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install drinking water cooling system units as described in Contract Documents.

B. Related Requirements:
   1. Section 22 0501: 'Common Plumbing Requirements'.
   2. Section 22 1116: 'Domestic Water Piping'.

1.2 REFERENCES

A. Reference Standard:
   1. American National Standards Institute / International Code Council:
      a. ANSI/ICC A117.1-2017, 'Standard for Accessible and Usable Buildings and Facilities'.
   2. Canadian Standards Association (CA):
      a. CSA C22.2 No. 120-13 (R2018), ‘Refrigeration Equipment’.
   3. NSF International Standard / American National Standards Institute:
      a. Bottle Filling Station:
         1) NSF/ANSI 42-2017, 'Drinking Water Treatments Units – Aesthetic Effects'.
         2) NSF/ANSI 53-2017, 'Drinking Water Treatments Units – Health Effects'.
      b. Water Cooler:
         1) NSF/ANSI 61-2017, 'Drinking Water System Components - Health Effects'.
         2) NSF/ANSI 372-2016, 'Drinking Water System Components - Lead Content'.
   4. Underwriters Laboratories (UL):
      a. UL 399: 'Drinking-Water Coolers’.

1.3 SUBMITTALS

A. Closeout Submittals:
   1. Warranty Documentation:
      a. Provide Manufacturer Warranty.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Handicap Accessible Products to meet ANSI/ICC A117 Accessible requirements.
   2. Meet NSF International Standards for materials or products that come into contact with drinking water, drinking water treatment chemicals, or both for chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.
   3. California only: California Assembly Bill 1953 (AB1953) Compliant for Lead Free.

1.5 WARRANTY

A. Manufacturer standard limited warranty on refrigeration system of unit.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers:
1. Manufacturer Contact List:
   a. Elkay Manufacturing Co, Oak Brook, IL www.elkay.com.
   b. Halsey Taylor, Oak Brook, IL www.halseytaylor.com.
   c. Murdock Manufacturing (Acorn), City of Industry, CA www.murdockmfg.com.
   d. Oasis, Tri Palm International, Columbus OH www.oasiswatercoolers.com.

B. Design Criteria:
1. All drinking water products, components, and materials above and below grade used in drinking water systems must meet NSF International Standards for Lead Free.
2. Interior exposed pipe, valves, and fixture trim shall be chrome plated.

C. Materials:
1. Handicap Accessible Bi-Level Cooler:
   a. Design Criteria:
      1) Vandal proof operating bar on front and both sides.
      2) 8 GPH (30.3 LPH) water at 50 deg F (10 deg C) water cooled from 80°F (26.7°C) inlet water and 90°F (32.2°C) ambient per ASHRAE testing.
      3) 115-120 V, 60 Hz, single phase.
      4) Flexible bubbler.
      5) Build-In strainer.
      6) Meets state and federal requirements for both children or adults as defined by the Americans with Disabilities Act.
   b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      1) Elkay: Model EZSTL8LC.
      2) Halsey Taylor: Model HAC8FSBL-Q-ADA.
      3) Murdock Manufacturing: Model A172408B-UBL.
      4) Oasis: Model PG8ACSL.
2. Handicap Accessible Bi-Level Cooler and Bottle Filling Station:
   a. Design Criteria:
      1) Vandal proof operating bar on front and both sides.
      2) Vandal proof operating bar on front and both sides.
      3) 8 GPH (30.3 LPH) water at 50 deg F (10 deg C) water cooled from 80°F (26.7°C) inlet water and 90°F (32.2°C) ambient per ASHRAE testing.
      4) 115-120 V, 60 Hz, single phase.
      5) Flexible bubbler.
      6) Build-In strainer.
      7) Meets state and federal requirements for both children or adults as defined by the Americans with Disabilities Act.
   b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      1) Elkay: Model LZSTL8WSLK.
      2) Halsey Taylor: Model HTHB-HACG8BLPV-WF.
      3) Murdock Manufacturing: Model A172.8UBL-BF12.
      4) Oasis: Model PGEBFSL.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fixtures with accessible stop or control valve.

B. Mounting:
   1. General:
      a. Coordinate location of fountain with location and height of electrical outlet to ensure concealment of outlet by fountain.
      b. Anchor bottom of fountain to wall.
      c. Install 3/8 inch (9.5 mm) IPS union connection and Chicago No. 441 stop to building supply line.
      d. Install 1-1/4 inch (32 mm) IPS slip cast brass 'P' trap. Install trap so it is concealed.
   2. Accessible Drinking Fountains:
      a. Spout outlets of wheelchair accessible drinking fountains shall be 36 inches (915 mm) maximum above floor.
      b. Spout outlets of drinking fountains for standing persons shall be 38 inches (965 mm) and 43 inches (1090 mm) maximum above floor.

3.2 CLEANING

A. Polish chrome finish at completion of Project.

END OF SECTION

SECTION 23 0501

COMMON HVAC REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Common requirements and procedures for HVAC systems.
   2. Responsibility for proper operation of electrically powered equipment furnished under this Division.
   3. Furnish and install sealants relating to installation of systems installed under this Division.
   4. Furnish and install Firestop Penetration Systems for HVAC system penetrations as described in Contract Documents.
   5. Furnish and install sound, vibration, and seismic control elements.

B. Products Furnished But Not Installed Under This Section:
   1. Sleeves, inserts, and equipment for mechanical systems installed under other Sections.

1.2 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's catalog data for each manufactured item.
         1) Provide section in submittal for each type of item of equipment. Include Manufacturer's catalog data of each manufactured item and enough information to show compliance with Contract Document requirements. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
         2) Include name, address, and phone number of each supplier.

B. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data (Modify and add to requirements of Section 01 7800):
         1) At beginning of HVAC section of Operations And Maintenance Manual, provide master index showing items included.
            a) Provide name, address, and phone number of Architect, Architect's Mechanical Engineer, General Contractor, and HVAC, Sheet Metal, Refrigeration, and Temperature Control subcontractors.
            b) Identify maintenance instructions by using same equipment identification used in Contract Drawings. Maintenance instructions shall include:
               (1) List of HVAC equipment used indicating name, model, serial number, and nameplate data of each item together with number and name associated with each system item.
               (2) Manufacturer's maintenance instructions for each piece of HVAC equipment installed in Project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment, and maintenance and lubrication instructions.

1.3 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. In case of differences between building codes, laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Notify Architect in writing of such differences before performing work affected by such differences.
2. Identification:
   a. Motor and equipment name plates as well as applicable UL / ULC and AGA / CGA labels shall be in place when Project is turned over to Owner.

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
1. Company:
   a. Company specializing in performing work of this section.
      1) Minimum five (5) years experience in HVAC installations.
      2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
   b. Upon request, submit documentation.
2. Installer:
   a. Licensed for area of Project.
   b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
   c. Upon request, submit documentation.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
1. Accept valves on site in shipping containers with labeling in place.

B. Storage And Handling Requirements:
1. In addition to requirements specified in Division 01:
   a. Stored material shall be readily accessible for inspection by Architect until installed.
   b. Store items subject to moisture damage, such as controls, in dry, heated spaces.
   c. Provide temporary protective coating on cast iron and steel valves.
   d. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
2. Protect bearings during installation. Thoroughly grease steel shafts to prevent corrosion.

1.5 WARRANTY

A. Manufacturer Warranty:
1. Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record 'start-up' date of each piece of equipment on certificate.

B. Special Warranty:
1. Guarantee HVAC systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
2. If HVAC sub-contractor with offices located more than 150 miles (240 km) from Project site is used, provide service / warranty work agreement for warranty period with local HVAC sub-contractor approved by Architect. Include copy of service / warranty agreement in warranty section of Operation And Maintenance Manual.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Components shall bear Manufacturer's name and trade name. Equipment and materials of same general type shall be of same make throughout work to provide uniform appearance, operation, and maintenance.

B. Pipe And Pipe Fittings:
   1. Use domestic made pipe and pipe fittings on Project.
   2. Weld-O-Let and Screw-O-Let fittings are acceptable.

C. Sleeves:
   1. In Framing: Standard weight galvanized iron pipe, Schedule 40 PVC, or 14 ga (2 mm) galvanized sheet metal two sizes larger than bare pipe or insulation on insulated pipe.
   2. In Concrete And Masonry: Sleeves through outside walls, interior shear walls, and footings shall be schedule 80 black steel pipe with welded plate.

D. Valves:
   1. Valves of same type shall be of same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLERS

A. Acceptable Installers. See Section 01 4301:
   1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Drawings:
   1. HVAC Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
   2. Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over HVAC Drawings.
   3. Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

B. Verification Of Conditions:
   1. Examine premises to understand conditions that may affect performance of work of this Division before submitting proposals for this work. Examine adjoining work on which mechanical work is dependent for efficiency and report work that requires correction.
   2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
   3. Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

4. Check that slots and openings provided under other Divisions through floors, walls, ceilings, and roofs are properly located. Perform cutting and patching caused by neglecting to coordinate with Divisions providing slots and openings at no additional cost to Owner.

3.3 PREPARATION

A. Changes Due To Equipment Selection:
   1. Where equipment specified or otherwise approved requires different arrangement or connections from that shown in Contract Documents, submit drawings, if requested by Architect, showing proposed installations.
   2. If proposed changes are approved, install equipment to operate properly and in harmony with intent of Contract Documents. Make incidental changes in piping, ductwork, supports, installation, wiring, heaters, panelboards, and as otherwise necessary.
   3. Provide any additional motors, valves, controllers, fittings, and other additional equipment required for proper operation of system resulting from selection of equipment.
   4. Be responsible for the proper location of roughing-in and connections provided under other Divisions.

3.4 INSTALLATION

A. Interface With Other Work:
   1. Furnish sleeves, inserts, supports, and equipment that are to be installed by others in sufficient time to be incorporated into construction as work proceeds. Locate these items and see they are properly installed.
   2. Electrical: Furnish exact location of electrical connections and complete information on motor controls to installer of electrical system.
   3. Testing And Balancing:
      a. Put HVAC systems into full operation and continue their operation during each working day of testing and balancing.
      b. Make changes in pulleys, belts, fan speeds, and dampers or add dampers as required for correct balance as recommended by Testing And Balancing Agency and at no additional cost to Owner.

B. Cut carefully to minimize necessity for repairs to previously installed or existing work. Do not cut beams, columns, or trusses.

C. Locating Equipment:
   1. Arrange pipes, ducts, and equipment to permit ready access to valves, cocks, unions, traps, filters, starters, motors, control components, and to clear openings of doors and access panels.
   2. Adjust locations of pipes, ducts, switches, panels, and equipment to accommodate work to interferences anticipated and encountered.
   3. Install HVAC work to permit removal of equipment and parts of equipment requiring periodic replacement or maintenance without damage to or interference with other parts of equipment or structure.
   4. Determine exact route and location of each pipe and duct before fabrication.
      a. Right-Of-Way:
         1) Lines that pitch shall have right-of-way over those that do not pitch. For example, steam, steam condensate, and drains shall normally have right-of-way.
         2) Lines whose elevations cannot be changed shall have right-of-way over lines whose elevations can be changed.
      b. Offsets, Transitions, and Changes in Direction:
         1) Make offsets, transitions, and changes in direction in pipes and ducts as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
         2) Furnish and install all traps, air vents, sanitary vents, and devices as required to effect these offsets, transitions, and changes in direction.

D. Piping:
   1. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus.
      a. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Division from responsibility for proper erection of systems of piping in every respect.
      b. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings.
         1) Arrange so as to facilitate removal of tube bundles.
         2) Provide accessible flanges or ground joint unions, as applicable for type of piping specified, at connections to equipment and on bypasses.
            a) Make connections of dissimilar metals with di-electric unions.
            b) Install valves and unions ahead of traps and strainers. Provide unions on both sides of traps.
         3) Do not use reducing bushings, street elbows, bull head tees, close nipples, or running couplings.
         4) Install piping systems so they may be easily drained. Provide drain valves at low points and manual air vents at high points in hot water heating and cooling water piping.
         5) Install piping to insure noiseless circulation.
         6) Place valves and specialties to permit easy operation and access. Valves shall be regulated, packed, and glands adjusted at completion of work before final acceptance.
      c. Do not install piping in shear walls.
   2. Properly make adequate provisions for expansion, contraction, slope, and anchorage.
      a. Cut piping accurately for fabrication to measurements established at site. Remove burr and cutting slag from pipes.
      b. Work piping into place without springing or forcing. Make piping connections to pumps and other equipment without strain at piping connection. Remove bolts in flanged connections or disconnect piping to demonstrate that piping has been so connected, if requested.
      c. Make changes in direction with proper fittings.
      d. Expansion of Thermoplastic Pipe:
         1) Provide for expansion in every 30 feet (9 meters) of straight run.
         2) Provide 12 inch (300 mm) offset below roof line in each vent line penetrating roof.
   3. Provide sleeves around pipes passing through concrete or masonry floors, walls, partitions, or structural members. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete floors on grade. Seal sleeves with specified sealants.
      a. Sleeves through floors shall extend 1/4 inch (6 mm) above floor finish in mechanical equipment rooms above basement floor. In other rooms, sleeves shall be flush with floor.
      b. Sleeves through floors and foundation walls shall be watertight.
   4. Provide spring clamp plates (escutcheons) where pipes run through walls, floors, or ceilings and are exposed in finished locations of building. Plates shall be chrome plated heavy brass of plain pattern and shall be set tight on pipe and to building surface.
   5. Remove dirt, grease, and other foreign matter from each length of piping before installation.
      a. After each section of piping used for movement of water or steam is installed, flush with clean water, except where specified otherwise.
      b. Arrange temporary flushing connections for each section of piping and arrange for flushing total piping system.
      c. Provide temporary cross connections and water supply for flushing and drainage and remove after completion of work.

E. Penetration Firestops: Install Penetration Firestop System appropriate for penetration at HVAC system penetrations through walls, ceilings, roofs, and top plates of walls.

F. Sealants:
   1. Seal openings through building exterior caused by penetrations of elements of HVAC systems.
   2. Furnish and install acoustical sealant to seal penetrations through acoustically insulated walls and ceilings.

3.5 REPAIR / RESTORATION

A. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
   1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown.
   2. Surface finishes shall exactly match existing finishes of same materials.

3.6 CLEANING

A. Clean exposed piping, ductwork, and equipment.

B. No more than one week before Final Inspection, flush out bearings and clean other lubricated surfaces with flushing oil. Provide best quality and grade of lubricant specified by Equipment Manufacturer.

C. Replace filters in equipment for moving air with new filters of specified type no more than one week before Final Inspection.

3.7 PROTECTION

A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.

B. Do not operate pieces of equipment used for moving supply air without proper air filters installed properly in system.

C. After start-up, continue necessary lubrication and be responsible for damage to bearings while equipment is being operated up to Substantial Completion.

END OF SECTION

SECTION 23 3401

EXHAUST FANS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install exhaust fans as described in Contract Documents.

B. Related Requirements:
   1. Section 23 3001: 'Common Duct Requirements'.
   2. Division 26: Control device and electrical connection.

1.2 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Bear AMCA seal and UL label.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Contact List:
   1. Acme Engineering & Manufacturing Corp, Muskogee, OK www.acmefan.com.
   2. Broan-Nu Tone LLC, Harford, WI www.broan.com.
   3. Carnes Co., Verona, MI www.carnes.com.
   4. Loren Cook Co., Springfield, MO www.lorencook.com.
   5. Soler & Palau (S&P USA Ventilation Systems, LLC), Jacksonville FL www.solerpalau-usa.com.

2.2 MANUFACTURED UNITS

A. Ceiling Mounted Exhaust Fans:
   1. Acoustically insulated housings. Sound level rating of 5.0 sones maximum for CFM and static pressure listed on Contract Drawings.
   2. Include chatterproof integral back-draft damper with no metal-to-metal contact.
   3. True centrifugal wheels.
   4. Entire fan, motor, and wheel assembly shall be easily removable without disturbing housing.
   5. Suitably ground motors and mount on rubber-in shear vibration isolators.
   6. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a. Acme: VQ.
      b. Broan: LoSone.
      c. Carnes: VCD.
      d. Cook: Gemini.
      e. Soler & Palau: FF.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Anchor fan units securely to structure.

END OF SECTION

SECTION 23 3713

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install diffusers, registers, and grilles connected to ductwork as described in Contract Documents.

B. Related Requirements:
   1. Section 23 3001: 'General Duct Requirements'.

1.2 SUBMITTALS

A. Maintenance Material Submittals:
   1. Tools: Leave tool for removing core of each different type of grille for building custodian.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Contact List:
   1. Carnes Co, Verona, MI www.carnes.com.
   2. Krueger Air System Components, Richardson, TX www.krueger-hvac.com.
   3. Metal*Aire by Metal Industries Inc, Clearwater, FL www.metalaire.com.
   4. Nailor Industries Inc, Houston, TX or Weston, ON www.nailor.com.
   5. Price Industries Inc, Suwanee, GA www.price-hvac.com or E H Price Ltd, Winnipeg, MB (204) 669-4220.
   6. Titus, Richardson, TX www.titus-hvac.com.
   7. Tuttle & Bailey, Richardson, TX www.tuttleandbailey.com.

2.2 MANUFACTURED UNITS

A. Hard Ceiling Diffusers:
   1. Finish: White baked enamel.
   2. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a. Carnes: SKSA.
      b. Krueger: SH Frame F21.
      c. Metal*Aire: 5500S-2.
      d. Nailor: 6500B
      e. Price: SMD.
      f. Titus: TDC Border Type 6.
      g. Tuttle & Bailey: MS.

B. Ceiling Return And Transfer Grilles:
   1. Finish: White baked enamel.
   2. 1/2 inch by 1/2 inch aluminum cove.
   3. Class One Quality Standard: Titus 50F-3.

a. Carnes.
b. Kreuger.
c. Metal*Aire.
d. Nailor.
e. Price.
f. Titus.
g. Tuttle & Bailey.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Anchor securely into openings. Secure frames to ductwork by using four sheet metal screws, one per side.

END OF SECTION

SECTION 26 0501

COMMON ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General electrical system requirements and procedures.
   2. Perform excavating and backfilling work required by work of this Division as described in Contract Documents.
   3. Make electrical connections to equipment provided under other Sections.

B. Products Furnished But Not Installed Under This Section:
   1. Anchor bolts and templates for exterior lighting equipment bases.

C. Related Requirements:
   1. Section 07 8400: 'Firestopping' for quality of Penetration Firestop Systems to be used on Project and submittal requirements.
   2. Section 31 2316: 'Excavation' for criteria for performance of excavating.
   3. Section 31 2323: 'Fill' for criteria for performance of backfilling.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association / American National Standards Institute:
      a. NFPA 70, 'National Electrical Code (NEC)' (2017 or most recent edition adopted by AHJ).
   2. National Electrical Manufacturing Association Standards (NEMA):
      a. NEMA 250-2018, 'Enclosure for Electrical Equipment (1000 Volts Maximum)'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Provide following information for each item of equipment:
         1) Catalog Sheets.
         2) Assembly details or dimension drawings.
         3) Installation instructions.
         4) Manufacturer's name and catalog number.
         5) Name of local supplier.
      b. Furnish such information for following equipment:
         1) Section 26 2816: 'Enclosed Switches And Circuit Breakers'.
         2) Section 26 5100: 'Interior Lighting Fixtures'.
         3) Section 26 5200: 'Emergency Lighting' for battery units.
      c. Do not purchase equipment before approval of product data.
   2. Shop Drawings:
      a. Submit on Panelboards:
      b. Indicate precise equipment to be used, including all options specified. Indicate wording and format of nameplates where applicable. Submit in three-ring binder with hard cover.

B. Informational Submittals:
   1. Test And Evaluation Reports:
      a. Report of site tests, before Substantial Completion.

2. Qualification Statement:
    a. Electrical Subcontractor:
        1) Provide Qualification documentation if requested by Architect or Owner.
    b. Installer:
        1) Provide Qualification documentation if requested by Architect or Owner.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
    a. Operations and Maintenance Data:
        1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
    b. Record Documentation:
        1) Manufacturers documentation:
            a) Manufacturer's literature.
            b) Include copy of approved shop drawings.
            c) Provide tritium exit sign tabulations for each exit sign installed on Project including following:
                (1) Serial number.
                (2) Expiration number.
                (3) Installed building location (example – warehouse north rear exit, etc.).

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
2. Material and equipment provided shall meet standards of NEMA or UL and bear their label wherever standards have been established and label service is available.

B. Qualifications: Requirements of Section 01 4301 applies, but not limited to following:
1. Electrical Subcontractor:
    a. Company specializing in performing work of this section.
        1) Minimum five (5) years experience in electrical installations.
        2) Minimum five (5) satisfactorily completed installations in past three (3) years of projects similar in size, scope, and complexity required for this project before bidding.
    b. Upon request, submit documentation.
2. Installer:
    a. Licensed for area of Project.
    b. Designate one (1) individual as project foremen who shall be on site at all times during installation and experienced with installation procedures required for this project.
    c. Upon request, submit documentation.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 INSTALLERS

A. Approved Installers. See Section 01 4301:

B. Acceptable Installers. See Section 01 4301:
1. Meet Quality Assurance Installer Qualifications as specified in Part 1 of this specification.

3.2 EXAMINATION

A. Verification Of Conditions:
   1. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

3.3 INSTALLATION

A. General:
   1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
   2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough in.
      a. Notify Architect of conflicts before beginning work.
      b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.
   3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.

B. Install Penetration Firestop System appropriate for penetration at electrical system penetrations through walls, ceilings, and top plates of walls.

3.4 FIELD QUALITY CONTROL

A. Field Tests:
   1. Test systems and demonstrate equipment as working and operating properly. Notify Architect before test. Rectify defects at no additional cost to Owner.
   2. Measure current for each phase of each motor under actual final load operation, i.e. after air balance is completed for fan units, etc. Record this information along with full-load nameplate current rating and size of thermal overload unit installed for each motor.

END OF SECTION

SECTION 26 0519

LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of conductors used on Project except as excluded below.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

1.2 REFERENCES

A. Definitions:
   1. Line Voltage: Over 70 Volts.

B. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA 70, 'National Electric Code (NEC)' (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Line Voltage Conductors:
   1. Copper with AWG sizes as shown:
      a. Minimum size shall be No. 12 except where specified otherwise.
      b. Conductor size No. 8 and larger shall be stranded.
   2. Insulation:
      a. Standard Conductor Size No. 10 And Smaller: 600V type THWN or XHHW (75 deg F (24 deg C)).
      b. Standard Conductor Size No. 8 And Larger: 600V Type THW, THWN, or XHHW (75 deg F (24 deg C)).
      c. Higher temperature insulation as required by NFPA 70 or local codes.
   3. Colors:
      a. 208Y / 120 V System:
         1) Black: Phase A.
         2) Red: Phase B.
         3) Blue: Phase C.
         4) Green: Ground.
         5) White: Neutral.
      b. 480Y / 277 Volt System:
         1) Brown: Phase A.
         2) Orange: Phase B.
         3) Yellow: Phase C.
         4) Gray: Neutral.
         5) Green: Ground.
      c. Conductors size No. 10 and smaller shall be colored full length. Tagging or other methods for coding of conductors size No. 10 and smaller not allowed.

d. For feeder conductors larger than No. 10 at pull boxes, gutters, and panels, use painted or taped band or color tag color-coded as specified above.

B. Standard Connectors:
1. Conductors No. 8 And Smaller: Steel spring wire connectors.
2. Conductors Larger Than No. 8: Pressure type terminal lugs.
3. Connections Outside Building: Watertight steel spring wire connections with waterproof, non-hardening sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
1. Conductors and cables shall be continuous from outlet to outlet.
2. Do not use direct burial cable.

B. Line Voltage Conductors:
1. Install conductors in raceway where indicated on Contract Drawings. Run conductors of different voltage systems in separate conduits.
2. Route circuits at own discretion, however, circuiting shall be as shown in Panel Schedules. Group circuit homeruns to panels as shown on Contract Drawings.
3. Neutrals:
a. On three-phase, 4-wire systems, do not use common neutral for more than three circuits.
b. On single-phase, 3-wire systems, do not use common neutral for more than two circuits.
c. Run separate neutrals for each circuit where specifically noted on Contract Drawings.
d. Where common neutral is run for two or three home run circuits, connect phase conductors to breakers in panel which are attached to separate phase legs:
1) Provide breaker tie so that all circuits that share common neutral are simultaneously disconnected.
2) Neutral conductors shall be of same size as phase conductors unless specifically noted otherwise.
4. Pulling Conductors:
a. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
b. Do not use heavy mechanical means for pulling conductors.
c. Use only listed wire pulling lubricants.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install grounding for electrical installation as described in Contract Documents except as excluded below.

B. Related Requirements:
   1. Section 03 3111: 'Cast-In-Place Structural Concrete'.
      a. Pre-installation conference held jointly with other concrete related sections.
   2. Section 26 0501: 'Common Electrical Requirements'.
   3. Section 26 4301: 'Surge Protection Devices'.

1.2 REFERENCES

A. Reference Standards:
   1. Institute of Electrical and. Electronics Engineers (IEEE):
      a. IEEE 837-2014, 'Standard for Qualifying Permanent Connections Used in Substation Grounding'.
   2. National Fire Protection Association:
      a. NFPA 70, 'National Electric Code (NEC)' (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).
      b. NFPA 780, 'Standard for the Installation of Lightning Protection Systems' (2014 or latest approved edition).
   3. Telecommunications Industry Association:
      a. TIA-942 A, 'Telecommunications Infrastructure Standard for Data Centers' (2014).
   4. Section 27 1501: 'Communications Horizontal Cabling' for cables for Telephone and Data Systems.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
   1. Participate in pre-installation conference as specified in Section 03 3111.
   2. In addition to agenda items specified in Section 01 3100 and 31 3111, review following:
      a. Review Architect's inspection of grounding conductor installation before placement of concrete.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Requirements of Section 27 1501 applies, but is not limited to following:
      a. Cable assemblies shall be UL / CE Listed and CSA Certified. Cables shall be a distinctive green or green/yellow in color, and all jackets shall be UL, VW-1 flame rated.
      b. Grounding shall conform to all required Commercial Building Grounding and Bonding Requirements for Telecommunications, Electrical Codes, and Manufacturer's grounding requirements.
   2. Systems shall be installed per NFPA 780 and NFPA 70.
   3. All Bonds shall comply with most current version of IEEE 837 Standard.

B. Qualifications: Requirements of Section 01 4301 applies, but is not limited to following:
   1. Installers Qualifications:
      a. Grounding and Bonding:
         1) Licensed electrical contractor shall perform installation and termination of main bonding conductor to building service entrance ground.
         2) Licensed in State that Work is to be performed.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Type One Acceptable Products:
      a. 'Cadweld' by Erico International, Solon, OH www.erico.com.
      b. 'ThermOweld' by Continental Industries, Tulsa, NE www.conind.com.
      c. Equal as approved by Architect before bidding. See Section 01 6200.

B. Performance:
   1. Design Criteria:
      a. Size materials as shown on Drawings and in accordance with applicable codes.
      b. Bonding System Workmanship:
         1) The ground/earthing system shall be designed for high reliability and shall meet following criteria:
            a) Local electrical codes shall be adhered to.
            b) All grounding/earthing conductors shall be copper.
            c) Regulatory Agency Sustainability Approvals requirements are required.
      c. Rack and Cabinet Grounding/Earthing:
         1) Equipment and racks shall be bonded in accordance with methods prescribed in TIA-942.
         2) All grounding backbone should be #6 AWG copper cable.
         3) In telecommunications spaces with small number of racks or cabinets, rack/cabinet grounding/earthing jumper cable directly to telecommunications ground bus is permitted. Large spaces shall utilize mesh Common Bonding network, or overhead grounding backbone.
         4) Equipment racks, housings, messenger cables, and raceways:
            a) Connect cabinets, racks, frames and terminal boards to single-point ground which is connected to building ground system proper sized, bonded and tested green insulated copper grounding conductor.

C. Materials:
   1. Grounding And Bonding Jumper Conductors: Bare copper or with green insulation.
   2. Make grounding conductor connections to ground rods and foundation ground loop using approved bolted clamps listed for such use.
   3. Service Grounding Connections And Cable Splices: Make by exothermic process.
   4. Telecommunications ground bus bar (TGB): copper.
      a. Grounding bus bar:
         1) Technology Room shall be provided with telecommunications ground bus bar (TGB).
         2) Ground loop current potential is minimized between telecommunications equipment and electrical system to which it is attached.
      b. All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in Technology Room shall be grounded to respective TGB using minimum #6 AWG stranded copper bonding conductor and compression connectors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Interface With Other Work: Coordinate with Section 03 3111 in installing grounding conductor and placing concrete. Do not allow placement of concrete before Architect's inspection of grounding conductor installation.

B. Grounding conductors and bonding jumper conductors shall be continuous from terminal to terminal without splice. Provide grounding for following.
   1. Electrical service, its equipment and enclosures.
   2. Conduits and other conductor enclosures.
   3. Neutral or identified conductor of interior wiring system.
   4. Main panelboard, power and lighting panelboards.
   5. Non-current-carrying metal parts of fixed equipment such as motors, starter and controller cabinets, instrument cases, and lighting fixtures.
   6. Lightning protection down conductors.

C. Provide concrete-encased electrode system by embedding 20 feet (6.10 m) minimum of No. 2/0 bare copper conductor in concrete footing that is in direct contact with the earth, 2 inches (50 mm) minimum below concrete surface. Extend No. 2/0 copper conductor to main panel as shown on Drawings.

D. Ground identified common conductor of electrical system at secondary side of main transformer supplying building. Ground identified grounded (neutral) conductor of electrical system on supply side of main service disconnect.

E. Pull grounding conductors in non-metallic raceways, in flexible steel conduit exceeding 72 inches (1 800 mm) in length, and in flexible conduit connecting to mechanical equipment.

F. Provide grounding bushings on all feeder conduit entrances into panelboards and equipment enclosures.

G. Bond conduit grounding bushings to enclosures with minimum #10 AWG conductor.

H. Connect equipment grounds to building system ground.
   1. Use same size equipment grounding conductors as Phased conductors up through #10 AWG.
   2. Use NEC Table 250-95 for others unless noted otherwise in Drawings.

I. Run separate insulated grounding cable from each equipment cabinet to electrical panel. Do not use intermediate connections or splices. Affix directly to cabinet.

J. On motors, connect ground conductors to conduit with approved grounding bushing and to metal frame with bolted solderless lug.

K. Ground cabinet of transformers to conduit and ground wires, if installed. Bond transformer secondary neutral conductor to cabinet.

L. TGB shall be 1/4 inch (6.4 mm) thick x 2 inches (50 mm) high x 12 inches (305 mm) long installed with insulated standoffs at location directed.

M. Ground rack to TGB using #6 copper conductor and compression connector.

3.2 FIELD QUALITY CONTROL

A. Field Inspections:

1. Notify Architect for inspection two (2) days minimum before placing concrete over grounding conductor.
2. Grounding Well integrity shall be tested separately and together with Lightning Protection System integrity.

END OF SECTION

SECTION 26 0533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of material and installation procedures for raceway, boxes, and fittings used on Project but furnished under other Divisions.
   2. Furnish and install raceway, conduit, and boxes used on Project not specified to be installed under other Divisions.
   3. Furnish and install main electrical service raceway as described in Contract Documents and comply with electrical utility company requirements.
   4. Furnish and install main telephone service raceway as described in Contract Documents and comply with telephone company requirements.
   5. Furnish and install indoor service poles.

B. Related Requirements:
   1. See Section 07 8400: 'Firestopping' for raceways penetrating fire rated walls, ceilings, and barriers'.
   2. Section 23 0933: 'Electric and Electronic Control System for HVAC' for concealed raceway and extensions for temperature control system.
   3. Section 26 0501: 'Common Electrical Requirements' for general electrical requirements'.
   4. Section 26 0503: 'Electrical Utility Services' for electrical primary underground service requirements.
   5. Section 26 0536: 'Cable Trays For Electrical Systems' for cable tray.
   6. Section 27 1501: ‘Communications Horizontal Cabling’ for raceway for telephone and data systems.
   7. Section 27 4117: 'Video Systems' for system wiring.
   8. Section 27 5117: 'Audio Systems' for sound system wiring.
   9. Section 28 3101: 'Fire Detection And Alarm System' for clarification of raceway and conduit requirements for detection and alarm system.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA 70, ‘National Electric Code (NEC)’ (2017 or most recent edition adopted by AHJ including all applicable amendments and supplements).
   2. Telecommunications Industry Association:
      a. TIA-569, 'Telecommunications Pathways And Spaces' (Revision D, 2015).
   3. Underwriters Laboratories:
      a. UL 498, 'Attachment Plugs and Receptacles' (15th Edition, 2012).

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Provide Manufacturer's data sheets and descriptive literature on each product to be used, including:
         1) Preparation instructions and recommendations.
         2) Storage and handling requirements and recommendations.

3) Installation methods.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer Qualifications:
a. Firms regularly engaged in manufacturer of raceway and box distribution products and systems of types and sizes required, whose products have been in satisfactory use in similar service for not less than ten (10) years.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
1. Manufacturer Contact List:
a. Cooper B-Line, Highland, IL www.b-line.com.
b. Hubbell Incorporated, Milford, CT www.hubbell-wiring.com.
c. Square D, Palatine, IL www.squared.com.
d. Thomas & Betts, Memphis, TN www.tnb.com.
e. Walker Systems Inc, Williamstown, WV (800) 240-2601.
f. Wiremold Co, West Hartford, CT www.wiremold.com.

B. Materials:
1. Raceway And Conduit:
a. Sizes:
1) 3/4 inch (19 mm) for exterior use, unless indicated otherwise.
2) 1/2 inch (13 mm) for interior use, unless indicated otherwise.
b. Types: Usage of each type is restricted as specified below by product.
1) Galvanized rigid steel or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.
2) Galvanized Electrical Metallic Tubing (EMT), Flexible Steel Conduit, and Electrical Non-Metallic Tubing (ENT):
a) Allowed for use only in indoor dry locations where it is:
(1) Not subject to damage.
(2) Not in contact with earth.
(3) Not in concrete.
b) For metal conduit systems, flexible steel conduit is required for final connections to indoor mechanical equipment.
3) Schedule 40 Polyvinyl Chloride (PVC) Conduit:
a) Allowed only for exterior underground use unless indicated otherwise on drawings for connection to in-slab equipment or boxes.
4) Listed, Liquid-Tight Flexible Metal Conduit:
a) Use in outdoor final connections to mechanical equipment, length not to exceed 36 inches (900 mm).
5) Pre-wired 3/8 Inch (9.5 mm) Flexible Fixture Whips: Allowed only for connection to recessed lighting fixtures, lengths not to exceed 72 inches (1 800 mm).
c. Prohibited Raceway Materials:
1) Aluminum conduit.
2) Armored cable type AC (BX) cable.
2. Raceway And Conduit Fittings:
a. Rigid Steel Conduit And IMC: Threaded and designed for conduit use.
b. EMT:
1) Compression type.

2) Steel set screw housing type.
c. PVC Conduit:
1) PVC type. Use PVC adapters at all boxes.
2) PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
d. Flexible Steel Conduit: Screw-in type.
e. Liquid-tight Flexible Metal Conduit: Sealtite type.
f. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
g. Prohibited Fitting Materials:
1) Crimp-on, tap-on, indenter type fittings.
2) Cast set-screw fittings for EMT.
3) Spray (aerosol) PVC cement.

3. Non-Metallic Surface Raceway:
a. Rigid PVC with white finish.
b. Two-piece, base and snap-on cover, and complete with accessories and fittings necessary for complete installation.
c. Type One Acceptable Products:
1) Wiremold 800 Series
2) Equal as approved by Architect before bidding. See Section 01 6200.

4. Cord-Ended Metal Surface Raceway:
a. Grey finish.
b. 40 inches (1 000 mm) long with 72 inch (1800 mm) long cord and grounding type plug.
c. Six receptacles spaced 6 inches (150 mm) on center.
d. Type One Acceptable Products:
1) Wiremold G20-C4
2) Equal as approved by Architect before bidding. See Section 01 6200.

5. Outlet Boxes:
a. Galvanized steel of proper size and shape are acceptable for all systems. Where metal boxes are used, provide following:
1) Provide metal supports and other accessories for installation of each box.
2) Equip ceiling and bracket fixture boxes with fixture studs where required.
3) Equip outlets in plastered, paneled, and furred finishes with plaster rings and extensions to bring box flush with finish surface.
b. Non-metallic boxes may be used only for control voltage wiring systems.
c. Telephone / data outlet boxes shall be single device outlet boxes.
d. HVAC Instrumentation And Control:
1) Junction boxes in mechanical equipment areas shall be 4 inches (100 mm) square.
2) Boxes for remote temperature sensor devices shall be recessed single device.
3) Boxes for thermostats shall be 4 inches (100 mm) square with raised single device cover.

6. Multi-Service Floor Box:
a. Type Two Acceptable Products:
1) RFB4 steel floor box with telephone/data and audio/video brackets and FPCTCAL flush flanged cover assembly for carpet by Wiremold.
2) Equal as approved by Architect before use. See Section 01 6200.

7. Indoor Service Poles:
a. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
1) Wiremold Tele-Power Pole System; Two separate compartments.
b. General:
1) Provide indoor service pole system to extend branch circuit wiring and data network, voice, video, and other communication cabling to points of use shown on Contract Drawings.
2) Provide custom base trim by Wiremold to accommodate pole into Cash Wrap countertop as shown in Contract Drawings.
3) System shall consist of pole multi-outlet assemblies, and appropriate fittings and accessories as required for complete assembly.
c. Classification and Use: Indoor service pole system shall be suitable for use in dry interior locations, only as covered in Articles 353 and 352 Part A of National Electrical Code, as

adopted by National Fire Protection Association and as approved by American National Standards Institute.

d. Design Criteria:
   1) Indoor service pole system, UL Listed under File Nos. E15191 Guide PVGT, E53857 Guide PVUR, E41751 Guide RJPR, and E169069 Guide ZTFR; also CUL Listed in above files, or are CSA Certified in File LR350.

e. Series: 25DTP-4 Series and AMDTP-4 Series:
   1) Color: Clear anodized aluminum.
   2) Length: 12 feet 5 inches (3 785).
   3) Cross Section: 2.25 inches (57 mm) by 2.3125 inches (59 mm).
   4) First Compartment:
      a) Factory wired with two duplex styles 20A, 125V NEMA 5-20R grounding-type specification grade receptacles and colored to match pole finish.
      b) Receptacles shall be UL tested to meet performance requirements of Fed. Spec. W-C695G General Specification for Electrical Power Connectors and conform to NEMA Specification WD 1-7.01 to 7.10 'Heavy Duty General Use Grounding Receptacles'.
      c) Receptacles shall be UL Listed and comply with UL 498.
   5) Harness:
      a) Provide single circuit (2 conductor plus ground) with #12 AWG solid type THHN conductors, factory assembled to receptacles.
      b) Provide 6 inch (152 mm) conductor leads for termination to overhead wiring system.
      c) Provide 8 inch (203 mm) removable cover section at top of power compartment to facilitate hard wiring of pole wire harness.
   6) Second Compartment (for field installation of telephone or data network cabling) to be removable without dismantling or removing Tele-Power Pole after installation:
      a) Provide 8 inch (203 mm) removable cover section at bottom of this compartment to assemble and mount communications connectors.
      b) Provide cover section with six (6) knockouts for modular voice-data jacks (RJ-type) and 1.375 inches by 2.7 inches (35 mm by 69 mm) rectangular knockout for modular furniture outlet.
      c) Provide 'mouse hole' knockout with furnished grommet for straight through communication cable access.
   7) Fittings:
      a) Provide all fittings necessary to make system workable, including but not limited to entrance end fittings for top of each electrical channel, ceiling trim plate and pole-mounting bracket.
      b) Provide custom base trim by Manufacturer of raceway to accommodate pole into countertop of Cash Wrap.
   8) Power Device Covers:
      a) Field install power device covers to add duplex, single 1.40 inch (36 mm) and 1.59 inch (40 mm), and rectangular-type receptacles, colored to match appropriate Tele-Power Pole.
   9) Communication Covers:
      a) Provide add-on communication covers to mount workstation device faceplates, inserts, and specialty mounting bezels.
      b) Power pole Manufacturer will provide complete line of connectivity outlets with multi-media modular inserts for UTP fiber optic, coaxial, and other cabling types,

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification Of Conditions:

1. Confirm dimensions, ratings, and specifications of materials to be installed and coordinate these with site dimensions and with other Sections.
2. Examine conditions under which raceways and boxes are to be installed. Do not proceed with installation until substrates have been properly prepared and deviations from Manufacturer's recommended tolerances are corrected.
3. Notify Architect in writing if substrates are not acceptable to install raceways and boxes.
   a. Commencing installation constitutes acceptance of existing conditions.

3.2 PREPARATION

A. Prepare substrates using methods recommended by manufacturer for achieving best result for substrate under project conditions.

3.3 INSTALLATION

A. Interface With Other Work:
   1. Coordinate with Divisions 22 and 23 for installation of raceway for control of plumbing and HVAC equipment.
   2. Before rough-in, verify locations of boxes with work of other trades to insure that they are properly located for purpose intended.
      a. Coordinate location of outlet for water coolers with Division 22.
      b. Coordinate location of outlets adjacent to or in millwork with Division 06 before rough-in. Refer conflicts to Architect and locate outlets under his direction.
   3. Install pull wires in raceways installed under this Section where conductors or cables are to be installed under other Divisions.

B. General:
   1. Sound and video system electrical components furnished and installed under this Section include following items:
      a. Factory-fabricated speaker enclosures.
      b. Fittings.
   2. Install in accordance with Manufacturer's instruction for system components. Coordinate installation with adjacent work to ensure proper clearances and to prevent electrical hazards.
   3. Install in accordance with complete system instruction sheet.
   4. Install enclosures to be mechanically continuous and connected to all electrical outlets, boxes, device mounting brackets, and cabinets, in accordance with manufacturer's installation sheets.
   5. Install enclosures to be electrically continuous and bonded in accordance with National Electrical Code for proper grounding:
      a. Mechanical Security: Raceway systems shall be mechanically continuous and connected to all electrical outlets, boxes, device mounting brackets, and cabinets, in accordance with Manufacturer's installation sheets.
      b. Electrical Security: Metal raceway shall be electrically continuous and bonded in accordance with National Electrical Code for proper grounding.
      c. Install custom base trim security in Cash Wraps countertop.
      d. Accessories: Provide accessories as required for complete installation, including insulated bushings and inserts where required by manufacturer.
      e. Unused Openings: Close unused raceway openings using manufacturer's recommended accessories.

C. Conduit And Raceway:
   1. Conceal conduit and raceways within ceilings and walls, except at Contractor's option, conduit and raceways may be exposed on walls or ceilings of mechanical equipment areas and above acoustical panel suspension ceiling systems. Install exposed raceway runs parallel to or at right angles to building structure lines.
   2. Seal all raceways penetrating fire rated walls, ceilings and barriers. See Section 07 8400.
   3. Keep raceway runs 6 inches (150 mm) minimum from hot water pipes.

4. Make no more than four quarter bends, 360 degrees total, in any conduit run between outlet and outlet, fitting and fitting, or outlet and fitting.
   a. Make bends and offsets so conduit is not injured and internal diameter of conduit is not effectively reduced.
   b. Radius of curve shall be at least minimum indicated by NFPA 70.
5. Cut conduit smooth and square with run and ream to remove rough edges. Cap raceway ends during construction. Clean or replace raceway in which water or foreign matter have accumulated.
6. Run two spare conduits from each new panelboard to ceiling access area or other acceptable accessible area and cap for future use.
7. Bend PVC conduit by hot box bender and, for PVC 2 inches (50 mm) in diameter and larger, expanding plugs. Apply PVC adhesive only by brush.
8. Installation In Framing:
   a. Do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches (600 mm) of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width.
   b. Holes shall be one inch (25 mm) diameter maximum.
9. Underground Raceway And Conduit:
   a. Bury underground raceway installed outside building 24 inches (600 mm) deep minimum.
   b. Bury underground conduit in planting areas 24 inches (600 mm) deep minimum. It is permissible to install conduit 6 inch (150 mm) below concrete sidewalks, however, conduit must be buried 24 inches (600 mm) deep at point of exit from planting areas.
   c. Install conduit in/or under concrete slab only at locations shown on drawings.
10. Conduit And Raceway Support:
    a. Securely support raceway with approved straps, clamps, or hangers, spaced as required.
    b. Do not support from mechanical ducts or duct supports without Architect's written approval. Securely mount raceway supports, boxes, and cabinets in an approved manner by:
       1) Expansion shields in concrete or solid masonry.
       2) Toggle bolts on hollow masonry units.
       3) Wood screws on wood.
       4) Metal screws on metal.
11. Prohibited Procedures:
    a. Installation of raceway beneath or embedded in concrete, except where explicitly shown on Contract Documents.
    b. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
    c. Installation of raceway that has been crushed or deformed.
    d. Use of torches for bending PVC.
    e. Spray applied PVC cement.
    f. Boring holes in truss members.
    g. Notching of structural members.
    h. Supporting raceway from ceiling system support wires.
    i. Nail drive straps or tie wire for supporting raceway.

D. Telephone / Data Systems:
   1. Install raceway from terminal board to each telephone and data outlet as indicated on Contract Drawings.
   2. Conduit to stub from each terminal or telephone and data outlet to above accessible ceiling.

E. Boxes:
   1. Boxes shall be accessible and installed with approved cover.
   2. Do not locate device boxes that are on opposite sides of framed walls in the same stud space. In other wall construction, do not install boxes back to back.
   3. Locate boxes so pipes, ducts, or other items do not obstruct outlets.
   4. Install outlets flush with finished surface and level and plumb.
   5. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.

6. At time of substantial completion, install blank plates on uncovered outlet boxes that are for future use.
7. Location:
   a. Install boxes at door locations on latch side of door, unless explicitly shown otherwise on Contract Drawings. Verify door swings shown on electrical drawings with architectural drawings, and report discrepancies to Architect before rough-in. Distance of box from jamb shall be 6 inches (150 mm) from door jamb.
   b. Properly center boxes located in walls with respect to doors, panels, furring, trim and consistent with architectural details. Where two or more outlets occur, space them uniformly and in straight lines with each other, if possible.
   c. Center ceramic tile boxes in tile.

F. Support factory-fabricated speaker enclosures from structure or ceiling suspension system.

G. Indoor Service Pole:
1. General:
   a. Locate electrical and data cable in separate cable tray as required by Manufacturer.
   b. Install service pole in Cash Wrap countertop with custom base provided by Service Pole Manufacturer.
   c. Coordinate final location of installation in Cash Wrap with Architect and Owner's Representative.
2. Mechanical Security: Install system in such manner that it is mechanically continuous and connected to all electrical outlets, boxes, and cabinets, in accordance with manufacturer's installation instructions.
3. Electrical Security: Install system in such manner that it is electrically continuous and bonded in accordance with provisions of the National Electrical Code.
4. System Support: Securely support system at ceiling and floor in accordance with manufacturer's installation instructions.
5. Install system complete with insulating bushings and inserts where required by manufacturer's installation instructions. Close all unused openings where wire is exposed.

3.4 REPAIR

A. Touch-up, repair or replace damaged products before completion of project.

3.5 CLEANING

A. General:
1. Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer.

3.6 PROTECTION

A. Protect installed products until completion of project.

END OF SECTION

SECTION 26 5100 - INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior luminaires.

B. Emergency lighting units.

C. Exit signs.

D. Ballasts and drivers.

E. Lamps.

1.02 REFERENCE STANDARDS

A. 47 CFR 15 - Radio Frequency Devices current edition.

B. ANSI C78.377-2015 - American National Standard for Electric Lamps: Specification for the Chromaticity of Solid State Lighting Products.

C. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts - Supplements 2011.

D. ANSI/IES RP-16-10 - Nomenclature and Definitions for Illuminating Engineering.

E. Federal Communications Commission (FCC): Code of Federal Regulations (CFR): FCC 47 CFR Part 18, 'Industrial, Scientific, and Medical Equipment'.

F. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code) 2013 (Corrigendum 2019).

G. IEC 60929 - AC and/or DC-Supplied Electronic Control Gear for Tubular Fluorescent Lamps - Performance Requirements 2015.

H. IEC 61000-3-2:2005 - Electromagnetic Compatibility (EMC) - Part 3-2: Limits for Harmonic Current Emissions (Equipment Input Current <= 16 A per phase).

I. IEC 61547 ED. 2.0 B:2009 - Equipment for General Lighting Purposes - EMC Immunity Requirements.

J. IEC 62384:2006 - D.C. or A.C. Supplied Electronic Control Gear for LED Modules - Performance Requirements.

K. IEEE C62.41.1 - IEEE Standard Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits 2002 (Reaffirmed 2008).

L. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits 2002 (Corrigendum 2012).

M. IES LM-63 - IESNA Standard File Format for Electronic Transfer of Photometric Data and Related Information 2002 (Reaffirmed 2008).

N. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products 2008.

O. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules 2015, with Errata (2017).

P. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

Q. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems 2006.

R. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems 2006.

S. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts 2016.

T. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility 2012.

U. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

V. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

W. UL 1310 - Class 2 Power Units Current Edition, Including All Revisions.

X. UL 924 - Emergency Lighting and Power Equipment Current Edition, Including All Revisions.

Y. UL 935 - Fluorescent-Lamp Ballasts Current Edition, Including All Revisions.

Z. UL 1598 - Luminaires Current Edition, Including All Revisions.

AA. UL 1598C - Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits Current Edition, Including All Revisions.

BB. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products Current Edition, Including All Revisions.

1.03 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. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:

1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

C. 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.
    b. Include IES LM-79 test report.
2. Ballasts and Drivers:
    a. Manufacturer's published product data on dimensions, ratings, catalog numbers and identification of products and accessories for products included for project. Include performance data.
    b. Provide fixture type(s) list for each specific ballast/driver.
    c. Provide wiring diagrams as needed for special operation or interaction with other system(s).
    d. Qualification Statements: Provide experience compliance documentation, experience compliance documentation, compliance documentation with UL / ULC requirements and compliance documentation with UL / ULC requirements.
3. Lamps: Include rated life, color temperature, color rendering index (CRI), and initial and mean lumen output.

D. Sustainable Design Documentation: Submit manufacturer's product data on rated lamp life, showing compliance with specified requirements.

E. Certificates for Dimming Ballasts and drivers: Manufacturer's documentation of compatibility with dimming controls to be installed.

F. 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.

G. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

H. Final, executed copy of Warranty on drivers.

1.05 **QUALITY ASSURANCE**

A. Comply with requirements of NFPA 70.

B. Regulatory Agency Sustainability Approvals: Meet UL / ULC requirements.

C. Qualifications. Requirements of Section 01 4000 01 4000 apply but not limited to following:

1. Manufacturer with five (5) years experience in manufacture of dimmable electronic lighting drivers.
2. Provide experience documentation.

D. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

E. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

F. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 **DELIVERY, STORAGE, AND PROTECTION**

A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting) and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.07 **FIELD CONDITIONS**

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.08 **WARRANTY**

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five five year manufacturer warranty for LED luminaires, including drivers.

PART 2 PRODUCTS

2.01 **LUMINAIRE TYPES**

A. Furnish products as indicated in luminaire schedule included on the drawings.

B. Furnish products as indicated in luminaire schedule provided by Owner’s Representative provided by Owner’s Representative.

C. Substitutions: See Section 01 6000 - Product Requirements See Section 01 6000 - Product Requirements.

2.02 **LIGHTING DEVICES AND FIXTURES**

A. Manufacturers:

1. Acuity Brands, Inc: www.acuitybrands.com/#sle.
2. Cooper Lighting, a division of Cooper Industries: www.cooperindustries.com/#sle.
3. Hubbell Lighting, Inc: www.hubbelllighting.com/#sle.
4. Philips Lighting North America Corporation; www.lightingproducts.philips.com/#sle.
5. Advance Transformer Co.: Rosemont, IL www.advancetransformer.com.
6. Cooper Wiring Devices by Eaton: Peachtree City, GA www.cooperindustries.com.
7. General Electric Lighting: Hendersonville, NC or General Electric Lighting Canada Inc, Mississauga, ON www.gelighting.com/na.
8. Osram Sylvania: Danvers, MA www.sylvania.com or Osram Sylvania Ltd, Mississauga, ON (905) 673-6171.
9. Philips Lighting Co: Somerset, NJ www.lighting.philips.com/nam or Philips Lighting Canada, Scarborough, ON (416) 292-3000.
10. Universal Lighting Technologies: Nashville, TN www.universalballast.com.
11. Watt Stopper Inc: Santa Clara, CA www.wattstopper.com.

B. Provide products that comply with requirements of NFPA 70.

C. Provide products that are listed and labeled as complying with UL 1598, where applicable.

D. Provide products listed, classified, and labeled as suitable for the purpose intended.

E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

F. 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.

G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

H. Product Options: When several lighting fixtures are specified by name for one use on Drawings, select any one of those specified. Do not mix fixtures from different manufacturers specified for one use.

I. Provide luminaries with integral, reusable, quick connect/disconnect.

J. 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.

K. 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.

L. Track Lighting Systems: Provide track compatible with specified track heads, with all connectors, power feed fittings, dead ends, hangers and canopies as necessary to complete installation.

M. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

N. Fixtures shall be fully assembled complete with necessary wiring, sockets, lamps, reflectors, ballasts, auxiliaries, plaster frames, recessing boxes, hangers, supports, lenses, diffusers, and other accessories essential for complete working installation.

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 Nickel cadmium or Lithium NMC unless otherwise indicated.
   2. Size battery to supply all connected lamps, including emergency remote heads where indicated.

D. Housing: Painted steel.

E. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.

F. Lamps: Designed for wet locations and with full vertical and horizontal adjustment.

G. Provide low-voltage disconnect to prevent battery damage from deep discharge.

H. Accessories:
   1. Provide compatible accessory mounting brackets where indicated or required to complete installation.
   2. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
   3. Provide compatible accessory wire guards where indicated.
   4. Where indicated, provide emergency remote heads that are compatible with the emergency lighting unit they are connected to and suitable for the installed location.

I. Manufacturers:
   1. Refer to light fixture schedule provided by Owner's Representative provided by Owner's Representative.
   2. Substitutions: See Section 01 6000 - Product Requirements See Section 01 6000 - Product Requirements.

2.04 **LED DRIVERS**

A. Manufacturers:
   1. General Electric Company/GE Lighting; www.gelighting.com/#sle.
   2. Lutron Electronics Company, Inc; www.lutron.com/#sle.
   3. OSRAM Sylvania, Inc; www.osram.us/ds/#sle.
   4. Philips Lighting North America Corporation; www.usa.lighting.philips.com/#sle.
   5. Manufacturer Limitations: Where possible, provide ballasts produced by a single manufacturer.

B. 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.

C. Dimmable LED Drivers:

1. Dimming Range: Continuous dimming from 100 percent to five 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.
3. 4-wire (010V DC Voltage Controlled) Dimming Drivers.
4. For replacement lamps other than linear T-8 provide integral diming driver
5. Design Criteria:
    a. Driver must be able to operate for ±10 percent supply voltage of 120V through 277VAC at 60Hz.
    b. Driver to be UL / ULC recognized under component program and shall be modular for simple field replacement. Drivers that are not UL / ULC recognized or not suited for field replacement will not be used.
    c. Driver shall have ability to provide no light output when analog control signal drops below 0.5 V, or DALI digital signal calls for light to be extinguished and shall consume 0.5 watts or less in this standby. Control deadband between 0.5V and 0.65V shall be included to allow for voltage variation of incoming signal without causing noticeable variation in fixture to fixture output.
    d. Range and Quality: LED dimming to be equal in range and quality to commercial grade incandescent dimmer:
        1) Quality of dimming to be defined by dimming range, freedom from perceived flicker or visible stroboscopic flicker, smooth and continuous change in level (no visible steps in transitions), natural square law response to control input, and stable when input voltage conditions fluctuate over what is typically experience in commercial environment.
    e. Inrush Current: Driver must limit inrush current as follows:
        1) Minimum Requirement: Meet or exceed NEMA 410 driver inrush standard of 430 amps per 10 amps load with maximum of 370 amps² per second.
        2) Preferred Requirement: Meet or exceed 30mA²s at 277VAC for up to 50 watts of load and 75A at 240µs at 277VAC for 100 watts of load.
    f. Withstand up to 1,000 volt surge without impairment of performance as defined by IEEE C62.41.1 Category A.
    g. Light Output: No visible change in light output with variation of ±10 percent line voltage input.
    h. Harmonic Distortion:
        1) Total Harmonic Distortion less than 20 20 percent and meet ANSI C82.11 maximum allowable THD requirements at full output.
        2) THD shall at no point in dimming curve allow imbalance current to exceed full output THD.
    i. Automatic Adaptation:

1) Driver must support automatic adaptation, allowing for future luminaire upgrades and enhancements and deliver improved performance.
   (a) Adjustment of forward LED voltage, supporting 3V through 55V.
   (b) Adjustment of LED current from 200mA to 1.05A at the 100 percent control input point in increments of 1 mA.
   (c) Adjustment for operating hours to maintain constant lumens (within 5 percent) over 50,000 hour design life of system, and deliver up to 20 percent energy savings early in life cycle.

j. Light Quality:
   1) Over entire range of available drive currents, driver shall provide step-free, continuous dimming to black from 100 - 1 percent light output and step to 0 percent where indicated. Driver shall respond similarly when raising from 0 percent to 100 percent.
   2) Drivers to track evenly across multiple fixtures at all light levels, and shall have input signal to output light level that allows smooth adjustment over entire dimming range.
   3) Driver and luminaire electronics shall deliver illumination that is free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10). At all points within dimming range from 100-0.1 percent luminaire shall have:
      (a) LED dimming driver shall provide continuous step-free, flicker free dimming similar to incandescent source.
      (b) Minimum Requirement: Flicker index shall less that 5 percent at all frequencies below 1000 Hz.
      (c) Preferred specification: Flicker index shall be equal to incandescent, less that 1 percent at all frequencies below 1000 Hz.

k. Control Input:
   1) 4-Wire (0-10V DC Voltage Controlled) Dimming Drivers:
      (a) Must meet IEC 60929 ED. 4.0 B Annex E for General White Lighting LED drivers.
      (b) Connect to devices compatible with 0 to 1 0V Analog Control Protocol, Class 2, capable of sinking 0.6 ma per driver at low end of 0.3V. Limit number of drivers on each 0-1 0V control output based on voltage drop and control capacity.
      (c) Control relays or contactors and transformers for up to six circuits.
      (d) Sensor controller with HIGH, LOW, and DEADBAND adjustments.
   2) Digital (DALI Low Voltage Controlled) Dimming Drivers:
      (a) Must meet requirements of IEC 62386-101 ED.1.0 B.
   3) Integral Dimmer Driver for replacement lamps:
      (a) LED Driver shall not cause shadows.

(b) LED Driver shall be line voltage controlled and shall be compatible with any universal dimmer.

6. Manufacturers:
   a. eldoLED America, San Jose, CA www.eldoled.com.
   b. General Electric Lighting, Hendersonville, NC or General Electric Lighting Canada Inc, Mississauga, ON www.gelighting.com/na.
   c. Howard Lighting Products, Laurel, MS www.howard-ind.com.
   d. OSRAM Sylvania, Danvers, MA or OSRAM Sylvania LTD, Mississauga, Ontario Canada www.Sylvania.com.
   e. Philips Lighting Co, Somerset, NJ www.lighting.philips.com/nam or Philips Lighting Canada, Scarborough, ON (416) 292-3000.

2.05 **EMERGENCY POWER SUPPLY UNITS**

A. Manufacturers:
   1. Beghelli, Miramar, FL www.beghelliusa.com.
   2. Dual-Lite, Cheshire, CT www.dual-lite.com.
   3. Iota Engineering, LLC: www.iotaengineering.com/#sle.
   4. Lithonia Lighting: www.lithonia.com/#sle.
   5. Signify Emergency Lighting/Bodine: www.bodine.com/#sle.
   6. Eaton-Cooper Industries/Sure-Lites; www.cooperlighting.com
   7. McPhilben / Day-Brite Lighting, Tupelo, MS www.mcphilben.com.
   8. Substitutions: See Section 01 6000 - Product Requirements.
   9. Manufacturer Limitations: provide fluorescent emergency power supply units produced by a single manufacturer.

B. Description: Self-contained 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. Compatibility:
   1. Ballasts: Compatible with electronic, standard magnetic, energy saving, and dimming AC ballasts, including those with end of lamp life shutdown circuits.

D. 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.

E. Battery: Sealed maintenance-free high-temperature nickel cadmium unless otherwise indicated.

F. Factory installed in lighting fixture, or field installed to same standards. Components shall be fully concealed and easily accessible for maintenance or replacement.

1. Install in ballast channel of fixture with charging indicator light and test switch mounted on fixture end, or visible and accessible through lens.

2.06 **LAMPS**

A. LED Lamps and Fixtures:

1. Replacement Lamps shall have minimum efficiency of 90 lm / W per LM 79.
2. Integral LED Lamps shall have minimum efficiency of 110 lm / W per LM 79.
3. Provide minimum rated life of 60,000 per LM 80 and LM 70 standards.
4. Color Temperature: 5,000 K.
5. Provide full spectrum color index of 80.

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 conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. 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. Proceed with installation only when following ambient conditions can be maintained:

1. Install when the temperature is between minus 4 deg F (minus 20 deg C) minimum and 122 deg. F (50 deg. C) maximum and relative humidity is ninety (90) percent, non-condensing.
2. Protect from dust and excess moisture during installation.

B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.

C. Install products in accordance with manufacturer's instructions.

D. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 500 (commercial lighting).

E. Provide required support and attachment in accordance with Section 26 0529.

F. Interface with Other Work:

1. Coordinate with Sections under 09 5000 heading to obtain symmetrical arrangement of fixtures in acoustic tile ceiling as shown on Reflected Ceiling Plan in Contract.

2. Coordinate with Sections under 09 9000 heading to ensure that light coves are properly painted before installation of light fixtures.
3. In mechanical equipment rooms, coordinate locations of light fixtures with equipment locations to provide proper room illumination without obstruction. Suspend fixtures that must be mounted below pipes, ducts, etc, with chains or other Architect approved method.

G. Securely mount fixtures. Support fixtures weighing 50 lbs (23 kg) or more from building framing or structural members.

H. Dimmable LED Drivers:
1. Installation of driver to meet Manufacturer's prescribed methods and instructions.
2. Meet Ambient Conditions requirements for installation.
3. Driver may be remote mounted up to 300 ft (90 m) depending on power level and wire gauge.
4. 0-10V input shall be protected from line voltage miswire, and immune and output unresponsive to induced AC voltage on control leads.

I. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

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.
2. Install lock-on device on branch circuit breaker serving units.
3. Wire so unit can be tested with lights on.
4. Wire so lamps are normally off and operate upon loss of normal building power.

M. 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.
2. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal ballast(s)/driver(s) in luminaire. Bypass local switches, contactors, or other lighting controls.
3. Install lock-on device on branch circuit breaker serving units.
4. Wire so unit can be tested with lights on.
5. Wire so lamps in normal mode are switched off with other lighting in area. Connect unit to unswitched conductor of normal lighting circuit.

N. Install lamps in each luminaire.

O. Lamp Burn-In: Operate lamps at full output for prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

3.04 **FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects. Repair scratches or nicks on exposed surfaces of fixtures to match original undamaged conditions.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Test self-powered exit signs, emergency lighting units and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.

E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.05 **CLEANING**

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 500 (commercial lighting), manufacturer's instructions and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

A. END OF SECTION

SECTION 26 5200

EMERGENCY LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install emergency battery units as described in Contract Documents.

B. Related Requirements:
   1. Section 26 0501: 'Common Electrical Requirements'.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Beghelli, Miramar, FL www.beghelliusa.com.
      b. Bodine Emergency Lighting, Collierville, TN www.bodine.com
      c. Dual-Lite, Cheshire, CT www.dual-lite.com.
      d. Iota Engineering Co, Tucson, AZ www.iotaengineering.com
      e. Lightolier, Fall River, MA www.lightolier.com.
      f. Lithonia Lighting, Conyers, GA www.lithonia.com.
      g. McPhilben / Day-Brite Lighting, Tupelo, MS www.mcphilben.com.
      h. Sure-Lites / Cooper Lighting, Elk Grove, IL www.cooperlighting.com.

B. Materials:
   1. Emergency Lighting Units And Fixtures:
      a. Design Criteria:
         1) Shall operate indicated number of lamps for ninety (90) minutes of emergency operation.
         2) Sealed, maintenance free, lead calcium type battery.
         3) Painted steel housing and complete with power indicator light and test switch.
         4) Lamps to be designed for wet locations and with full vertical and horizontal adjustment of lamps.
      b. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
         1) See Contract Drawings for approved fixtures. Coordinate emergency lighting unit and fixture so that systems function as required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Battery Packs:
   1. General:
      a. Wire so unit can be tested with lights on.
      b. Wire so lamps in normal mode are switched off with other lighting in area. Connect unit to unswitched conductor of normal lighting circuit.

END OF SECTION

SECTION 28 3101

FIRE DETECTION AND ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install fire alarm and detection system components as described in Contract Documents.
   2. Furnish and install raceway, cable and conductors, boxes, and miscellaneous items necessary for complete system.

1.2 REFERENCES

A. Reference Standards:
   1. National Fire Protection Association:
      a. NFPA 72, ‘National Fire Alarm and Signaling Code’ (2019 or most recent edition adopted by AHJ).
   2. Underwriters Laboratories:
      a. UL 268, ‘Smoke Detectors for Fire Alarm Systems’.
      b. UL 464, ‘Audible Signal Appliances’.
      c. UL 521, ‘Heat Detectors for Fire Protective Signaling Systems’.
      d. UL 864, ‘Control Units and Accessories for Fire Alarm Systems’.
      e. UL 1480, ‘Speakers for Fire Alarm, Emergency, and Commercial and Professional’.
      f. UL 1481, ‘Power Supplies for Fire-Protective Signaling Systems’.
      g. UL 1971, 'Standard for Signaling Devices for the Hearing Impaired’.
   3. Underwriters Laboratories of Canada:
      a. CAN/ULC-S524-14, ‘Standard for the Installation of Fire Alarm Systems'.

1.3 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Prepared by authorized factory representative and including:
         1) Single line diagram of actual system. Typical riser diagrams are not acceptable.
         2) Complete wiring diagrams.
         3) Manufacturer's original catalog data and descriptive information on each piece of equipment to be used.

B. Informational Submittals:
   1. Certificates:
      a. Certificate of completion, from Manufacturer's Representative, in accordance with NFPA 72 requirements.
   2. Qualification Statement:
      a. Installer:
         1) Provide NICET Certification documentation.

C. Closeout Submittals:
   1. Include following information in Operations And Maintenance Manual specified in Section 01 7800:
      a. Operations and Maintenance Data:

1) Provide operating and maintenance instructions for each item of equipment submitted under Product Data.
2) Provide instruction manual from Manufacturer that explains what is to be done in event of various indications.

b. Record Documentation:
1) Include copy of approved shop drawings.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
1. System shall meet approval of authority having jurisdiction (AHJ). NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
2. Equipment, devices, and cable shall be UL or Factory Mutual listed for use in fire alarm systems.

B. Qualifications:
1. Installer:
a. Project Forman or Person in Charge at all times to be NICET Level III Certified for work performed by this Section.
b. Provide Certificate documentation before installation.

PART 2 - PRODUCTS

2.1 SYSTEMS

A. Install new components compatible with the existing system.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fire alarm and detection systems as indicated, in accordance with Equipment Manufacturer's written instructions, and complying with applicable portions of NEC, NFPA, and NECA's 'Standard of Installation'.

3.2 FIELD QUALITY CONTROL

A. Field Tests:
1. Perform complete system testing in presence of Owner's representative and local fire department personnel upon completion of installation.
a. Test each initiating and annunciating device for proper operation, except fixed temperature heat detectors.
b. Test operation of trouble annunciation on each circuit.
c. Perform complete testing of control panel functions including off-site monitoring.

3.3 PROTECTION

A. Provide dust protection for installed smoke detectors until finish work is completed and building is ready for occupancy.

B. Protect conductors from cuts, abrasion and other damage during construction.

END OF SECTION