



Atlantic City Board of Education
Bid Specifications and Bidding Package

For

Uptown School Complex Locker Room Renovations

Bid #26-030

FY 2025-2026

Bid Opening Date: February 26, 2026
Bid Opening Time: 1:00pm Prevailing Time
Bid Opening Location: 1300 Atlantic Avenue, 5TH Floor
Atlantic City, NJ 08401

Table of Contents

	Page Number
Public Notice	3
Bid Documents Checklist	4
Advisory Information for Bidders	5
Instructions to Bidders	6 – 29
Title Page	30
Acknowledgment of Receipt of Addenda	31
Affirmative Action Acknowledgment for Construction Contracts	32
Affirmative Action Language Exhibit A	33 – 35
Americans with Disabilities Act Exhibit B	36
Contractor's Questionnaire	37 – 38
Subcontractor Disclosure Statement	39 – 44
Statement of Ownership	45 – 46
Non-Collusion Affidavit	47
Prequalification Affidavit	48
Public Works Contractor Registration Certification	49
Prevailing Wage Certification	50
Vendor's Affidavit	51
Sworn Contractor Certification - Qualifications and Credentials	52
Disclosure of Investment Activities in Iran	53 – 54
C.271 Political Contribution Disclosure Form—Contractor's Instructions	55
C.271 Political Contribution Disclosure Form	56 – 57
List of Agencies with Elected Officials	58
Certification of Federal Non-Debarment	59 – 62
Form W-9 SAMPLE	63
Locations	64
Bid Proposal Form	65
Title Page	66
Technical Specifications	67 – 273

Atlantic City Public School District
Bid Notice

Sealed proposals for Bid #26-030 Uptown School Complex Locker Room Renovations will be opened February 26, 2026 at 1:00pm prevailing time at:

**Atlantic City Board of Education
1300 Atlantic Avenue, 5th Floor
Atlantic City, NJ 08401**

Bids will be opened and read immediately thereafter on the date and time above.

A pre-bid meeting and walk-through will be held February 12, 2026 at 11:00am at 323 Madison Avenue, Atlantic City, NJ 08401. Attendance is not mandatory. See bid specifications package for details.

Bid specifications and general information may be obtained by submitting a request to abyngs@acboe.org. Bidders are to send their proposals through the US Postal Service or other recognized delivery service that provides certification of delivery to the sender. Bids will not be accepted via facsimile transmission or email. Information concerning the live streaming of bid openings is available on the district's website at www.acboe.org and by clicking on Departments>Business Office>Bid & Request for Proposals.

Bids must be accompanied by a certified check, bank cashier's check, treasurer's check or Bid Bond, with corporate surety satisfactory to the Owner, in an amount not less than 10% of the Base Bid (but in no case in excess of \$20,000.00, pursuant to N.J.S.A 18A:18A-24), naming as payee or obligee, as applicable, Atlantic City Board of Education, to be retained and applied by the undersigned as provided in Contract Documents in case bidder would default in executing the Agreement or furnishing the required bonds and insurance certificates as required by Contract Documents.

Prospective bidders are advised that this Project is one which will be subject and will be governed by provisions of New Jersey State Law governing (a) Prequalification of Bidders N.J.S.A. 18A:18A-26 et seq., (b) Prevailing Wage Rates N.J.S.A. 34:11-56.27, (c) Use of Domestic Materials, N.J.S.A. 1 to 52:34-4 including any amendments and supplements thereto, and (d) P.L. 1977, Chapter 33, (N.J.S.A. 54:25-24-2) listing corporate/partnership names and addresses for individuals with a share of 10% or more.

"The Public Works Contractor Registration Act" became effective on April 11, 2000. No contractor shall bid unless the contractor is registered pursuant to this act.

Pursuant to P.L. 2009, c.315 and N.J.S.A. 52:32-44, all business organizations that do business with a local contracting agency are required to be registered with the State and provide proof of their Registration with the New Jersey Department of Treasury, Division of Revenue before the contracting agency may enter into a contract with the business.

In addition, and pursuant to N.J.S.A. 18A:18A-25, each bid must be accompanied by a certificate from a surety company stating it will provide said bidder with a bond in such sum as required by the above referenced statute.

No proposals may be withdrawn for a period of 60 days after the date set for opening of bids. Right is reserved to waive minor irregularities and to reject bids pursuant to N.J.S.A. 18A:18A-22.

Bidders must comply with the requirements of P.L. 1975, Chapter 127, N.J.A.C. 17:27 Laws Against Discrimination and NJSA 10:5-31 et seq.

By order of the Atlantic City Board of Education school business administrator.

BID DOCUMENTS CHECKLIST

The following documents **must be** submitted with your bid. Place a ✓ next to each number to indicate forms are included.

1. ADDENDA ACKNOWLEDGEMENT FORM
2. ADDENDUM(S) (*IF APPLICABLE*)
3. AFFIRMATIVE ACTION LANGUAGE EXHIBIT A
4. AFFIRMATIVE ACTION ACKNOWLEDGMENT FOR CONSTRUCTION CONTRACTS
5. AMERICANS WITH DISABILITIES EXHIBIT B
6. BID DOCUMENTS CHECKLIST
7. BID PROPOSAL FORM
8. BID SECURITY
9. CONSENT OF SURETY
10. CONTRACTOR'S QUESTIONNAIRE/CERTIFICATION FORM
11. CONTRACTOR REGISTRATION CERTIFICATION FORM
12. CONTRACTOR'S REGISTRATION APPLICATION (*IF APPLICABLE*)
13. DPMC NOTICE OF CLASSIFICATION (FORM DPMC 27)
14. DPMC TOTAL AMOUNT OF UNCOMPLETED CONTRACTS (FORM DPMC 701); CERTIFIED
15. IRS FORM W-9
16. NON-COLLUSION AFFIDAVIT FORM
17. POLITICAL CONTRIBUTION DISCLOSURE FORM
18. PRE-QUALIFICATION AFFIDAVIT FORM
19. PREVAILING WAGES CERTIFICATION FORM
20. STATEMENT OF OWNERSHIP FORM
21. SWORN CONTRACTOR CERTIFICATION – QUALIFICATIONS AND CREDENTIALS
22. TAXPAYER'S IDENTIFICATION NUMBER - (must be included where requested and indicated)
23. VENDOR'S AFFIDAVIT

The following documents are not required to be submitted with the proposal, but **must be** submitted prior to the contract award:

1. Proof of business registration with the State of New Jersey (NJ Business Registration Certificate)
2. Disclosure of Investment Activities in Iran
3. Certification of Federal Non-Debarment

I have read the above and complied with the given instructions.

AUTHORIZED SIGNATURE: _____ TITLE: _____

COMPANY: _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

ADVISORY INFORMATION FOR BIDDERS

1. PROMPTNESS OF BID SUBMITTAL

It is the responsibility of the bidder to ensure their bid proposal is presented at the district's Business Office before the date and time fixed for closure of the bid proposal period. This will occur at the advertised date and prevailing time. No extensions or exceptions will be made. Access to the Business Office may be delayed because of security clearance.

2. MAIL

All mail is brought to the Board Offices in mailbags, approximately 10:00 am each day. The mail is then sorted within the district system by departments. The Business Office routinely receives its mail at approximately 11:00am.

3. HAND DELIVERY

Hand delivery is permitted, but it is recommended that bidders send their responses through a recognized delivery service that provides certification of delivery to the sender.

4. UPS / FED EX / AND OTHER EXPRESS DELIVERY SERVICES

Deliveries of this type are usually made from 10:00am and beyond. These items are brought only to the receptionist at the main building entrance. The receptionist then calls the various departments with a request to pick up their items. There may be some delays in getting bid proposals to the Business Office on the 5th floor.

Bid proposals arriving after the advertised date and time for any reason **cannot** be accepted or opened. The school district will not be responsible for any delay in the purchasing department receiving bid proposals.

Bidders are advised to confirm the purchasing department's receipt of mailed proposals prior to the opening date and time. Bidders are further advised to make certain their mailed proposals are properly addressed, please see *INSTRUCTIONS TO BIDDERS*, Section 1 titled BIDS.

THE BOARD OF EDUCATION WILL NOT ASSUME RESPONSIBILITY FOR BIDS FORWARDED THROUGH THE MAIL OR IF LOST IN TRANSIT AT ANY TIME BEFORE THE OPENING.

INSTRUCTIONS TO BIDDERS

- BIDS** must be properly submitted and executed in accordance to the Instructions and made upon the forms supplied by the Atlantic City Board of Education in this specifications package, unless otherwise indicated. Failure to use the forms supplied in this package is cause for disqualification. Bidders are advised to not use forms from any other specifications package issued by the Board. Material deviations or alterations shall be grounds for rejection.

After being executed by the bidder or someone having authority for same, the bid must be enclosed, sealed and the covering properly marked to indicate the contents. The sealed envelope containing the bid should be enclosed in another envelope and mailed via the US Postal Service or other recognized delivery service that provides certification of delivery to the sender and addressed as follows:

**Atlantic City Board of Education
Bid# 26-030 USC Locker Room Renovations
1300 Atlantic Avenue, 5th Floor
Atlantic City, NJ 08401
Attn: Atiya Byngs, Purchasing Administrator**

It is the responsibility of each bidder to ensure the bid proposal is complete and submitted **prior** to the advertised bid date and time. No bids shall be received or accepted by the Atlantic City Board of Education after the advertised bid date and time.

THE BOARD OF EDUCATION WILL NOT ASSUME RESPONSIBILITY FOR BIDS FORWARDED IF LOST IN TRANSIT AT ANY TIME BEFORE THE OPENING OR NOT DELIVERED TO THE ADDRESS ABOVE.

- BID OPENING**

All bids will be unsealed by the school district's purchasing administrator on February 25, 2026 at 1:00pm, local time, at the following location:

**Atlantic City Board of Education
1300 Atlantic Avenue, 5th Floor
Atlantic City, NJ 08401**

Information concerning online live streaming of the opening and link are available on the district's website at www.acboe.org and by clicking as follows: **Departments>Business Office>Bid & RFP Proposals**

Questions concerning bids should be directed in writing to Atiya Byngs, Purchasing Administrator, via e-mail at abyngs@acboe.org.

- BID PROPOSAL PACKAGES—NUMBER OF COPIES TO SUBMIT** (1) ORIGINAL; (1) COPY
The district requires one (1) original proposal (marked "original") and one (1) copy to be submitted at the prevailing date and time. The original will be kept on file in the Business Office and one copy will be available for public inspection. Faxed proposals will not be accepted; electronic (e-mailed) proposals will not be accepted.
- AFFIRMATIVE ACTION - EQUAL EMPLOYMENT OPPORTUNITY IN PUBLIC CONTRACTS (EEO)**
The construction contractor shall complete and submit an Initial Project Workforce Report, Form AA-201 upon notification of award by the board of education. Proper completion and submission of this Report shall constitute evidence of the contractor's compliance with the regulations. Failure to submit this form may result in the contract being terminated. The contractor also agrees to submit a copy of the Monthly Project Workforce Report, Form AA-202 once a month thereafter for the duration of the contract to the Department of Labor Workforce and Development and the board of education's Public Agency Compliance Officer.

The EEO/AA evidence must be submitted after notification of award, but prior to signing a construction contract. A link to Form AA-201 is as follows:

https://www.nj.gov/treasury/contract_compliance/documents/pdf/forms/aa201.pdf

All bidders should familiarize themselves with Exhibit A-Mandatory Affirmative Action Language Revised 2016.P.L. 1975 C.127 (N.J.A.C. 17:27) CONSTRUCTION CONTRACTS, herein attached to these specifications. If awarded a contract your firm will be required to comply with the requirements of N.J.S.A. 10:5-31 et. seq. and P.L. 1975 C.127 (N.J.A.C. 17:27) et. seq.

Questions concerning this requirement should be relayed to:

Department of Treasury
Division of Purchase and Property
Contract Compliance and Audit Unit
EEO Monitoring Program—PO Box 206
Trenton, New Jersey 08625-0206

All bidders are required to complete and submit the Affirmative Action Construction Contracts Acknowledgment Form, here enclosed in the bid package.

5. AMERICAN GOODS

In accordance with N.J.S.A. 18A:18A-20, only manufactured products of the United States, wherever available, and where possible are to be used with this project.

6. AMERICANS WITH DISABILITIES ACT; FACILITIES FOR PERSONS WITH DISABILITIES

The contractor must comply with all provisions of Title II of the Americans with Disabilities Act (ADA), P.L 101-336, in accordance with 42 U.S.C. S121.01 et seq. The Board of Education further recognizes that all specifications for the construction, remodeling or renovation of any public building shall provide facilities for the physically handicapped. Reference—N.J.S.A. 18A:18A-17.

It is further recommended that bidders are required to read the Americans with Disabilities language form that is included in these specifications. The form shall be signed to show agreement with the provisions of Title II of the Act and the provisions are to be made a part of the contract. The signed form shall be submitted with the bid proposal. The contractor is obligated to comply with the Act and to hold the owner harmless.

7. ANTI-BULLYING BILL OR RIGHTS—REPORTING HARASSMENT, INTIMIDATION AND BULLYING—CONTRACTED SERVICE

The contracted service provider shall comply with all applicable provisions of the New Jersey Anti-Bullying Bill of Rights Act—N.J.S.A. 18A:37-13.1 et seq., all applicable code and regulations, and the Anti-Bullying Policy of the Board of Education. The district shall provide to the contracted service provider a copy of the board's Anti-Bullying Policy.

In accordance with N.J.A.C. 6A:16-7.7 (c), a contracted service provider, who has witnessed, or has reliable information that a student has been subject to harassment, intimidation, or bullying shall immediately report the incident to any school administrator or safe schools resource officer, or the school business administrator/board secretary.

8. ANTI-DISCRIMINATION PROVISIONS—N.J.S.A. 10:2-1

Every contract for or on behalf of the State or any county or municipality or other political subdivision of the State, or any agency of or authority created by any of the foregoing, for the construction, alteration or repair of any public building or public work or for the acquisition of materials, equipment, supplies or services shall contain provisions by which the contractor agrees that:

A. In the hiring of persons for the performance of work under this contract or any subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this contract, no contractor, nor any person acting on behalf of such contractor or subcontractor, shall, by reason of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex, discriminate against any person who is qualified and available to perform the work to which the employment relates;

B. No contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee engaged in the performance of work under this contract or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any such materials, equipment,

supplies or services to be acquired under such contract, on account of race, creed, color, national origin, ancestry, marital status, gender identity or expression, affectional or sexual orientation or sex;

C. There may be deducted from the amount payable to the contractor by the contracting public agency, under this contract, a penalty of \$50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the contract; and

D. This contract may be canceled or terminated by the contracting public agency, and all money due or to become due hereunder may be forfeited, for any violation of this section of the contract occurring after notice to the contractor from the contracting public agency of any prior violation of this section of the contract.

No provision in this section shall be construed to prevent a board of education from designating that a contract, subcontract or other means of procurement of goods, services, equipment or construction shall be awarded to a small business enterprise, minority business enterprise or a women's business enterprise pursuant to P.L.1985, c.490 (C.18A:18A-51 et seq).

9. ARBITRATION

All matters in dispute other than those set forth above shall be submitted to arbitration at the request of either party to the dispute and the decision of the arbitrators shall be final and conclusive. Any demand for arbitration shall be made within a reasonable time after the dispute has arisen but in no case shall the demand be made later than the time of final payment.

10. ARCHITECT OR CONSTRUCTION DISPUTES; ALTERNATIVE DISPUTE RESOLUTION PROCESS

All disputes relating to construction contracts or relating to contracts for engineers or architects, surveyors, design or skilled services relating to construction contracts for prompt payment issues shall be submitted to the following Alternative Dispute Resolution process ("ADR"):

All disputes shall first be submitted to the architect of record, if there is one, for a determination. If thirty (30) days pass without a determination by the architect or a determination is made that does not resolve the dispute, then the claims shall be submitted for non-binding mediation by a single mediator.

The mediation shall be held where the project is located before a mediator who is mutually acceptable to the parties. The parties shall share the mediator's fees equally. If the dispute is submitted for mediation the neutral party involved must demonstrate knowledge of the Public School Contracts Law.

Nothing shall prevent either party from seeking injunctive or declaratory relief in court at any time.

The alternative dispute resolution practices required by this section shall not apply to disputes concerning the bid solicitation process, or to the formation of contracts.

The Bidder further agrees to include a similar provision in all agreements with independent contractors and consultants retained for the project and to require all independent contractors to include similar mediation provisions in all agreements with subcontractors, suppliers or fabricators so retained, thereby providing for mediation as the primary method for dispute resolution between the parties to those agreements. The arbitration of claims is expressly excluded under this Contract.

If the parties cannot resolve their dispute through the mediation process, the parties are free to file an action in the appropriate court of law.

11. ASSIGNMENT

Assignment to any third party of any moneys due or to become due to the bidder or any contract based on this bid is prohibited and will not be recognized by the Atlantic City Board of Education.

12. AVAILABILITY OF FUNDS

When award of contract is made in one fiscal year with the effective date in the next fiscal year, the award shall be contingent upon the availability and appropriation of sufficient funds for that purpose for the year in which said contract takes effect. When a contract shall be awarded for a period in excess of one year, said contract shall be contingent upon the annual availability and appropriation of sufficient funds for that purpose for each year of the contract term.

13. BID GUARANTEE AND BONDING REQUIREMENTS

The name address and phone number of the Bond Underwriter as well as the Bond Number shall be included with all bonds submitted to the board of education.

A. Bid Guarantee/Bid Bond Required for this bid: YES X NO ___

Each bid shall be accompanied by a bid bond, cashier's or certified check for 10 percent (10%) of the amount of the contract, but not in excess of \$20,000. This bond shall be made payable to the Atlantic City Board of Education. Such deposit shall be forfeited upon refusal of a bidder to execute a contract, as liquidated damages; otherwise, checks shall be returned when the contract is executed and the surety (performance) bond is filed with the Board of Education. The bid security check for unsuccessful bidders will be returned as soon after the bid opening as possible, but in no event later than 10 days after the bid opening. **Uncertified business checks, personal checks or money orders are not acceptable.**

All bid bonds submitted must be signed and witnessed with original signatures. The board will not accept facsimile or rubber stamp signatures on the bid bond. Failure to sign the bid bond by either the Surety or Principal shall be deemed cause for disqualification of the bid. The Attorney –in –Fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the Power of Attorney. The Atlantic City Board of Education will only accept bid bonds from companies that are licensed and qualified to do business in the State of New Jersey. Such a list may be obtained upon request to the State of New Jersey, Department of Insurance, CN 325, Trenton, NJ 08625. **Failure to submit a bid guarantee, when required, shall be cause for disqualification and rejection of bid.**

Please note: The name, address and phone number of the Bind Underwriter as well as the Bond Number shall be included withal bonds submitted to the Board of Education.

B. Performance Bond Required: YES X NO ___

1. The successful bidder shall furnish a Performance, Payment and Completion Bond in a sum of at least one hundred (100%) percent of the total amount payable by the terms of this Contract. Such bond shall be in the form required by Statute.
2. Such bond shall further carry a stipulation that no advance, premature, excessive or delayed payments by the Owner shall in any way affect the obligation of the Surety on its bond.
3. Such bond shall further stipulate that no payments made to the Contractor, nor partial or entire use of occupancy of the work by the Owner shall be an acceptance of any work or materials not in accordance with this Contract and the Surety shall be equally bound to the same extent as the Contractor.
4. It is expressly stipulated that the Surety for the Contractor on the project shall be obligated to make periodic inquiries of the Owner at reasonable times, to determine whether its Principal has performed or was performing the Contract in accordance with all of its terms and conditions, particularly in relation to the progress payments scheduled under said Contract with the Owner.
5. In the event the Contractor defaults or fails to perform the work prescribed under the Contract for any reason whatsoever, it shall become the unqualified obligation of the Surety for the defaulting contractor to complete the Contract in accordance with its terms following receipt of notice from the owner of such default.
6. Successful bidder shall execute formal contract with the Board in the form required and in such number of counterparts as the Board may request.
7. Such Performance, Payment and Completion Bond shall be furnished and such Contracts shall be executed and delivered by the successful bidder within ten (10) days after the receipt by the successful bidder of notice accepting his bid by the Board.
8. The Atlantic City Board of Education will only accept performance bonds from surety companies that are licensed and qualified to do business in the State of New Jersey.
9. Please note: The name, address and phone number of the Bond Underwriter as well as the Bond Number shall be included with all bonds submitted to the Board of Education.

C. Certificate (Consent) of Surety Required: YES X NO ___

When required, each bidder must submit with his bid a certificate from a surety company stating that the surety company will provide the contractor with a performance bond in an amount equal to the amount of the contract (N.J.S.A. 18A: 18A-25). Such surety company must be licensed and qualified to do business in the State of New Jersey. All certificate (consent) of surety documents must be signed with original signatures.

The Board will not accept facsimile or rubberstamp signatures. The certificate (consent) of surety, together with a power of attorney must be submitted with the bid. Submission of a Consent of Surety which contains any prior conditions upon the Surety's issuance of the required Bonds (other than the award of the contract) may be cause for rejection of the bid.

Failure to sign the Certificate (Consent) of Surety by either the Surety or Principal, and/or failure to submit the properly executed Certificate (Consent) of Surety with the bid package, shall be deemed cause for disqualification and rejection of the bid.

14. BID PRICES

No bidder will be allowed to offer more than one price on each item. The net unit price and extension for each article which the bidder agrees to furnish shall be written NEATLY in INK or typewritten in the spaces provided on the Board's Bid Proposal form, opposite the name of the item for which the price is given. If the bidder wishes to change a price entered on his proposal PRIOR TO SUBMITTING SAID BID, they shall do so by crossing out the originally entered, inserting the correct price and extension and INITIALING SAME IN INK.

In the event the bid amount shown in words and its equivalent in figures do not agree, the written words shall be binding. Ditto marks are not considered writing or printing and shall not be used.

In the event that there is a discrepancy between the unit prices and the extended totals, the unit price shall prevail. In the event there is an error of the summation of the extended totals, the computation by the Atlantic City Board of Education of the extended totals shall govern.

Prices shall include proper packing, inside delivery and all delivery charges, F.O.B. DESTINATION PREPAID to the Board of Education's designated points.

All additional charges and taxes, including consumer's taxes which are required to be paid under existing and future laws, shall be paid by the bidder without right of reimbursement from the Board of Education. The bidder is required to provide any tax exemption certificates or blanks that shall be necessary. The winning bidder shall agree to guarantee the bid price(s) for a period of ninety (90) days from the bid opening.

15. BID PROPOSAL FORM

All bids are to be written in by typewriter or ink in a legible manner on the official Bid Proposal Form. Any bid price showing any erasure or alteration must be initialed by the bidder in ink at the right margin next to the altered entry. Failure to initial any erasure or alteration may be cause to disqualify that particular bid entry. If the disqualified entry is a required one, the entire bid may be subject to rejection, so please fill our all entries with care.

The Bid Proposal Form must be duly signed by the authorized representative of the company in the appropriate space at the end of the Form. **Failure to sign the Bid Proposal Form may be cause to disqualify the entire bid.** If the Bid Proposal Form contains more than one sheet, then bidders are requested to affix the company name and address on each intervening sheet between the front sheet and the signature sheet that already bears the company information.

The Atlantic City Board of Education will not consider any bid on which there is any alteration to, or departure from, the bid specifications. Bidders are not to make any changes on the Bid Proposal Form, or qualify their bid with conditions differing from those defined in the contract documents. If bidders do make changes on the Bid Proposal Form, except as noted above for initialed clerical mistakes, it shall be cause to disqualify that particular bid as non-responsive N.J.S.A. 18A:18A-2(y).

By submitting a proposal, the bidder covenants that he has carefully examined the contract documents, addenda (if any), and the site(s); and that from his investigation he has satisfied himself as to the nature and location of the work, the general and local conditions and all matters which may in any way affect the work or its performance, and that as a result of such examination, he fully understands the intent and purpose thereof, his obligations there under, and that he will not make any claim for, or have any right to damages, because of the lack of any information.

Each bidder submitting a bid for a service contract shall include in his/her bid price all labor, materials, equipment, services, and other requirements necessary, or incidental to, the completion of the work, and other pertinent work as hereinafter described, in accordance with the contract documents.

16. BIDDER'S RESPONSIBILITY FOR BID SUBMITTAL

It is the responsibility of the bidder to ensure that their bid is presented to the Business Office and officially received before the advertised date and time of the bid. It is understood and agreed upon that any person in the Board of Education will be absolved from responsibility for the premature opening of any bid not properly labeled and sealed.

17. BRAND NAMES, STANDARDS OF QUALITY AND PERFORMANCE

Brand names and/or descriptions used in this specification are to acquaint bidders with the types of goods and services desired and will be used as a standard by which goods and services offered as equivalent will be evaluated.

When a specification uses "brand name or equivalent," the listed brand name shall serve as a reference or point of comparison for the functional or operational characteristic desired for the good or service being requested. Where a bidder submits an equivalent, it shall be the responsibility of the bidder to document the equivalent claim. Failure to submit such documentation shall be grounds for rejection of the claim of equivalence.

In submitting its bid, the bidder certifies that the goods and services to be furnished will not infringe upon any valid patent or trademark and that the successful bidder shall, at its own expense, defend any and all actions or suits charging such infringement, and will save the owner harmless from any damages resulting from such infringement.

The contractor shall guarantee any or all goods and service supplies under these specifications. Defective or inferior goods shall be replaced at the expense of the contractor. The contractor will be responsible for return freight or restocking charges.

18. BUSINESS REGISTRATION CERTIFICATE (N.J.S.A. 52:32-44)

Pursuant to N.J.S.A. 52:32-44 as amended by P.L. 2009 – Chapter 57, all bidders or companies providing responses for requested proposals are required to submit a copy of their New Jersey Business Registration Certificate as issued by the Department of the Treasury of the State of New Jersey. Failure to provide the New Jersey Business Registration Certificate prior to the award of the contract will be cause for the rejection of the entire bid. The board of education is prohibited from entering into a contract with an entity unless the bidder/proposer/contractor, and each subcontractor that is required to by law to be named in a bid/proposal/contract has a valid Business Registration Certificate on file with the Division of Revenue and Enterprise Services within the Department of Treasury.

Goods, Services, and Construction Contracts

N.J.S.A. 52:32-44 imposes the following requirements on contractors and all subcontractors:

A contractor shall provide the contracting agency with the business registration of the contractor and that of any named subcontractor prior to the time a contract, purchase order, or other contracting document is awarded or authorized. At the sole option of the contracting agency, the requirement that a contractor provide proof of business registration may be fulfilled by the contractor providing the contracting agency sufficient information for the contracting agency to verify proof of registration of the contractor, or named subcontractors, through a computerized system maintained by the State.

A subcontractor named in a bid or other proposal made by a contractor to a contracting agency shall provide a copy of its business registration to any contractor who shall provide it to the contracting agency pursuant to the provisions of subsection b. of this section. No contract with a subcontractor shall be entered into by any contractor under any contract with a contracting agency unless the subcontractor first provides the contractor with proof of a

valid business registration. For bids and requests for proposals, the contracting agency must retain the proof of business registration in the file where documents relating to the contract are maintained. For all other contracts, proofs of business registration shall be maintained in an alphabetical file.

The contractor shall maintain and submit to the contracting agency a list of subcontractors and their addresses that may be updated from time to time during the course of the contract performance. A complete and accurate list shall be submitted before final payment is made for goods provided or services rendered or for construction of a construction project under the contract. A contracting agency shall not be responsible for a contractor's failure to comply with this subsection.

A contractor or a contractor with a subcontractor that has entered into a contract with a contracting agency, and each of their affiliates, shall collect and remit to the Director of the Division of Taxation in the Department of the Treasury the use tax due pursuant to the "Sales and Use Tax Act," P.L.1966, c.30 (C.54:32B-1 et seq.) on all their taxable sales of tangible personal property delivered into this State.

A contracting agency entering into a contract with a contractor, or a contractor with a subcontractor, shall include in its contract with that contractor, or a contractor with a subcontractor, for the term of the contract, a requirement that the contractor or subcontractor and each of their affiliates shall collect and remit to the Director of the Division of Taxation in the Department of Treasury the use tax due pursuant to the "Sales and Use Tax Act," P.L.1966, c.30 (C.54:32B-1 et seq.) on all their sales of tangible personal property delivered into this State.

For the purposes of this subsection, "affiliate" means an entity that (1) directly, indirectly, or constructively controls another entity, (2) is directly, indirectly, or constructively controlled by another entity, or (3) is subject to the control of a common entity. For purposes of this subsection an entity controls another entity if it owns, directly or individually, more than 50% of the ownership interest in that entity.

If a contractor fails to provide proof of a business registration certificate upon request by the contracting agency for a contract that does not require bidding or a request for proposals, and the contracting agency determines that the purpose of the that contract is of a proprietary nature with a contractor that does not have a business presence in New Jersey, the contracting agency shall provide the Division of Revenue, within 10 days of executing the contract, a copy of the contract, evidence of the contractor's taxpayer identification number, and a signed certification attesting to the proprietary nature of the contract and representing that the contracting agency made a diligent effort to obtain proof of a business registration from the contractor.

Pursuant to N.J.S.A. 54:49-4.1, a business organization that fails to provide a copy of a business registration as required, or that provided false business registration information, shall be liable for a penalty of \$25 for each day, not to exceed \$50,000, for each proof of business registration not properly under a contract with the board of education.

19. CHALLENGES TO BID SPECIFICATIONS (N.J.S.A. 18A:18A-15)

Any prospective bidder who wishes to challenge a bid specification shall file such challenges in writing with the Purchasing Administrator no less than three (3) days prior to the opening of bids. Challenges filed after that date shall be considered void and having no impact on the Board of Education or the award of a contract.

20. CHANGE ORDERS (N.J.A.C. 6A:23A-21.1 et. seq.)

Pursuant to New Jersey Administrative Code change orders are limited to three (3) types and may be approved by the Board of Education in an amount up to twenty percent (20%) when necessitated:

- Emergencies consistent with N.J.S.A. 18A:18A-7;
- Unforeseeable physical conditions; and
- Minor modifications to the project/scope that achieve cost savings, improve service or resolve construction conditions.

All change orders must be submitted to the Board of Education for review and written approval. All contractors are prohibited from performing any additional work or providing additional materials or supplies outside the scope of the original purchase order, estimate, or quote/proposal unless the contractor receives written permission from the Board of Education.

21. CONTRACTOR'S REGISTRATION EVIDENCE

Pursuant to N.J.S.A. 34:11-56.48 et. seq., "The Public Works Contractor Registration Act," all contractors bidding on this public works project shall submit with their bid a copy of **one** of the following:

- A.** Contractor's Certificate of Registration as issued by the Contractor Registration Unit of the New Jersey Department of Labor, valid on the date of the bid.
- B.** Application for Public Works Contractor Registration form as submitted to the New Jersey Department of Labor Division of Wage and Hour Compliance.

In the event that the application form (option B above) is submitted in lieu of the actual Certificate of Registration, the contractor shall provide to the Atlantic City Board of Education a copy of their Certificate of Registration upon receipt from the Department of Labor. Per C. 34:11-56.51, no Contractor shall engage in any contract for public work unless the Contractor is registered pursuant to this act. If the certificate of registration is not subsequently provided following use of the option to use the application form to satisfy the contractor's registration evidence at time of bid, the contractor will be considered "non-responsive," which will nullify their contract award. Subcontractors must also comply with N.J.S.A. 34:11-56.48 et. seq.

22. CONTRACTS

A. Award of Contract; Rejection of Bid

The contract shall be awarded, if at all, to the lowest responsible bidder as determined by the Board of Education. The Board of Education reserves the right to reject any or all bids pursuant to N.J.S.A. 18A:18A-2(s), (t), (x), (y), 18A:18A-4(a), 18A:18A-22, and to waive any abnormalities and to take such alternates that the Board feels are in the best interests of the Board. The Board may at its option accept the lowest bid on each item and split awards among the various bidders who submit the lowest responsible bids. Further, the Board may at its option accept any quantity of each item at the pride bid depending on need. Pursuant to N.J.S.A. 18A:18A-36 the Atlantic City Board of Education shall award the contract or reject all bids within sixty (60) days, noting the exception highlighted in the law.

It is the intent of the Atlantic City Board of Education to award the contract at its **March 17, 2026** meeting. Once awarded, the contract shall remain effective until completion of the project as specified in this package.

B. Equal Contract Prices

Pursuant to N.J.S.A. 18A:18A-37(d) when two or more bidders submit equal prices and the prices are the lowest responsible bids, The Atlantic City Board of Education may award the contract to the vendor whose response, in the discretion of the Board, is the most advantageous, price and other factors considered.

C. Return of Contracts and Related Documents

Upon written notification of award of contract by the Atlantic City Board of Education, the successful bidder shall sign and execute a formal contract agreement when required. If a formal contract is not required, an approved and signed Atlantic City Board of Education purchase order will constitute a contractual agreement.

The executed contract and related documents shall be returned to the purchasing administrator within ten (10) days of receipt of notification. Failure to execute the contract and return said contract and related documents within the prescribed time may be cause for a delay in payment for services rendered or products received or the annulment of the award by the Board of Education with the bid security becoming the property of the Atlantic City Board of Education. The Board of Education reserves the right to accept the bid of the next lowest responsible bidder.

D. Contract Completion Date

The successful bidder shall complete the work stated in the formal contract and bid specifications within **90 CALENDAR DAYS**. The board of education is considering spring 2026 for the start of the project and work can be done while school is in session. No work shall commence until the contractor is in receipt of a fully executed service agreement *and* a purchase order issued by the school board's purchasing agent. The exact start date is not known at this time.

The contractor agrees that the board of education may, without recourse or other legal action, retain from the monies that are or may become due the amount stipulated in Section LIQUIDATED DAMAGES for each and every calendar day (Sundays and legal holidays excepted) that the completion of the work may be delayed beyond the time stipulated below. Such amount is hereby mutually agreed, not as a penalty, but as liquidated damages accruing to the board of education due to such delay for extra costs due to engineering or other expenses.

E. Contract Extensions and Renewals

If applicable, the awarded vendor may be given the option to renew their contract for no more than one two-year, or two one-year, extensions subject to limitations per N.J.S.A. 18A:18A-42(n). Provided performance under the contract is satisfactory and complies with the requirements of these specifications, and upon agreement of both parties, the contract may be extended for additional twelve (12) month periods not to exceed a maximum contract period of (4) four years in accordance with the terms required by N.J.S.A. 18A:18A-42.

The School Business Administrator/Board Secretary or the Purchasing Administrator may negotiate terms for a renewal of the contract proposal and present such negotiated proposal to the Board of Education. The Atlantic City Board of Education is the final authority in awarding renewals and extensions of contracts. All multi-year contracts and renewals are subject to the availability and appropriation annually of sufficient funds as may be needed to meet the extended obligation.

F. Termination of Contract

The successful bidder, to whom the contract is awarded, will be required to do and perform the work/services and to provide and furnish the materials in connection therewith in accordance with the plans and specifications. If, through any cause, the contractor shall fail to fulfill in a timely and proper manner obligations under the contract or if the contractor shall violate any of the requirements of the contract, the board of education shall there upon have the right to terminate the contract by giving written notice to the contractor of such termination and specifying the effective date of termination. Such termination shall relieve the board of education of any obligation for balances to the contractor of any sum or sums set forth in the contract. The board of education will pay only for goods and services accepted prior to termination.

Notwithstanding the above, the contractor shall not be relieved of liability to the board of education for damages sustained by the board of education by virtue of any breach of the contract by the contractor and the board of education may withhold any payments to the contractor for the purpose of compensation until such time as the exact amount of the damage due the board of education from the contractor determined.

The contractor agrees to indemnify and hold the board of education harmless from any liability to subcontractor/suppliers concerning payment for work performed or goods supplied arising out of the lawful termination of the contract by the board of education under this provision.

In case of default by the contractor, the board of education may procure the goods or services from other sources and hold the contractor responsible for excess cost.

Continuation of the terms of the contract beyond the fiscal year is contingent on availability of funds in the following year's budget. In the event of unavailability of such funds, the board of education reserves the right to cancel the contract.

It is understood by all parties that if, during the life of the contract, the contractor disposes of his/her business concern by acquisition, novation, merger, sale and/or transfer or by any means convey his/her interest(s) to another party, all obligations are transferred to that new party. In this event, the new owner(s) will be required to submit all documentation/legal instruments that were required in the original bid/contract. Any change shall be approved by the board of education.

The contractor will not assign any interest in the contract and shall not transfer any interest in the same without the prior written consent of the board of education.

The contractor shall maintain all documentation related to products, transactions or services under this contract for a period of five years from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

For contracts that exceed one year, each fiscal year payment obligation of the board of education is conditioned upon the availability of board of education funds appropriated or allocated for the payment of such an obligation. If funds are not allocated and available for the continuance of any services performed by the bidder awarded the contract (contractor) hereunder, whether in whole or in part, the board of education at the end of any particular fiscal year may terminate such services. The board of education will notify the contractor in writing immediately of any services that will be affected by a shortage of appropriated funds. This provision shall not be construed so as to permit the board of education to terminate the contract during the term, or any service hereunder, merely in order to acquire identical services from another contractor.

Neither party shall be responsible for an resulting loss or obligation to fulfill duties as specified in any of the terms or provisions of a contract if the fulfillment of any term or provision of the contract is delayed or prevented by any revolutions, insurrections, riots, wars, acts of enemies, national emergencies, strikes, floods, acts of God, or by any cause not within control of the party whose performance is interfered with which by the exercise of reasonable diligence such party is unable to prevent. Additionally, if the fulfillment of any of the terms and provisions of the contract is delayed or prevented by a court order, or action or injunction or other such agreement, the contract shall become voidable by the Board of Education by notice to the parties.

G. Purchase Order Required

No contractor shall commence any public works project until he/she is in receipt of an approved purchase order authorizing work to begin and the contract has been duly executed by the Atlantic City Board of Education and all contract documents have been duly received by the Board of Education.

H. Alterations of Contract

The Board of Education reserves the right to alter or amend the contract by adding to or subtracting from the work herein specified such additions or omissions being done under the general conditions of these specifications and the terms of the Contract. No changes shall be permitted from the specifications except that the same is in writing and the amount of the extra compensation or credit stipulated therein. Change orders are subject to N.J.A.C. 6A:26-4 and 5:30-11.1 et seq. It is the district's procedure to have all change orders submitted to the Board of Education for review and approval.

I. Open-End Contract (Estimated Quantities) (If Applicable)

The Atlantic City Board of Education has attempted to identify the item(s) and the estimated amount of each item bid to cover its requirement; however, past experience shows that the amount ordered may be different than that submitted for bidding. The right is reserved to decrease or increase the quantities specified in the specifications pursuant to N.J.A.C. 5:30-11.2 and 11.10. **NO MINIMUM PURCHASE IS IMPLIED OR GUARANTEED.**

23. CONTRACTOR'S QUALIFICATION STATEMENT (AIA)

If the Board of Education so chooses to include the American Institute of Architects Contractor Qualification Statement in the bid specification, said document shall be completed in ink or typed and be duly signed and notarized. This document shall be submitted with the bid. **N/A FOR THIS BID.**

24. CONTRACTOR/VENDOR REQUIREMENTS—OFFICE OF THE NEW JERSEY STATE COMPTROLLER

A. Access to Relevant Documents and Information – N.J.S.A. 52:15C-14(d)

Private vendors or other persons contracting with or receiving funds from a unit in the Executive branch of State government, including an entity exercising executive branch authority, independent State authority, public institution of higher education, or unit of local government or board of education shall upon request by the State Comptroller provide the State Comptroller with prompt access to all relevant documents and information as a condition of the contract and receipt of public monies. The State Comptroller shall not disclose any document or information to which access is provided that is confidential or proprietary. If the State Comptroller finds that any person receiving funds from a unit in the Executive branch of State government, including an entity exercising executive branch authority, independent State authority, public institution of higher education, or unit of local government or board of education refuses to provide information upon the request of the State Comptroller, or otherwise impedes or fails to cooperate with any audit or performance review, the State Comptroller may recommend to the contracting unit that the person be subject to termination of their contract, or temporarily or permanently debarred from contracting with the contracting unit.

B. Maintenance of Contract Records – N.J.A.C. 17:44-2.2

Relevant records of private vendors or other persons entering into contracts with covered entities are subject to audit or review by the New Jersey Office of the State Comptroller pursuant to N.J.S.A. 52:15C-14(d). The contractor/vendor to whom a contract has been awarded, shall maintain all documentation related to products, transactions or services under this contract for a period of five years from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

25. CONTRACTOR TRADE LICENSES

All bidders are to submit with their proposals all current and valid contractor or trade licenses as issued by the New Jersey Division of Consumer Affairs for any trade or specialty area the contractor seeks to perform work for this project.

26. CRIMINAL HISTORY BACKGROUND CHECK— N.J.S.A. 18A:6-7.1 REQUIREMENT

The contractor and all subcontractors for the project shall provide to the school district (Director of Facilities or School Business Administrator/Board Secretary) evidence or proof that each worker assigned to the project that comes in regular contact with students, has had a criminal history background check, and that said check indicates that no criminal history record information exists on file for that worker.

The determination of “contact with students” will be made by the school district. Failure to provide proof of a criminal history background check for any contractor or subcontractor employee coming in regular contact with students may be cause for breach of contract.

If it is discovered during the course of the contract that a contractor or subcontractor employee has a disqualifying criminal history or the employee has not had a criminal history background check, that employee is to be removed from the project immediately.

27. DEBARMENT, SUSPENSION, OR DISQUALIFICATION – N.J.A.C. 17:19-1.1

The Atlantic City Board of Education will not enter into a contract for work with any person, company or firm that is on the State Department of Labor and Workforce Development; Prevailing Wage Debarment List, or the State of New Jersey Consolidated Debarment Report (www.state.nj.us/treasury/debarred) or the Federal System for Award—SAM.gov.

All bidders are required to submit a sworn statement indicating whether or not the bidder is, at the time of the bid, included on the State Department of Labor and Workforce Development; Prevailing Wage Debarment List or the State of New Jersey Consolidated Debarment Report, or the Federal Debarred Vendor List--Excluded Parties List System, through the System for Award Management portal—SAM.gov.

Workplace Accountability in Labor List (The WALL)

P.L 2019, c.366 (N.J.S.A. 34:1A-1.16) authorized the New Jersey Department of Labor and Workforce Development (NJDOLE) to create a list on its website, dubbed the Workplace Accountability in Labor List (the WALL), of any person found in violation of any state wage, benefit, and tax laws and against whom a final order has been issued by the NJDOLE for such violation.

Any person or business named on The WALL is prohibited from contracting with any contracting unit until the liability for violations of state wage, benefit, and tax laws have been paid in full. The WALL is live at <https://www.nj.gov/labor/ea/osec/wall.shtml>.

28. DISCRIMINATION IN EMPLOYMENT ON PUBLIC WORKS CONTRACTS

Every contract for or on behalf of the State or any county, or municipality or other political subdivision the State, or any agency or authority created by any of the foregoing, for the construction, alteration or repair of any public building or public work or for the acquisition of materials, equipment, supplies or services shall contain provisions by which the contractor agrees that:

- A.** In the hiring of persons for the performance of work under this contract or any subcontractor hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this contract, no contractor, nor any person acting on behalf of such contractor or subcontractor, shall, by reason of race, creed, color, age, marital status, sex, national origin, ancestry or affectional or sexual orientation, discriminate against any person who is qualified and available to perform the work to which the employment relates;

- B. No contractor, subcontractor, nor any person on his behalf shall in any manner, discriminate against or intimidate any employee engaged in the performance of work under this contract or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing any such materials, equipment, supplies or services to be acquired under such contract, on account of race, creed, color, age, marital status, sex, national origin, ancestry, or affectional or sexual orientation;
- C. There may be deducted from the amount payable to the contractor by the contracting public agency, under this contract, a penalty of \$50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the contract; and
- D. This contract may be cancelled or terminated by the contracting agency and all money due or to become due hereunder may be forfeited, for any violation of this section of the contract occurring after notice to the contractor from the contracting public agency of any prior violation of this section of the contract.

29. DOCUMENTS, MISSING/ILLEGIBLE

The bidder shall familiarize himself with all forms provided by the Board that are to be returned with the bid. If there are any forms the Board is to provide that are either missing or illegible, it is the responsibility of the bidder to contact the purchasing administrator via email at abyngs@acboe.org during regular business hours or the architect of the project as outlined in the bid advertisement for duplicate copies of the forms. This must be done before the bid date and time. The Board accepts no responsibility for duplicate forms that were not received by the bidder in time for the bidder to submit with his bid.

All documents returned to the Board shall be signed in ink with an original signature. Failure to sign and return all required documents with the bid package may be cause for disqualification and for the bid to be rejected pursuant to N.J.S.A. 18A:18A-2(y) (non-responsive). The Board will not accept facsimile or rubber stamp signatures.

30. DRAWINGS AND PRINTING

Any drawings of the public works project that may be available to prospective bidders will be appended to the bid specifications package and provided as a Portable Document Format (PDF). All prospective bidders are responsible for printing their own full-sized copies from the PDF provided.

31. EMERGENCY MATERIALS, SUPPLIES, EQUIPMENT, ETC.

The Board of Education reserves the right to require any or all of the successful bidders to both quote on and supply emergency any materials, supplies, equipment, etc. which are consistent with the items listed but not specifically set forth in this document during the term of this contract. Emergency requirements include, but are not limited to, those currently undefined, unanticipated and otherwise non-routine requirements which could not have been included at solicitation as specified requirements

32. EXAMINATION OF SPECIFICATIONS, ACKNOWLEDGEMENT

The bidder, by submitting a proposal, acknowledges that he has carefully examined the bid specifications, documents, addenda (if any), and the site; and that from his investigation, he has satisfied himself as to the nature and location of the work, the general and local conditions and all matters which may in any way affect the work or its performance, and that as a result of such examination, he fully understands the intent and purpose thereof, his obligations thereunder, and that he will not make any claim for, or have any right to damages, because of the lack of any information.

Each bidder submitting a bid for a service contract shall include in his bid price all labor, materials, equipment, services, and other requirements necessary, or incidental to, the completion of the work, and other pertinent work as hereinafter described, in accordance with the bid specifications and documents.

33. FEDERAL NON-DEBARMENT CERTIFICATION (N.J.S.A. 52:32-44.1)

A contractor that is debarred from contracting with a federal government agency, along with any affiliates of the debarred contractor, is prohibited from contracting with state or local government entity. Before a board of education can award a contract for public work, the contractor must provide written a certification to the board of education that neither the contractor nor the contractor's affiliates are debarred by the federal government from contracting with a federal agency. The term "affiliate" means any entity that directly, indirectly, or constructively controls the contractor, or any entity that the contractor directly, indirectly, or constructively controls, or is subject to the control of a common entity. An entity is considered to be in control of another entity if it owns,

directly or indirectly, more than 50% of the ownership interest in that entity. A contractor must not directly or indirectly own or be owned by an entity debarred from contracting on the federal level.

34. FORCE MAJEURE

Neither party shall be liable in damages for any failure, hindrance or delay in the performance of any obligation under this contract if such delay, hindrance or failure to perform is caused by conditions beyond the control of either party, including, but not limited to, acts of God, flood, fire, war or the public enemy, explosion, government regulations whether or not valid (including the denial or cancellation of any export or other necessary license), court order, state funding, or other unavoidable causes beyond the reasonable control of the party whose performance is affected which cannot be overcome by due diligence.

Vendors, and/or contractors who have a contract with the Board of Education to provide goods or services cannot unilaterally claim an increase in the cost of the contract because of force majeure.

35. INSURANCE AND INDEMNIFICATION

The insurance documents indicated by an **(X)** shall include but are not limited to the following coverages. The successful bidder(s) shall provide coverage so that all insurance coverage must be in effect no later than 12:01 A.M. EST at the start of the day of the contract and remain in effect for the duration of the contract, including any extensions.

A. INSURANCE REQUIREMENTS

X **Worker's Compensation Insurance** shall be maintained in full force during the life of the contract, covering all employees engaged in performance of the contract pursuant to N.J.S.A. 34:15-12(a) and N.J.A.C. 12:235-1.6. Part One shall be the statutory limits of liability. Unless a greater amount is required by law, the minimum employer's liability limits for Part Two shall be **\$1,000,000** each accident for bodily injury by accident, **\$1,000,000** policy limit for bodily injury by disease, **\$1,000,000** each employee for bodily injury by disease, and contract liability shall be the same as general liability requirements.

X **General Liability Insurance** shall be provided with limits of not less than **\$5,000,000** general aggregate, **\$1,000,000** products, **\$1,000,000** bodily injury, property damage and personal injury combined, **\$1,000,000** each occurrence, **\$100,000** pollution cleanup, **\$50,000** fire damage, and **\$5,000** medical expense.

X **Excess Umbrella Liability** shall be provided with limits of not less than **\$2,000,000** and **\$2,000,000** sexual harassment.

X **Automotive Liability Insurance** covering contractor for claims arising from owned, hired and non-owned vehicles with limits of not less than **\$1,000,000** combined single limit bodily injury/property damage, shall be maintained in full force during the life of the contract.

 Builders Risk. The contractor shall obtain and pay for within their bid, a Builder's Risk Policy providing coverage for all risk of physical loss or damage to the property in an amount equal to the total project value, less excavations and foundations.

The policy must be maintained for the duration of the project from the beginning of construction until:

- (i) written acceptance by architect, or substantial completion; and
- (ii) a temporary certificate of occupancy or certificate of occupancy has been issued.

A copy of the policy must be delivered to the Board of Education before construction begins. All of the contractor's policies, with the exception of workers' compensation, shall be endorsed naming the Board of Education, its elected and appointed officials, and employees as additional insured. The contractor must also name the state of New Jersey, the NJSDA, the NJDOE, and the architect and staff as additional insured with respect to the work.

B. CERTIFICATES OF THE REQUIRED INSURANCE

Certificates of Insurance for those policies required above shall be submitted with the contract. Such coverage shall be with an insurance company authorized to do business in the state of New Jersey and shall name the Atlantic City Board of Education as an additional insured. The insurance company shall have an AM Best rating of at least A, and shall be a New Jersey admitted carrier.

C. INDEMNIFICATION

The contractor shall indemnify and hold harmless the Board of Education, its officers, servants, and employees from any and all claims, demands, suits or actions, recoveries, damages or costs of every name and description (including, but not limited to, attorney's fees) to which the owner may be subjected or put by reason of injury to the person or property of another, or the property of the Board of Education, resulting from:

- (a) negligent acts or omissions on the part of the contractor, the contractor's agents, servants or subcontractors in the delivery of goods and services, or in the performance of the work under the contract; and
- (b) the use of any copyrighted or copyrighted composition, valid trademark, secret process, patented or unpatented invention or article furnished or used in the performance of this contract.

36. INTERPRETATIONS AND ADDENDA (N.J.S.A. 18A:18A-21(c-2))

No interpretation of the meaning of the specifications will be made to any bidder orally. Every request for such interpretations should be made in writing to the school district's purchasing administrator at abyngs@acboe.org and to be given consideration must be received at least ten (10) business days prior to the date fixed for the opening of bids. Any and all interpretations and any supplemental instructions will be in the form of written addenda to the specifications, will be provided in accordance with N.J.S.A. 18A:18A-21(c-2) to the bidder by certified mail or certified fax no later than seven (7) days, Saturdays, Sundays, or holidays excepted prior to the date for acceptance of the bids. All addenda so issued shall become part of the contract document.

If addenda are issued, the bidder shall submit a form acknowledging receipt. The Board shall not be bound by any representations whether oral or written, made at any meeting, phone conversation, e-mail, fax, etc., unless the representations are incorporated in writing and become part of the bid specifications and/or any addenda. All bidders shall acknowledge all addenda received through the appropriate form.

37. IRAN DISCLOSURE OF INVESTMENT ACTIVITIES

The Atlantic City Board of Education, pursuant to N.J.S.A. 18A:18A-49.4, shall implement and comply with Public Law 2012, c.25, and 2021, c.4 Disclosure of Investment Activities in Iran—N.J.S.A. 52:32-55 et seq.

Pursuant to N.J.S.A. 52:32-5, et seq. (P.L. 2012, c.25 and P.L 2021, c.4) any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract, must certify that neither person nor entity, nor any of its parents, subsidiaries, or affiliates, is identified on the New Jersey Department of Treasury's Chapter 25 List as a person or entity engaged in investment activities in Iran. The Chapter 25 list is found on the Division's website at: <https://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf>.

Vendors/bidders must review this list prior to completing the certification. If the Board determines that a person or entity has submitted a false certification concerning its engagement in investment activities in Iran under section 4 of P.L.2012, c.25 (C.52:32-58), the board shall report to the New Jersey Attorney General the name of that person or entity, and the Attorney General shall determine whether to bring a civil action against the person to collect the penalty prescribed in paragraph (1) of subsection a. of section 5 of P.L.2012, c.25 (C.52:32-59).

In addition, bidders must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the boxes on the lower portion of the enclosed form.

The Board has provided within the specifications, a Disclosure of Investments Activities certification form for all persons or entities, that plan to submit a bid, respond to a proposal, or renew a contract with the board, to complete, sign and submit prior to the contract award.

38. LIQUIDATED DAMAGES

The contractor agrees to substantially complete this public works project to the complete satisfaction of the Atlantic City Board of Education by the stated contract completion date or within the number of working days so specified in the contract.

Failure to complete the project within the specified time frame or contract completion date shall lead to the Board of Education assessing liquidated damages against the contractor in accordance with and pursuant to N.J.S.A. 18A:18A-41 and 18A:18A-19.

For each calendar day thereafter that the work included under this contract remains uncompleted in accordance with the provision of the contract, the Board of Education shall assess liquidated damages in the amount of **\$2,500.00 per calendar day**. The Board shall assess liquidated damages by deducting the amount from monies which are due or may become due on the contract.

The Board shall also assess the contractor additional damages for costs the Board may incur because of each day the project remains uncompleted. These costs include, but are not limited to:

- Construction management fees
- Architect/Engineer fees
- District administrative costs
- Any inspector or inspectors necessarily employed by the Board of Education on the work, for any number of days in excess of the number allowed in the specifications.

The Board of Education shall also assess against all monies owed to the contractor, liquidated damages for the violation of any terms and conditions of the contract or agreement by the contractor or the failure to perform said contract or agreement in accordance with its terms and conditions or the terms and conditions of the "Public School Contracts Law", in accordance with and pursuant to N.J.S.A. 18A:18A-19 and 18A:18A-41.

39. MAINTENANCE BONDS () Required () Not Required

When required by the Atlantic City Board of Education, the successful contractor shall furnish a Maintenance Bond for the total sum of the contract/bid price, indemnifying the Board of Education against defects in construction for a period of **two (2) years** after the completion of the work, general wear and tear excepted.

The condition of this obligation is such that if the successful contractor shall indemnify and hold harmless the Atlantic City Board of Education from and against all losses, costs, damages and expenses, whatsoever, which the Board may suffer or be compelled to pay by reason of the failure of the successful contractor to indemnify the Board against defects in systems/installation for a period of **two (2) years** after the completion of the work.

40. NON-COLLUSION AFFIDAVIT (N.J.S.A. 2A:93-6)

A notarized Non-Collusion Affidavit must be submitted with the bid.

41. NOTICE (AUTHORIZATION) TO PROCEED (N.J.S.A. 18A:18A-36(b))

The Contractor shall not perform any work, or provide any services, materials, supplies until a Notice (Authorization) to Proceed is received from the Atlantic City Board of Education. The Atlantic City Board of Education only recognizes the receipt by the contractor of an approved signed purchase order as a Notice to Proceed. No word of mouth, phone, fax, e-mail, letter or other form of communication to proceed is a valid Notice to Proceed.

42. PAYMENT

A. Prompt payment of goods and services contracts, P.L. 2018, c.127. Upon receipt of a properly executed invoice, the school district shall make payments the later of (a) 90 calendar days from receipt of properly executed invoice; or (b) 90 calendar days from the date the goods or services were received (as certified by an officer or duly designated district employee). All payments are subject to approval by the Board of Education at a public meeting and will be made in accordance with the Board of Education's policy and procedures.

B. Properly executed invoice. All invoices shall contain sufficient detail for the payment to be made. All invoices shall include the district's purchase order number. All invoices for services shall specify, in detail, the period for which payment is claimed, the services performed during the prescribed period, the work order or

service ticket number (if applicable), the number of hours worked (if applicable), the hourly rate (if applicable), the amount claimed and correlation between the services claimed and this proposal. All invoices for goods shall include, but not be limited to, the quantity, item number, product name/description, unit cost, and the total cost. Expenses for travel time shall not be invoiced or reimbursed by the Board of Education.

The following are necessary components of a properly executed invoice:

- Affidavit or signed declaration stating that the claims and demands are correct in all particulars
- Certified payroll records for public work projects that meet or exceed \$2,000 threshold

C. Goods delivered or services rendered. Public funds may be used to pay only for goods delivered or services rendered. Payment will be issued upon completion of services or delivery of full order to the satisfaction of the Board of Education, unless otherwise agreed to by written contract or mandated by state law. The Board may, at its discretion, make partial payments.

D. Rejection and challenge of invoices. The Board shall act accordingly to accept or reject all or portions of an invoice. Undisputed portions of the invoice will be paid based on the original date the Board received the properly executed invoice. Prompt and timely notice will be provided to the vendor as to why the invoice was rejected and what is necessary to cure the defect. The Board will not make payments prior to the receipt of goods and/or services. The Board will not make payments for good and/or services provided as a result of unauthorized change orders.

E. Prompt payment of construction contracts, P.L. 2006, c.96. Pursuant to N.J.S.A. 2A:30A-1, effective September 1, 2006, requiring school boards to pay the amount due to the prime contractor for each periodic payment, final payment or retainage monies not more than 30 calendar days after each billing date, please note the following:

1. The billing date is the first day of every month. If that day falls on a holiday or weekend, the next business day would be the billing date.
2. All required documentation must be received by the School Business Administrator on or before the bill date described above.
3. Billing information provided on the billing date shall include but not be limited to the following:
 - a. Properly signed Declaration and Certification of requested payment on a form provided by the board of education.
 - b. Properly signed and executed authorization from the Architect and/or Construction Manager.
 - c. Certified Payrolls
 - d. A copy of monthly affirmative action reports.
 - e. Any other documentation required by the district.
4. The payment date ("Payment Cycle") for acceptable and approved billing will occur on or before the last day of the month.

43. PAYMENT, PARTIAL AND WITHHOLDING FOR CONSTRUCTION CONTRACTS

Pursuant to N.J.S.A. 18A:18A-40.1, if the contract exceeds \$100,000, partial payment shall be made to the contract at least once per month. As per N.J.S.A. 18A:18A-40.3 Percentage to be Withheld, the Atlantic City Board of Education shall withhold two (2) percent of the amount due on each partial payment pending completion of the contract when the outstanding balance exceeds \$500,000 and five (5) percent of the amount due when the outstanding balance is \$500,000 or less. Contracts under \$100,000 shall be paid as a lump sum upon completing project to the complete satisfaction of the Board of Education.

44. PERFORMANCE REVIEW

Pursuant to N.J.S.A. 18A:18A-15, the Atlantic City Board of Education, through its designee, upon completion of every contract for public work that exceeds \$20,000, shall report to the department as to the contractor's performance, and shall also furnish such report from time to time during performance if the contractor is then in default.

45. POLITICAL CONTRIBUTIONS DISCLOSURE—REQUIREMENTS

Annual Disclosure

A business entity as defined by law is advised of its responsibility to file an annual disclosure statement on political contributions with the New Jersey Election Law Enforcement Commission pursuant to N.J.S.A. 19:44A-20.27 (P.L. 2005 c.271 s.3) if the business entity receives contracts in excess of \$50,000 from public entities in a calendar year. It is the business entity's responsibility to determine if filing is necessary. Additional information on this requirement is available from the New Jersey Election Law Enforcement commission at 1-888-313-3532 or at www.elec.nj.us.

Chapter 271 Political Contribution Disclosure Form

Business entities (excluding those that are not non-profit organizations) receiving contracts in excess of \$17,500 from a board of education, are subject to the provisions of N.J.S.A. 19:44A-20.26. The law and rule provide that 10 days prior to the award of such a contract, the contractor shall disclose contributions to:

- any State, county, or municipal committee of a political party
- any legislative leadership committee*
- any continuing political committee (a.k.a., political action committee)
- any candidate committee of a candidate for, or holder of, an elective office:
 - of the public entity awarding the contract
 - of that county in which that public entity is located
 - of another public entity within that county
 - or of a legislative district in which that public entity is located or, when the public entity is a county, of any legislative district which includes all or part of the county.

The disclosure must list reportable contributions to any of the committees that exceed \$200 per election cycle that were made during the 12 months prior to award of the contract. See N.J.S.A. 19:44A-8 and 19:44A-16 for more details on reportable contributions.

The Atlantic City Board of Education has provided a Chapter 271 Political Contribution Disclosure Form within the specifications package for use by the business entity. The Board has also provided a list of agencies to assist the contractor. The enclosed list of agencies is provided to assist the contractor in identifying those public agencies whose elected official and/or candidate campaign committees are affected by the disclosure requirement. It is the contractor's responsibility to identify the specific committees to which contributions may have been made and need to be disclosed. The disclosed information may exceed the minimum requirement.

The enclosed Chapter 271 Political Contribution Disclosure form, a content-consistent facsimile, or an electronic data file containing the required details (along with a signed cover sheet) may be used as the contractor's submission and is subject to disclosure to the public under the Open Public Records Act.

POLITICAL CONTRIBUTIONS/AWARD OF CONTRACTS

Pursuant to N.J.A.C. 6A:23A-6.3 (a) (1-4) please note the following:

Award of Contract -- Reportable Contributions -- N.J.A.C. 6A:23A-6.3 (a) (1)

"No board of education will vote upon or award any contract in the amount of \$17,500 or greater to any business entity which has made a contribution reportable by the recipient under N.J.S.A. 19:44A-1 et seq. to a member of the board of education during the preceding one-year period.

Contributions during Term of Contract – Prohibited -- N.J.A.C. 6A:23A-6.3 (a) (2-3)

"Contributions reportable by the recipient under P.L. 1973, c.83 N.J.S.A. 19:44A-1 et seq. to any member of the school board from any business entity doing business with the school district are prohibited during the term of the contract."

"When a business entity referred in (a) (2) above is a natural person, contribution by that person's spouse or child that resides therewith, shall be deemed to be a contribution by the business entity. When a business entity is other than a natural person, a contribution by any person or other business entity having an interest therein shall be deemed to be a contribution by the business entity."

Chapter 271 Political Contribution Disclosure Form – Required -- N.J.A.C. 6A:23A-6.3 (a)

All business entities shall submit with their bid/proposal package a completed and signed Chapter 271 Political Contribution Disclosure Form. The Chapter 271 form will be reviewed by the Board to determine whether the business entity is in compliance with the aforementioned N.J.A.C. 6A:23A-6.3 (a) (2) Award of Contract.

It is noted that the disclosure requirements set forth in Section 2 of P.L. 2005 c. 271 (N.J.S.A. 19:44A-20.26) also shall apply when the contract is required by law to be publicly advertised for bids.

46. PRE-BID MEETINGS/FACILITIES WALKTHROUGH

The pre-bid meeting is an important part of the bidding process. It allows all bidders to have an equal understanding of the scope of work involved and to view the project worksite. **ATTENDANCE IS NOT MANDATORY.**

_____ A pre-bid meeting will not be held.

 X A pre-bid meeting and walkthrough of the project worksite will be held February 12, 2026 at 11:00am at 323 Madison Avenue, Atlantic City, NJ 08401. Please contact the school district's facilities manager, Nelson Landon, at nlandon@acboe.org, if you would like to attend.

47. PRE-QUALIFICATION OF BIDDERS

- A.** Pursuant to N.J.S.A. 18A:18A-26, 27 et seq., all bidders on any contract for public work(s) which the entire cost of the contract exceeds \$20,000.00, must be pre-qualified by the Department of Treasury, Division of Property Management and Construction (DPMC), as to character and amount of public work on which they may submit bids. No person shall be qualified to bid on any public work contract with the Board if he has not submitted a statement to the Department of Treasury, Division of Property Management and Construction which fully develops the financial ability, adequacy of plant and equipment, organization and prior experience of the prospective bidder, and such other pertinent and material facts, within a period of one year preceding the date of opening of the bids for such contract.
- B. Prequalification Affidavit—No Material Adverse Change**
Every pre-qualified bidder shall submit with his proposal, a notarized affidavit setting forth the type of work and the amount of work for which he has been qualified, that there has been no material adverse change in his qualification information, the total amount of completed work on contracts at the time and date of the classification. **Any bid not including a copy of this affidavit shall be rejected as being non-responsive to bid requirements.** (N.J.S.A. 18A:18A-32)
- C.** All bidders shall furnish satisfactory evidence that he and his subcontractors have sufficient means and experience in the type of work to complete the project in accordance with the bid specifications. A subcontractor listing and bidder's personnel and experience sheet shall be submitted to the Board as part of the bidding documents. Where the bidder intends to subcontract any portion of the project, the cost of which will exceed \$20,000.00, the sub-contractor shall be pre-qualified to perform the work and the bidder shall submit the requisite documentation pertaining to the sub-contractor in accordance with Paragraphs A and B above. The Board may make such additional investigations as it deems necessary to determine the ability, competence and financial responsibility of the bidder to perform the work. The bidder shall furnish the Board with the information and data for this purpose upon request. The Board reserves the right to reject any bid if the information fails to establish to the Board's satisfaction that the bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated here.
- D.** Notice of Classification (For Contracts exceeding \$20,000) (N.J.S.A. 18A:18A-27 et. seq.)
Each bidder shall submit with their bid a copy of a valid and active Notice of Classification letter issued by the Department of Treasury, Division of Property Management and Construction as appropriate to the nature of the bid. **Any bid submitted to a school board under the terms of New Jersey Statutes not including a copy of a valid and active classification letter shall be rejected as being non-responsive to bid requirements.**

"The Board of Education, through its authorized agent, shall upon completion of the contract report to the State agency listed on the pre-qualification/classification letter as to the contractor's performance and shall furnish such report from time to time during performance if the contractor is then in default."

- E. Uncompleted Contracts (For Contracts exceeding \$20,000) (N.J.A.C. 17:19-2.13)
The Board also requires that each bidder submit with his bid a certified Total Amount of Uncompleted Contracts form as prescribed by law (Form DPMC 701). **Failure to submit this document shall lead to having the bid being rejected as non-responsive.**

48. PREVAILING WAGES: CONSTRUCTION, ALTERATIONS, REPAIRS

The State of New Jersey Prevailing Wage Act, Chapter 150 Laws of 1963 with applicable statewide wage rates and for the wage rates for the county of the location of the school district, as published by the Department of Labor and Workforce Development in conformance with N.J.S.A. 34:11-56.25 et seq., may be included in these bid contract documents. Copies of these wage rates may be obtained from the State Department of Labor and Workforce Development, and/or viewed at <http://lwd.dol.state.nj.us/> the Prevailing Wages Determination Section.

Compliance with New Jersey Prevailing Wage Act

Every contractor and subcontractor performing services in connection with these services, shall pay all workers a wage rate not less than the published prevailing wage rates, for the locality the work is being performed, as designated by the New Jersey Department of Labor and Workforce Development.

Certified Payrolls

Every contractor agrees to submit to the Board of Education a certified payroll for each payroll period within ten (10) days of the payment of wages. The contractor further agrees that no payments will be made to the Contractor by the Board of Education, if certified payrolls are not received by the board. It is the Contractor's responsibility to insure timely receipt by the district of certified payrolls.

Additionally, all contractors and subcontractors working on public works projects must submit certified payroll and contract/project details to the New Jersey Wage Hub. The New Jersey Wage Hub collects public works contracts and certified payrolls in accordance with the Prevailing Wage Act and the Diane B. Allen Act. The successful bidder (prime contractor) for this project will be required to register for the New Jersey Wage Hub and add this contract/project to the Hub under the school district's public body name and assign the project a contract/project ID. Information and guidance regarding the Hub are available at <https://njwages.nj.gov>.

Submission of Affidavit

Before final payment, the contractor shall furnish the Board of Education with an affidavit stating that all workers have been paid the prevailing rate of wages in accordance with State of New Jersey requirements. The contractor shall keep an accurate record showing the name, craft, or trade and actual hourly rate of wages paid to each workman employed by him in connection with this work. Upon request, the Contractor(s) and each subcontractor shall file written statements certifying to the amounts then due and owing to any and all workmen for wages due on account of the work. The statements shall be verified by the oaths of the Contractor or Subcontractor, as the case may be.

Posting of Prevailing Wages

The contractor and subcontractor shall post the prevailing wage rates for each craft and classification involved in the work, including the effective date of any changes thereof, in prominent and easily accessible places at the site of the work and in such place or places as used to pay workmen their wages. Ref. 18A:7G-23 and N.J.S.A. 34:11-56.32.

Prevailing Wages Certification—Submission with Bid

The bidder shall submit a Prevailing Wages Certification with its bid package.

Non-compliance Statement

If it is found that any worker, employed by the contractor or any subcontractor covered by said contract, has been paid a rate of wages less than the prevailing wage required to be paid by such contract, the Board of Education, may begin proceedings to terminate the contractor's or subcontractor's right to proceed with the work, or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise. The contractor and his sureties shall be liable for any excess costs occasioned thereby to the public body.

49. QUALIFICATION OF BIDDERS – Contractor Questionnaire Certification Form

The Atlantic City Board of Education may make such investigations as it seems necessary to determine the ability of the bidder to perform the terms of the contract. The bidder shall complete a Contractor Questionnaire Certification Form and return same with the bid and shall furnish all information to the Board as the Board may require to determine the contractor's ability to perform the duties and obligations as outlined in these specifications. All bidders are reminded that bids may be rejected as not being responsive pursuant to N.J.S.A. 18A:18A-2(y) and therefore bidders are asked to complete the Questionnaire and to provide any supporting documentation with the bid package.

50. RESIDENT CITIZENS; PREFERRED IN EMPLOYMENT OF PUBLIC WORKS CONTRACTS

All bidders are to familiarize themselves with N.J.S.A. 34:9-2, which requires the contractor of any public works project to give preference in employment on the project, to citizens of the state of New Jersey. If the terms and conditions of N.J.S.A. 34:9-2 are not complied with, the contract shall be voidable. The Atlantic City Board of Education is obligated to file with the Commissioner of Labor, the names and addresses of all contractors holding contracts with this project.

51. RIGHT TO KNOW: MATERIAL SAFETY DATA SHEETS

All potentially hazardous materials or substances must be properly labeled in full accordance with the New Jersey Right to Know Law - N.J.S.A. 34:5A-1 et seq. All contractors or vendors who need additional information about the New Jersey Right to Know Law are to contact the following department:

New Jersey Department of Health and Senior Services
Right to Know Program
CN 368

Trenton, New Jersey 08625-0368

www.nj.gov/health/workplacehealthandsafety/right-to-know/

NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW ACT

The manufacturer or supplier of chemical substances or mixtures shall label them in accordance with the N.J. Worker and Community Right to Know Law (N.J.S.A. 34:5A-1 et seq., and N.J.A.C 8:59-2 et seq.,). All direct use containers shall bear a label indicating the chemical name(s) and Chemical Abstracts Service number(s) of all hazardous substances in the container, and all other substances which are among the five most predominant substances in the container, or their trade secret registry number(s) pursuant to N.J.A.C. 8:59-5. "Container" means a receptacle used to hold a liquid, solid or gaseous substance such as bottles, bags, barrels, cans, cylinders, drums and cartons. (N.J.A.C. 8:59-1.3). Further, all applicable Material Safety Data Sheets (MSDS) - hazardous substance fact sheet - must be furnished. All containers which are stored at owner facilities by subcontractors shall display RTK labeling. Vendors with questions concerning labeling should contact the New Jersey Department of Health and Senior Services Right to Know Program for assistance in developing proper labels.

Further, all applicable Material Safety Data Sheets (MSDS) also known as hazardous substance fact sheet must be furnished to the Board of Education of Atlantic City, NJ.

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE SURE THAT ALL CHEMICALS ARE PACKAGED IN CONTAINERS LABELED WITH THE COMPONENTS OF THE MIXTURE OR SUBSTANCE ALONG WITH ALL PRECAUTIONARY STATEMENTS, WARNINGS, AND DIRECTIONS FOR USE. ITEMS NOT SO MARKED WILL NOT BE ACCEPTED.

52. STATEMENT OF OWNERSHIP (N.J.S.A. 52:25-24.2)

No corporation, partnership or limited liability company shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any material or supplies, the cost of which is to be paid with or out of any public funds, by the State of New Jersey, or any county, municipality or school district, or any subsidiary or agency of the State, or of any county, municipality or school district, or by any authority, board, or commission which exercised governmental functions, unless prior to the receipt of the bid, accompanying bid, proposal, of said corporation, said partnership, or said limited liability corporation, there is submitted a statement setting forth the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. If one or more such stockholder or partner or member is itself a corporation

or partnership, or limited liability company, the stockholders holding 10 percent or more of that corporation's stock, or the individual partners owning 10 percent or greater interest in that partnership, or the members owning 10 percent or greater interest in that limited liability company, as the case may be, shall also be listed. The disclosure shall be continued until names and addresses of every non corporate stockholder, and individual partner, and member exceeding the 10 percent ownership criteria established in this act, has been listed.

To comply with this section, a bidder or respondent with any direct or indirect parent entity which is publicly traded may submit the name and address of each publicly traded entity and the name and address of each person that holds a 10 percent or greater beneficial interest in the publicly traded entity as of the last annual filing with the federal Securities and Exchange Commission or the foreign equivalent, and if there is any person that holds a 10 percent or greater beneficial interest, also shall submit links to the website containing the last annual filings with the federal Securities and Exchange Commission or the foreign equivalent and the relevant page numbers of the filings that contain the information one each person that holds a 10 percent or greater beneficial interest. N.J.S.A. 52:25-24.2—as amended P.L. 2016 c.43.

The Atlantic City Board of Education has provided within the specifications, a two (2) page form titled:

STOCKHOLDER/PARTNERSHIP DISCLOSURE AND STATEMENT OF OWNERSHIP

All bidders/respondents are to complete, sign, and submit both pages of the form. **Failure to complete, sign, and submit the form with the bid/proposal, shall be cause for the disqualification of the bid/proposal.**

53. SUBCONTRACTING: SUBCONTRACTOR DISCLOSURE STATEMENT

Pursuant to N.J.S.A. 18A:18A-18(b), any bidder who bids for the overall contract shall identify the subcontractor that will be used, on the form provided, if the following work is to be subcontracted:

- Plumbing and gas fitting work;
- Electrical work, including any electrical power plant, tele-data, fire alarm or security system;
- Refrigeration, heating and ventilating systems and equipment; or
- Structural steel and ornamental ironwork

Qualified Subcontractors

If the cost of the work done by the subcontractor exceeds \$20,000, then said contractor shall be qualified in accordance with N.J.S.A. 18A:18A-26 et. seq. For those subcontractors in the four branches listed above, the bid shall supply proof that the subcontractor is qualified by submitting with the bid response the following subcontractor documents:

- DPMC Notice of Classification
- Certified copy of Total Amount of Uncompleted Contracts Form (DPMC 701)
- Valid and Current Public Works Contractor Registration Certificate
- New Jersey Business Registration Certificate
- Trade Licenses when applicable

For all other subcontractors who will perform work valued in excess of \$20,000.00, the bidder shall submit the evidence of the subcontractor's qualifications listed above within ten (10) days of receipt of notice of the award of contract.

Documents to be Submitted: All Subcontractors; Request of the Board of Education

The prime contractor (bidder) who will be using a subcontractor on any part of this bid pursuant to Paragraph 5 of N.J.S.A. 18A:18A-18 is requested to identify the subcontractor(s) on the appropriate form and submit with the bid package the following subcontractor documents:

- DPMC Notice of Classification
- Certified copy of Total Amount of Uncompleted Contracts Form (DPMC 701)
- Valid and Current Public Works Contractor Registration Certificate
- New Jersey Business Registration Certificate
- Trade Licenses when applicable

Contractors are reminded that the subcontractors listed on the forms provided by the school district may not be changed later, except in the case of failure in performance or other contract breach where a change is needed to protect the school district.

54. SUBCONTRACTING; PROHIBITIONS; HOLD HARMLESS

Prime contractors, with whom the Board of Education have an executed contract, may not subcontract any part of any work done for the Board without first receiving written approval. Contractors seeking to use subcontractors must first complete the Request to Subcontract Form as provided.

Subcontractors Prohibited to Subcontract

It is the responsibility of the prime contractor to ensure that no subcontractor who has received written permission to do work for the Board of Education subcontracts any of its/their work without first receiving written approval from the prime contractor **and** the Board of Education.

The prime contractor assumes all responsibility for work performed by subcontractors. The prime contractor must also provide to the Board Business Office the following documents secured from all approved subcontractors:

- Insurance Certificate as outlined in the bid specifications;
- Affirmative Action Evidence as outlined in the bid specifications;
- Written certification that the subcontractor shall adhere to prevailing wages as provided through New Jersey State Law;
- Evidence of Performance Security

In cases of subcontracting, the Atlantic City Board of Education shall only pay the prime contractor. It is the sole responsibility of the prime contractor to ensure that all subcontractors are paid. The Atlantic City Board of Education shall not be responsible for payments to subcontractors and shall be held harmless against any or all claims generated against prime contractors for non-payment to subcontractors.

The Board of Education shall pay subcontractors directly only when the following conditions are met:

- A.** The prime contractor has been awarded the bid for all the work and materials required to complete the building in a single overall contract.
- B.** The prime contractor identified in letter (A) submits to the Board of Education:
 - Certification that all materials, supplies have been supplied and all work has been completed by the subcontractor;
 - Certification of the amount due to the subcontractor

Penalties - The Board of Education shall deduct the amount of \$1,000.00 (one thousand dollars) per day as a penalty, for each day a prime contractor uses a subcontractor without first receiving **written** permission from Board of Education.

55. SWORN CONTRACTOR CERTIFICATION; QUALIFICATIONS AND CREDENTIALS

Pursuant to N.J.S.A. 18A:7G-37, a pre-qualified contractor seeking to bid school facilities projects, and any subcontractors, that are required to be named under N.J.S.A. 18A:7G-1 et seq. shall, as a condition of bidding, submit the Sworn Contractor Certification regarding qualifications and credentials. Failure to complete, sign and submit the certification may lead to the bid being rejected.

56. TAXES, PERMITS, AND FEES

Respective contractors shall secure and pay for all necessary permits required by any local, County, State or Federal ordinances, laws, rules or regulations.

For the term of the contract, the contractor and each of its affiliates and a subcontractor and each of its affiliates [N.J.S.A. 52:32-44(g)(3)] shall collect and remit to the Director, New Jersey Division of Taxation, the use tax due pursuant to the Sales and Use Tax Act on all sales of tangible personal property delivered into this State, regardless of whether the tangible personal property is intended for a contract with a contracting agency.

The respective contractors shall make notification and coordinate the inspections required by governing agencies, paying all fees connected therewith, deposits and/or payments for services, including the costs and installation of utility meters, connecting equipment, etc.

As a New Jersey governmental entity, the Atlantic City Board of Education is exempt from the requirements under New Jersey state sales and use tax (N.J.S.A. 54:32B-1 et seq.), and does not pay any sales or use taxes. Bidders should note that they are expected to comply with the provisions of said statute and the rules and regulations promulgated thereto to qualify them for examinations and reference to any and all labor, services, materials and supplies furnished to the Board of Education. Contractors **may not** use the Board's tax identification number to purchase supplies, materials, service or equipment, for this project.

A contractor may qualify for a New Jersey Sales Tax Exemption on the purchase of materials, supplies and services when these purchases are used exclusively to fulfill the terms and conditions of the contract with the Board of Education. All contractors are referred to New Jersey Division of Taxation—Tax Bulletin S&U-3 and in particular, Contractor's Exempt Purchase Certificate (Form ST-13). Again, contractors are not permitted to use the Board's tax identification number to purchase supplies, materials, services of equipment.

57. TRUTH IN CONTRACTING (False Claims and Representations)

A person commits a crime if the person knowingly submits to the Board of Education any claim for payment for performance of a contract knowing such claim to be false, fictitious, or fraudulent. If the claim is for \$25,000.00 or above, the offender is guilty of a crime of the second degree; the penalty for which is 5-10 years in prison and \$150,000.00 fine. If the claim exceeds \$2,500.00 but is less than \$25,000.00, the offender is guilty of a crime of the third degree; the penalty for which is 3-5 years in prison and \$15,000.00 fine. If the contract amount is for \$2,500.00 or less, the offender is guilty of a crime of the fourth degree; the penalty for which is up to 18 months in prison and \$10,000.00 fine. N.J.S.A. 2C:21-33.

Bidders should be aware of the statute N.J.S.A. 56:9-11 and the below violations, crime and grading, and that the Attorney General of the State of New Jersey can bring civil suit for treble damages and can criminally prosecute anyone involved in "Bid Rigging."

- a. Any person who shall knowingly violated any of the provisions of P.L. 1970, c.73 (C.56:9-1 et seq.) or knowingly aid or advise in such violation is guilty of a crime.
- b. Any person convicted pursuant to the provisions of subsection a. of this section of a violation involving or affecting trade or commerce of a value less than \$1,000,000.00 shall be guilty of a crime of the third degree. Any person convicted pursuant to the provisions of subsection a. of this section of a violation involving or affecting trade or commerce of a value equal to or greater than \$1,000,000.00 shall be guilty of a crime of the second degree. Any person convicted pursuant to the provisions of subsection a. of this section of a violation **involving bid rigging on public contracts**, regardless of value of trade or commerce involved or affected, shall be guilty of a crime of the second degree.

58. WARRANTY REQUIREMENTS

All materials shall carry the manufacturer's standard warranty and/or guarantee. The warranty and/or guarantee shall accompany the materials when delivered.

If any item supplied fails to perform satisfactorily within the first thirty (30) days, it shall be replaced by a new one of the same make and model. Temporary equipment shall be provided within twenty-four (24) hours while replacement is being processed.

If a product must be returned during the warranty period due to a defect, malfunction or dead-on arrival, the contractor shall pay the shipping/freight charges.

59. WITHDRAWAL OF BIDS BEFORE THE BID OPENING

The Board of Education will consider a written request to withdraw a bid if the written request is received by the School Business Administrator and/or the Board Secretary or the Purchasing Administrator before the advertised time for opening of bids. **Any withdrawn bid cannot be resubmitted.**

AFTER THE BID OPENING

A bidder who discovers a mistake or omission after bids have been opened may request to withdraw the bid provided the bidder gives immediate written notice to the Purchasing Administrator of the mistake and/or omission and certification supported by clear evidence that he or she exercised reasonable care in the examination of the specifications and preparation of the bid.

Any bidder who is granted permission by the Board of Education to withdraw the bid under this clause is subject to forfeit any bid guarantee.

Uptown School Complex Locker Room Renovations

BID DOCUMENTS AND REQUIRED DOCUMENTATION

All documents in this section shall be completed, signed and submitted with the bidder's bid package. Failure to submit the required bid documents and other documents so specified shall be cause to reject the bid pursuant to N.J.S.A. 18A:18A-2(y).

ACKNOWLEDGMENT OF RECEIPT OF ADDENDA

USC Locker Room
Bid #26-030

The bidder acknowledges receipt of the hereinafter enumerated Addenda which have been issued during period of proposal and agrees that said Addenda shall become a part of this contract. The bidder shall list below the numbers and issuing dates of the Addenda.

<u>ADDENDA NUMBER</u>	<u>ISSUING DATES</u>
_____	_____
_____	_____
_____	_____
_____	_____

No Addenda Received

Name of Company: _____

Address: _____

City, State, Zip: _____

Authorized Agent: _____

Title of Agent: _____

Signature of Agent: _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

AFFIRMATIVE ACTION ACKNOWLEDGMENT FOR CONSTRUCTION CONTRACTS

USC Locker Room
Bid #26-030

The undersigned acknowledges and agrees to comply with the following:

AFFIRMATIVE ACTION EQUAL EMPLOYMENT OPPORTUNITY IN PUBLIC CONTRACTS—EEO

The construction contractor shall complete and submit an Initial Project Workforce Report, Form AA-201 upon notification of award by the board of education. Proper completion and submission of this Report shall constitute evidence of the contractor’s compliance with the regulations. Failure to submit this form may result in the contract being terminated. The contractor also agrees to submit a copy of the Monthly Project Workforce Report, Form AA-202 once a month thereafter for the duration of the contract to the Department of Labor Workforce and Development and the board of education Public Agency Compliance Officer.

A link to Form AA-201 is as follows: https://www.nj.gov/treasury/contract_compliance/documents/pdf/forms/aa201.pdf

All bidders should familiarize themselves with N.J.S.A. 10:5-31 et seq. and N.J.A.C. 17:27-1.1 et seq. MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE—EXHIBIT A. If awarded a contract, your company/firm will be required to comply with the above requirements.

Contractors and vendors are to familiarize themselves with the following document:

Vendor/Contractor Guidelines for Awarded Public Contracts

The document may be obtained from the New Jersey Division of Purchase and Property, Contract Compliance and Audit Unit, Equal Employment Opportunity (EEO) Program website or by visiting the following link.

[NJ Department of the Treasury Contract Compliance \(state.nj.us\)](http://www.state.nj.us/treasury/contract-compliance/)

I certify that the above information is correct to the best of my knowledge.

Name of Company _____

Address: _____

City, State, Zip Code _____

Name of Authorized Agent _____

Title _____

Signature _____

Date _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

EXHIBIT A

MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE

N.J.S.A. 10:5-31 et seq. (P.L. 1975, C.127)

N.J.A.C. 17:27-1.1 et seq.

CONSTRUCTION CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, sex, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in the recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor, where applicable, will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program, may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B, and C, as long as the Dept. of LWD, Construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with the standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27-7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

- A. If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq., as supplemented and amended from time to time and the American with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and

women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

- B. If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:
1. To notify the Public Agency Compliance Officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;
 2. To notify any minority and women workers who have been listed with it as awaiting available vacancies;
 3. Prior to commencement of work, to request that the local construction trade union refer minority and women workers fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;
 4. To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;
 5. If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and nondiscrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;
 6. To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:
 - i. The contractor or subcontractor shall interview the referred minority or women worker.
 - ii. If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriated qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Dept. of LWD, Construction EEO monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provision of (C) below.
 - iii. The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.
 - iv. If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.

7. To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program and submitted promptly to the Dept. of LWD, Construction EEO Monitoring Program upon request.

C. The contractor or subcontractor agrees that nothing contained in (B) preceding provision shall preclude the contractor or subcontractor from complying with the hiring hall or apprenticeship policies in any applicable collective bargaining agreement or hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in number which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ration established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA-201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Dept. of LWD, Construction EEO Monitoring Program, and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the-job programs for outreach and training of minorities and women.

D. The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposed of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to N.J.A.C. 17:27-1.1 et seq.

Company Name

Authorized Signature

Date

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

EXHIBIT B

**AMERICANS WITH DISABILITIES ACT OF 1990
Equal Opportunity for Individuals with Disability**

The contractor and the Atlantic City Board of Education, (hereafter "owner") do hereby agree that the provisions of Title 11 of the Americans with Disabilities Act of 1990 (the "Act") (42 U.S.C. S121 01 et seq.), which prohibits discrimination on the basis of disability by public entities in all services, programs, and activities provided or made available by public entities, and the rules and regulations promulgated pursuant there unto, are made a part of this contract. In providing any aid, benefit, or service on behalf of the owner pursuant to this contract, the contractor agrees that the performance shall be in strict compliance with the Act. In the event that the contractor, its agents, servants, employees, or subcontractors violate or are alleged to have violated the Act during the performance of this contract, the contractor shall defend the owner in any action or administrative proceeding commenced pursuant to this Act. The contractor shall indemnify, protect, and save harmless the owner, its agents, servants, and employees from and against any and all suits, claims, losses, demands, or damages, of whatever kind or nature arising out of or claimed to arise out of the alleged violation. The contractor shall, at its own expense, appear, defend, and pay any and all charges for legal services and any and all costs and other expenses arising from such action or administrative proceeding or incurred in connection therewith. In any and all complaints brought pursuant to the owner's grievance procedure, the contractor agrees to abide by any decision of the owner which is rendered pursuant to said grievance procedure. If any action or administrative proceeding results in an award of damages against the owner, or if the owner incurs any expense to cure a violation of the ADA which has been brought pursuant to its grievance procedure, the contractor shall satisfy and discharge the same at its own expense.

The owner shall, as soon as practicable after a claim has been made against it, give written notice thereof to the contractor along with full and complete particulars of the claim. If any action or administrative proceeding is brought against the owner or any of its agents, servants, and employees, the *owner shall* expeditiously forward or have forwarded to the contractor every demand, complaint, notice, summons, pleading, or other process received by the owner or its representatives.

It is expressly agreed and understood that any approval by the owner of the services provided by the contractor pursuant to this contract will not relieve the contractor of the obligation to comply with the Act and to defend, indemnify, protect, and save harmless the owner pursuant to this paragraph.

It is further agreed and understood that the owner assumes no obligation to indemnify or save harmless the contractor, its agents, servants, employees and subcontractors for any claim which may arise out of their performance of this Agreement. Furthermore, the contractor expressly understands and agrees that the provisions of this indemnification clause shall in no way limit the contractor's obligations assumed in this Agreement, nor shall they be construed to relieve the contractor from any liability, nor preclude the owner from taking any other actions available to it under any other provisions of the Agreement or otherwise at law.

Company Name

Authorized Signature

Date

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

Contractor Questionnaire/Certification (Page 1)

USC Locker Room

Bid #26-030

Name of Company _____

Street Address _____ P.O. Box _____

City, State, Zip _____

Business Phone Number _____ Extension _____

Emergency Phone Number _____ Fax _____

E-Mail Address _____

1. How many years have you been engaged in the contracting business under your present firm or trading name?

Answer _____

2. Have you ever failed to complete any work awarded to your company? Answer _____

If yes, when, where and with whom? _____

3. Have you ever defaulted on a contract? Answer _____

If yes, when, where and with whom? _____

4. Have you or other principals of your company been debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in any public works projects by any federal, state or local agencies, including any "prior negative experience" disqualification pursuant to N.J.S.A. 18A:18A-4 (b)(c)?

Answer _____ If yes, when, where and with whom? _____

References

Architects--List names of architects that you have worked on projects within the last five (5) years:

	<u>Firm</u>	<u>Principal</u>	<u>Phone Number</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____

List name of principal bank with which your company does business:

<u>Bank</u>	<u>Officer</u>	<u>Phone Number</u>
_____	_____	_____

Contractor Questionnaire/Certification (Page 2)

USC Locker Room
Bid #26-030

Experience – Educational Facilities

List names of school districts with which your company has completed projects similar to the one outlined in this bid:

<u>School District</u>	<u>Official</u>	<u>Phone Number</u>
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____

Trade – List names of companies within your trade with which your company does business:

<u>Firm</u>	<u>Principal</u>	<u>Phone Number</u>
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____

Certification

I declare and certify that I and the company of which I am the agent are not presently included on the following:

- New Jersey Department of Treasury – Consolidation Debarment Report
- NJ Department of Labor and Workforce Development – Prevailing Wage Debarment List
- Federal Debarred Vendor List – System for Award Management (SAM.gov/exclusions)

I further declare and certify that no member of the Atlantic City Board of Education, nor any officer or employee or person whose salary is payable in whole or in part by said Board of Education is directly or indirectly interested in this bid or in the supplies, materials, equipment, work or services to which it relates, or in any portion of profits thereof. If a situation so exists where a Board member, employee, officer of the board has an interest in the bid, etc., then please attach a letter of explanation to this document, duly signed by the president of the firm or company.

Name of Company _____

Name of Authorized Agent _____

Title of Authorized Agent _____

Signature of Authorized Agent _____

THIS FORM (TWO PAGES) MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

Subcontractor Disclosure Statement (Page 1)

USC Locker Room

Bid #26-030

The _____
(Name of Bidding Company)

PLEASE CHECK ONE _____ will subcontract a portion of this project.

_____ will not subcontract any portion of this project.

Authorized Agent _____ **Title** _____

Signature of Bidder _____ **Date** _____

If the bidder **is not going** to subcontract any portion of this project, the bidder need not complete any further part of this document. If the bidder **will** subcontract any of the following four major branches:

- Plumbing and gas fitting work;
- Electrical work, including any electrical power plant, tele-data, fire alarm or security system;
- Refrigeration, heating and ventilating systems and equipment; or
- Structural steel and ornamental ironwork

The bidder **MUST** do the following:

- Identify the contract number and type of work that is intended to be subcontracted.
- Provide the name, address and other pertinent information about the subcontractor. Failure to identify the names and addresses of any subcontractors required to be named in the bid or to submit the appropriate documents for each subcontractor may be cause for the bid to be rejected for being non-responsive pursuant to N.J.S.A. 18A:18A-2(y).
- If the cost of the work by the subcontractor is \$2,000 or more, the bidder shall provide in the bid response the following document:
 - Valid and Current Public Works Contractor Registration Certificate
- If the cost of work by the subcontractor exceeds \$20,000.00, the bidders shall provide in the bid response the following documents:
 - DPMC Notice of Classification Form (DPMC 27)
 - Certified copy of Total Amount of Uncompleted Contracts Form (DPMC 701)
 - Valid and Current Public Works Contractor Registration Certificate; and
 - New Jersey Business Registration Certificate

*Bidders are hereby instructed to list subcontractor(s) for this project on the following pages. **ALL AREAS OF THE SUBCONTRACTOR DISCLOSURE STATEMENT MUST BE COMPLETED AND SIGNED WHERE INDICATED.** Bidders may make extra copies of the following pages if necessary.

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

Subcontractor Disclosure Statement (Page 2)

USC Locker Room

Bid #26-030

1. Subcontractor for: **PLUMBING AND GAS FITTING WORK**

Name of Subcontractor Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

Email _____ FEIN _____

Authorized Agent _____ Title _____

Will the cost of subcontract exceed \$20,000?

_____ Yes Estimated Value of Contract \$ _____

_____ No Estimated Value of Contract \$ _____

If checked **Yes**, the subcontractor must be pre-qualified to perform the work and the bidder **must** provide in the bid package the following subcontractor documents:

- * DPMC Notice of Classification
- * Certified copy of Total Amount of Uncompleted Contracts Form (DPMC 701)
- * Valid and Current Public Works Contractor's Registration Certificate
- * New Jersey Business Registration Certificate

If checked **No** but the value of the subcontracted work is **\$2,000 or more**, the bidder must provide in the bid package the following subcontractor document:

- * Valid and Current Public Works Contractor's Registration Certificate

Certification of Equipment and Performance Security

The _____ hereby certifies the above-named subcontractor
Name of Bidding Company

has the personnel, equipment, experience, financial and sufficient means to complete their portion of the contract in full accordance with the bid specifications.

Name of Bidding Company _____

Name of Authorized Agent _____

Signature of Authorized Agent _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID, IF APPLICABLE

Subcontractor Disclosure Statement (Page 3)

USC Locker Room

Bid #26-030

2. Subcontractor for: **REFRIGERATION, HEATING & VENTILATING SYSTEMS AND EQUIPMENT**

Name of Subcontractor Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

Email _____ FEIN _____

Authorized Agent _____ Title _____

Will the cost of subcontract exceed \$20,000?

_____ Yes Estimated Value of Contract \$ _____

_____ No Estimated Value of Contract \$ _____

If checked **Yes**, the subcontractor must be pre-qualified to perform the work and the bidder **must** provide in the bid package the following subcontractor documents:

- * DPMC Notice of Classification
- * Certified copy of Total Amount of Uncompleted Contracts Form (DPMC 701)
- * Valid and Current Public Works Contractor's Registration Certificate
- * New Jersey Business Registration Certificate

If checked **No** but the value of the subcontracted work is **\$2,000 or more**, the bidder must provide in the bid package the following subcontractor document:

- * Valid and Current Public Works Contractor's Registration Certificate

Certification of Equipment and Performance Security

The _____ hereby certifies the above-named subcontractor
Name of Bidding Company

has the personnel, equipment, experience, financial and sufficient means to complete their portion of the contract in full accordance with the bid specifications.

Name of Bidding Company _____

Name of Authorized Agent _____

Signature of Authorized Agent _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID, IF APPLICABLE

Subcontractor Disclosure Statement (Page 4)

USC Locker Room
Bid #26-030

3. Subcontractor for: **ELECTRICAL WORK, TELE-DATA, FIRE ALARM OR SECURITY SYSTEM**

Name of Subcontractor Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

Email _____ FEIN _____

Authorized Agent _____ Title _____

Will the cost of subcontract exceed \$20,000?

_____ Yes Estimated Value of Contract \$ _____

_____ No Estimated Value of Contract \$ _____

If checked **Yes**, the subcontractor must be pre-qualified to perform the work and the bidder **must** provide in the bid package the following subcontractor documents:

- * DPMC Notice of Classification
- * Certified copy of Total Amount of Uncompleted Contracts Form (DPMC 701)
- * Valid and Current Public Works Contractor's Registration Certificate
- * New Jersey Business Registration Certificate

If checked **No** but the value of the subcontracted work is **\$2,000 or more**, the bidder must provide in the bid package the following subcontractor document:

- * Valid and Current Public Works Contractor's Registration Certificate

Certification of Equipment and Performance Security

The _____ hereby certifies the above-named subcontractor
Name of Bidding Company

has the personnel, equipment, experience, financial and sufficient means to complete their portion of the contract in full accordance with the bid specifications.

Name of Bidding Company _____

Name of Authorized Agent _____

Signature of Authorized Agent _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID, IF APPLICABLE

Subcontractor Disclosure Statement (Page 5)

USC Locker Room

Bid #26-030

4. Subcontractor for: **STRUCTURAL STEEL AND IRON WORK**

Name of Subcontractor Company _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____

Email _____ FEIN _____

Authorized Agent _____ Title _____

Will the cost of subcontract exceed \$20,000?

_____ Yes Estimated Value of Contract \$ _____

_____ No Estimated Value of Contract \$ _____

If checked **Yes**, the subcontractor must be pre-qualified to perform the work and the bidder **must** provide in the bid package the following subcontractor documents:

- * DPMC Notice of Classification
- * Certified copy of Total Amount of Uncompleted Contracts Form (DPMC 701)
- * Valid and Current Public Works Contractor's Registration Certificate
- * New Jersey Business Registration Certificate

If checked **No** but the value of the subcontracted work is **\$2,000 or more**, the bidder must provide in the bid package the following subcontractor document:

- * Valid and Current Public Works Contractor's Registration Certificate

Certification of Equipment and Performance Security

The _____ hereby certifies the above-named subcontractor
Name of Bidding Company

has the personnel, equipment, experience, financial and sufficient means to complete their portion of the contract in full accordance with the bid specifications.

Name of Bidding Company _____

Name of Authorized Agent _____

Signature of Authorized Agent _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID, IF APPLICABLE

Subcontractor Disclosure Statement (Page 6)

USC Locker Room
Bid #26-030

OTHER TRADES

A. Name of Trade/Type of Work _____
Name of Subcontractor Company _____
Address _____
City, State, Zip _____
Telephone _____ Fax _____
Email _____ FEIN No. _____
Authorized Agent _____ Title _____
Estimate Value of Contract \$ _____

Bid Submittals from Subcontractor

____ Notice of Classification ____ Contractor's Registration Certificate ____ Uncompleted Contracts

B. Name of Trade/Type of Work _____
Name of Subcontractor Company _____
Address _____
City, State, Zip _____
Telephone _____ Fax _____
Email _____ FEIN No. _____
Authorized Agent _____ Title _____
Estimate Value of Contract \$ _____

Bid Submittals from Subcontractor

____ Notice of Classification ____ Contractor's Registration Certificate ____ Uncompleted Contracts

Certification of Equipment and Performance Security

The _____ hereby certifies the above-named subcontractor
Name of Bidding Company

has the personnel, equipment, experience, financial and sufficient means to complete their portion of the contract in full accordance with the bid specifications.

Name of Bidding Company _____
Name of Authorized Agent _____
Signature of Authorized Agent _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID, IF APPLICABLE

STOCKHOLDER/PARTNERSHIP DISCLOSURE AND STATEMENT OF OWNERSHIP

N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

USC Locker Room

Bid #26-030

This statement shall be completed, certified to, and included with all bid and proposal submissions. Failure to submit the required information is cause for automatic rejection of the bid or proposal.

Name of Organization: _____

Organization Address: _____

Part I Check the box that represents the type of business organization:

- Sole Proprietorship (skip Parts II and III, execute certification in Part IV)
- Non-Profit Corporation (skip Parts II and III, execute certification in Part IV)
- For-Profit Corporation (any type) Limited Liability Company (LLC)
- Partnership Limited Partnership Limited Liability Partnership (LLP)
- Other (be specific): _____

Part II

- The list below contains the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. (**COMPLETE THE LIST BELOW IN THIS SECTION**)

OR

- No one stockholder in the corporation owns 10 percent or more of its stock, of any class, or no individual partner in the partnership owns a 10 percent or greater interest therein, or no member in the limited liability company owns a 10 percent or greater interest therein, as the case may be. (**SKIP TO PART IV**)

(Please attach additional sheets if more space is needed):

Name of Individual or Business Entity	Address

Part III DISCLOSURE OF 10% OR GREATER OWNERSHIP IN THE STOCKHOLDERS, PARTNERS OR LLC MEMBERS LISTED IN PART II

If a bidder has a direct or indirect parent entity which is publicly traded, and any person holds a 10 percent or greater beneficial interest in the publicly traded parent entity as of the last annual federal Security and Exchange Commission (SEC) or foreign equivalent filing, ownership disclosure can be met by providing links to the website(s) containing the last annual filing(s) with the federal Securities and Exchange Commission (or foreign equivalent) that contain the name and address of each person holding a 10% or greater beneficial interest in the publicly traded parent entity, along with the relevant page numbers of the filing(s) that contain the information on each such person. **Attach additional sheets if more space is needed.**

Website (URL) containing the last annual SEC (or foreign equivalent) filing	Page #'s

STOCKHOLDER/PARTNERSHIP DISCLOSURE AND STATEMENT OF OWNERSHIP (continued)

N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

USC Locker Room

Bid #26-030

Please list the names and addresses of each stockholder, partner or member owning a 10 percent or greater interest in any corresponding corporation, partnership and/or limited liability company (LLC) listed in Part II **other than for any publicly traded parent entities referenced above**. The disclosure shall be continued until names and addresses of every non-corporate stockholder, and individual partner, and member exceeding the 10 percent ownership criteria established pursuant to N.J.S.A. 52:25-24.2 has been listed. **Attach additional sheets if more space is needed.**

Stockholder/Partner/Member and Corresponding Entity Listed in Part II	Address

Part IV Certification

I, being duly sworn upon my oath, hereby represent that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I acknowledge: that I am authorized to execute this certification on behalf of the bidder/proposer; that the **Atlantic City Board of Education** is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the completion of any contracts with **Atlantic City Board of Education** to notify the **Atlantic City Board of Education** in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the, permitting the **Atlantic City Board of Education** to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print):		Title:	
Signature:		Date:	

THIS FORM (TWO PAGES) MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

NON-COLLUSION AFFIDAVIT

USC Locker Room

Bid #26-030

I, _____ of the city of _____ in the county of _____ and the state of _____ am of full age, being duly sworn according to law on my oath depose and say that:

I am _____ of the firm of _____, the bidder making the bid for the herein project, and that I executed said bid with full authority to do so, that said bidder has not directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the project named in this bid, and that all statements contained in said bid and in this Affidavit are true and correct, and made with full knowledge that the ATLANTIC CITY BOARD OF EDUCATION relies upon the truth of the statement contained in said bid and in the statements contained in this Affidavit in awarding the contract for said project.

I warrant that no requirement or commitment was made in reference to any political contribution to any party, person or elected official, and that no undisclosed benefits of any kind were promised to anyone connected with the ATLANTIC CITY BOARD OF EDUCATION or any political party in reference hereto.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, **EXCEPT** bona fide employees or bona fide established commercial or selling agencies maintained by:

(Name of Bidding Contractor)

I further warrant and represent that I have never been convicted of or acknowledged or admitted to any payment of kickbacks or unlawful gifts to any government official, school board official or employee for which conduct the ATLANTIC CITY BOARD OF EDUCATION deems me disqualified from doing business with them under such circumstances.

I also understand that the above disqualification does not apply to any vendor who co-operates with the prosecution and gives supporting testimony on behalf of the prosecution in the course of a judicial inquiry.

SWORN AND SUBSCRIBED TO BEFORE ME

THIS _____ **DAY OF** _____, **20** _____

(Signature of NOTARY PUBLIC)

Signature of Affiant

NOTARY PUBLIC OF: _____

Print/type name of Affiant

My Commission Expires: _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

PREQUALIFICATION AFFIDAVIT

USC Locker Room
Bid #26-030

The below affidavit must be submitted with your bid for projects over \$20,000.00 pursuant to N.J.S.A. 18A:18A-32:

I, _____ of the city of _____ in the county of _____
and the state of _____ am of full age, being duly sworn according to law on my oath
depose and say that:

No Material Adverse Change in Qualification

I am _____ (*Position in Company*) and the bidder for the
above-named project. The answers to the following statements are true and correct and there has been no material
adverse change in the qualification information after the latest statement submitted as required (N.J.S.A. 18A:18A-32 et
seq.) as amended, except as set forth herewith. I further certify that there is not now pending any litigation or other
action that may jeopardize my rating, status, or contract limits from their current limits.

Notice of Classification (DPMC 27)

_____ (*Name of Company*) is classified by the State of New Jersey under
Chapter 105, Laws of 1962, as amended. This Classification became effective _____ (*Date*).

Type of Contract/Trade Classified: _____

Classification Approved Amount: \$ _____

A copy of my valid and active prequalification/classification certificate from the Department of Treasury, Division of
Property Management and Construction has been submitted with this bid.

Total Amount of Uncompleted Contracts (DPMC 701)

The total amount of uncompleted work is \$ _____ as of _____ (*Date*).

A copy of the company's Total Amount of Uncompleted Contracts form is required to be submitted with the bid.

Signature of Authorized Representative Date

Sworn and subscribed to before me this _____ day of _____ in the Year _____.

Signature of Notary Print Name of Notary Notary Public of _____

My Commission Expires: _____
Month Day Year **-SEAL-**

PLEASE READ: This affidavit does not take the place of the "Notice of Classification" or the "Total Amount of
Uncompleted Contracts" issued by the State of New Jersey, both of which must be submitted with the
bid package of each bidder.

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION

USC Locker Room
Bid #26-030

It is the determination of the Atlantic City Board of Education that this is a public works project which contract amount in total will exceed \$2,000.00 (two thousand dollars), therefore, pursuant to the Public Works Contractor Registration Act N.J.S.A. 34:11-56.48 et seq., contractors are advised of the following:

No contractor shall bid on any contract for public work as defined in section 2 of P.L.1963, c. 150 (C.34:11-56.26) unless the contractor is registered pursuant to this act. No contractor shall list a subcontractor in a bid proposal for the contract unless the subcontractor is registered pursuant to P.L.1999, c.238 (C.34:11-56.48 et seq.) at the time the bid is made. No contractor or subcontractor, including a subcontractor not listed in the bid proposal, shall engage in the performance of any public work subject to the contract, unless the contractor or subcontractor is registered pursuant to that act.

I certify that our company understands that the project of the Atlantic City Board of Education requires that all contractors and subcontractors listed in this proposal possess a valid Contractor Registration Certificate or submit with its bid a copy of the registration application (contractors and subcontractors) at the time the proposal is received by the Board and furthermore certify that I will provide copies of the valid certificates prior to the award of contract.

Name of Company _____

Authorized Agent _____

Title _____

Authorized Signature _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

PREVAILING WAGE CERTIFICATION

USC Locker Room
Bid #26-030

It is the determination of the Atlantic City Board of Education that this is a public works project that in total will exceed \$2,000.00 (two thousand dollars), therefore prevailing wages rules and regulations apply as promulgated by the New Jersey Prevailing Wage Act and in conformance with N.J.S.A. 34:11-56:25 et seq.

Certification

I certify that our company understands that this project of the Board of Education requires all workers to be paid prevailing wages and that we shall pay all workers a wage rate not less than the published prevailing wage rates for the locality in which the work is being performed, as designated by the New Jersey Department of Labor and Workforce Development. I further certify that all subcontractors named in this bid understand that this project requires the subcontractor to pay its workers prevailing wages in full accordance with the law.

Certified Payroll Records – Form MW-562 (6/23)

I agree to submit certified payroll records to the Atlantic City Board of Education for each payroll period within ten (10) days of payment of wages and that I will use the New Jersey Department of Labor and Workforce Development Form MW-562 (6/23) to certify all payroll records. I understand and certify that the Atlantic City Board of Education will not make any payments if certified payroll records are not received.

Submission of Certified Payroll Records

Contractors are required to submit certified payroll records for each payroll using the online form MW-562(6/23) through the New Jersey Wage Hub *and* to submit certified payroll records for each payroll to the Atlantic City Board of Education. Submission of the MW-562 (6/23) online to the New Jersey Wage Hub alone will not satisfy the requirement to submit certified records to the Board of Education.

Non-compliance Statement

I understand that if it is found that any worker employed by the contractor or any subcontractor covered by said contract has been paid a rate of wages less than the prevailing wage required to be paid by such contract, the Atlantic City Board of Education may begin proceedings to terminate the contractor's or subcontractor's right to proceed with the work, or such part of the work as to which there has been a failure to pay required wages, and to prosecute the work to completion or otherwise. The contractor and his sureties shall be liable for any excess costs occasioned thereby to the public body.

Notification of Violations – New Jersey Department of Labor & Workforce Development

Has the bidder or any person having an "interest" with the bidder been notified by the New Jersey Department of Labor and Workforce Development by notice issued pursuant to N.J.S.A. 34:11-56:37 that he/she has been in violation for failure to pay prevailing wages as required by the New Jersey Prevailing Wage Act within the last five (5) years?

* Yes _____ No _____

*If yes, please attach a signed document explaining any/or all administrative proceedings with the Department within the last five (5) years. Please include any pending administrative proceedings with the Department.

Submission of Certified Payroll Records

Certified payroll records to the Atlantic City Board of Education maybe submitted via email to accountspayable@acboe.org or postal mail as follows:

**Atlantic City Board of Education
1300 Atlantic Avenue, 5th Floor
Atlantic City, New Jersey 08401
ATTN: ACCOUNTS PAYABLE**

Name of Company: _____

Authorized Agent: _____

Authorized Signature: _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

VENDOR'S AFFIDAVIT

USC Locker Room

Bid #26-030

I, _____ of the city of _____ in the county of _____ and the state of _____ am of full age, being duly sworn according to law on my oath depose and say that:

I am _____ (*Position Title*) of the firm _____ the Bidder making the bid for the herein project and that I executed said bid with full authority to do so, and that all statements contained in said bid and in this Affidavit are true and correct and made with full knowledge that the **ATLANTIC CITY BOARD OF EDUCATION** relies upon the truth of the statement contained in said bid and in the statements contained in this Affidavit in awarding the contract for said project.

I understand that this Affidavit is being provided to the **ATLANTIC CITY BOARD OF EDUCATION** in compliance with the provisions of NJSA 18A:12-2 and NJSA 18A:6-8 which prohibit persons having a conflict of interest in entering into contracts or selling textbooks, apparatus, or supplies to the **ATLANTIC CITY BOARD OF EDUCATION**.

No person who is a shareholder, officer, director, partner or owner of the above vendor is officially connected with or employed in the **ATLANTIC CITY PUBLIC SCHOOL DISTRICT** or is in any way pecuniarily or beneficially interested in or receives compensation or reward of any kind in connection with the sales of the vendor to the **ATLANTIC CITY BOARD OF EDUCATION**.

No member of the **ATLANTIC CITY BOARD OF EDUCATION** is employed or interested directly in the above vendor.

I further declare and certify that I and the company of which I am the agent, are not included on the State Treasurer's **List of Debarred, Suspended or Disqualified Bidders**.

I understand that if any statements made herein are false, I am subject to punishment and that any person who may be interested in my company while employed by the **ATLANTIC CITY BOARD OF EDUCATION** is subject to removal from office and to revocation of his/her certificate to teach or administer, direct or supervise instruction or educational guidance in the public school system.

SWORN AND SUBSCRIBED TO BEFORE ME

THIS _____ **DAY OF** _____, **20** _____

(Signature of NOTARY PUBLIC)

Signature of Affiant

NOTARY PUBLIC OF: _____

Print/type name of Affiant

My Commission Expires: _____

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

Sworn Contractor Certification - Qualifications and Credentials

USC Locker Room
Bid #26-030

Pursuant to N.J.S.A. 18A:7G-37, a pre-qualified contractor seeking to bid school facilities projects, and any subcontractors, that are required to be named under N.J.S.A. 18A:7G-1 et seq. shall, as a condition of bidding, submit this Sworn Contractor Certification regarding qualifications and credentials.

I, _____ the principal owner or officer of the company, certify that the forging statements are true and our firm has the following qualifications and credentials:

1. A current, valid certificate of registration issued pursuant to "The Public Works Contractor Registration Act," N.J.S.A. 34:11-56:48 et seq. A copy of which is submitted with its bid;
2. A current, valid Certificate of Authority (Business Registration) to perform work in New Jersey issued by the Department of Treasury, a copy of which is submitted with its bid;
3. A current valid contractor trade license required under applicable New Jersey Law for any specialty trade or specialty area in which the firm seeks to perform work, a copy of which is submitted with its bid;
4. During the term of the school facilities project, I as principal owner or officer of the company or corporation, as contractor, will have in place a suitable quality control and quality assurance program and an appropriate safety and health plan.
5. Certify that, at the time of bidding, the amount of the bid proposal and value of all of its outstanding incomplete contracts does not exceed the firm's existing aggregate rating limit.

Name of Company _____

Name of Owner or Officer _____

Signature of Owner or Officer _____

Notarized before me this _____ day of _____, _____
Month Year

NOTARY PUBLIC SIGNATURE

PRINTED NAME OF NOTARY PUBLIC

MY COMMISSION EXPIRES _____
Month Day Year

THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

Disclosure of Investment Activities in Iran

Person or Entity

Part 1: Certification

COMPLETE PART 1 BY CHECKING **EITHER BOX.**

Pursuant to Public Law 2012, c. 25, any person or entity that is a successful bidder or proposer, or otherwise proposes to enter into or renew a contract, must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any parent entity, subsidiary, or affiliate is identified on the State Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The list is found on Treasury's website at www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf.

The Chapter 25 list must be reviewed prior to completing the below certification. If a vendor or contractor is found to be in violation of law, action may be taken as appropriate and as may provided by law, rule or contract, including but not limited to imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party.



I certify, pursuant to Public Law 2012, c. 25, that neither the person or entity listed above, nor any parent entity, subsidiary, or affiliate thereof is listed on the N.J. Department of the Treasury's list of entities determined to be engaged in prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. I will skip Part 2 and sign and complete the Certification below.

OR



I am unable to certify as above because the person or entity and/or a parent entity, subsidiary, or affiliate thereof is listed on the N.J. Department of the Treasury's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below sign and complete the Certification below.

Part 2: Additional Information

PLEASE PROVIDE FURTHER INFORMATION RELATED TO INVESTMENT ACTIVITIES IN IRAN.

You must provide a detailed, accurate and precise description of the activities of the person or entity, or a parent entity, subsidiary, or affiliate thereof engaging in investment activities in Iran below and, if more space is needed, on additional sheets provided by you.

Part 3: Certification of True and Complete Information

I, being duly sworn upon my oath, hereby represent and state that the foregoing information and any attachments there to the best of my knowledge are true and complete. I attest that I am authorized to execute this certification on behalf of the above-referenced person or entity.

*I acknowledge that the **Atlantic City Board of Education** is relying on the information contained herein and thereby acknowledge that I am under a continuing obligation from the date of this certification through the completion of any contracts with the **Atlantic City Board of Education** to notify the **Atlantic City Board of Education** in writing of any changes to the answers of information contained herein.*

*I acknowledge that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I recognize that I am subject to criminal prosecution under the law and that it will also constitute a material breach of my agreement(s) with the **Atlantic City Board of Education** and that the **Atlantic City Board of Education** at its option may declare any contract(s) resulting from this certification void and unenforceable.*

Full Name (Print)		Title	
Signature		Date	

THIS FORM (TWO PAGES) MUST BE COMPLETED, SIGNED, AND RETURNED *PRIOR* TO AWARD



C. 271 POLITICAL CONTRIBUTION DISCLOSURE FORM

ATLANTIC CITY BOARD OF EDUCATION

Contractor Instructions

Business entities (contractors) receiving contracts from a public agency that are NOT awarded pursuant to a “fair and open” process (defined at N.J.S.A. 19:44A-20.7) are subject to the provisions of P.L. 2005, c. 271, s.2 (N.J.S.A. 19:44A-20.26). This law provides that 10 days prior to the award of such a contract, the contractor shall disclose contributions to:

- any State, county, or municipal committee of a political party
- any legislative leadership committee*
- any continuing political committee (a.k.a., political action committee)
- any candidate committee of a candidate for, or holder of, an elective office:
 - of the public entity awarding the contract
 - of that county in which that public entity is located
 - of another public entity within that county
 - or of a legislative district in which that public entity is located or, when the public entity is a county, of any legislative district which includes all or part of the county

The disclosure must list reportable contributions to any of the committees that exceed \$200 per election cycle that were made during the 12 months prior to award of the contract. See N.J.S.A. 19:44A-8 and 19:44A-16 for more details on reportable contributions.

N.J.S.A. 19:44A-20.26 itemizes the parties from whom contributions must be disclosed when a business entity is not a natural person. This includes the following:

- individuals with an “interest” ownership or control of more than 10% of the profits or assets of a business entity or 10% of the stock in the case of a business entity that is a corporation for profit
- all principals, partners, officers, or directors of the business entity or their spouses
- any subsidiaries directly or indirectly controlled by the business entity
- IRS Code Section 527 New Jersey based organizations, directly or indirectly controlled by the business entity and filing as continuing political committees, (PACs).

When the business entity is a natural person, “a contribution by that person’s spouse or child, residing therewith, shall be deemed to be a contribution by the business entity.” [N.J.S.A. 19:44A-20.26(b)] The contributor must be listed on the disclosure.

Any business entity that fails to comply with the disclosure provisions shall be subject to a fine imposed by ELEC in an amount to be determined by the Commission which may be based upon the amount that the business entity failed to report.

The enclosed list of agencies is provided to assist the contractor in identifying those public agencies whose elected official and/or candidate campaign committees are affected by the disclosure requirement. It is the contractor’s responsibility to identify the specific committees to which contributions may have been made and need to be disclosed. The disclosed information may exceed the minimum requirement.

The enclosed form, a content-consistent facsimile, or an electronic data file containing the required details (along with a signed cover sheet) may be used as the contractor’s submission and is disclosable to the public under the Open Public Records Act.

The contractor must also complete the attached Stockholder Disclosure Certification. This will assist the agency in meeting its obligations under the law. **NOTE: This section does not apply to Board of Education contracts.**

N.J.S.A. 19:44A-3(s): “The term “legislative leadership committee” means a committee established, authorized to be established, or designated by the President of the Senate, the Minority Leader of the Senate, the Speaker of the General Assembly or the Minority Leader of the General Assembly pursuant to section 16 of P.L.1993, c.65 (C.19:44A-10.1) for the purpose of receiving contributions and making expenditures.”

**List of Agencies with Elected Officials Required for Political Contribution Disclosure
N.J.S.A. 19:44A-20.26**

County Name: Atlantic

State: Governor

Legislative District #: 1, 2, 8 & 9

State Senator and two members of the General Assembly per district.

County:

County Commissioners
County Executive

County Clerk
Surrogate

Sheriff

Municipalities (Mayor and members of governing body, regardless of title):

Absecon City	Estell Manor City	Mullica Township
Atlantic City	Folsom Borough	Northfield City
Brigantine City	Galloway Township	Pleasantville City
Buena Vista Township	Hammonton Town	Somers Point City
Corbin City	Linwood City	Ventnor City
Egg Harbor City	Longport Borough	Weymouth Township
Egg Harbor Township	Margate City	

Boards of Education (Members of the Board):

Absecon City	Folsom Borough	Mainland Regional
Atlantic City	Galloway Township	Mullica Township
Buena Regional	Greater Egg Harbor Regional	Northfield City
Egg Harbor City	Hamilton Township	Pleasantville City
Egg Harbor Township	Hammonton Town	Somers Point City
Estell Manor City	Longport	Weymouth Township

Fire Districts (Board of Fire Commissioners):

Buena Borough Fire District No. 1
Buena Borough Fire District No. 2
Buena Vista Township Fire District No. 1
Buena Vista Township Fire District No. 2
Buena Vista Township Fire District No. 3
Buena Vista Township Fire District No. 4

**CERTIFICATION OF NON-DEBARMENT
FOR FEDERAL GOVERNMENT CONTRACTS**

N.J.S.A. 52:32-44.1 (P.L. 2019, c.406)

USC Locker Room

Bid #26-030

This certification shall be completed, certified to, and submitted to the contracting unit prior to contract award, except for emergency contracts where submission is required prior to payment.

PART I: VENDOR INFORMATION	
Individual or Organization Name	
Physical Address of Individual or Organization	
Unique Entity ID (If applicable)	
CAGE/NCAGE Code (If applicable)	
Check the box that represents the type of business organization:	

- | | |
|--|---|
| <input type="checkbox"/> Sole Proprietorship (skip Parts III and IV) | <input type="checkbox"/> Non-Profit Corporation (skip Parts III and IV) |
| <input type="checkbox"/> For-Profit Corporation (any type) | <input type="checkbox"/> Limited Liability Company (LLC) <input type="checkbox"/> Partnership |
| <input type="checkbox"/> Limited Partnership | <input type="checkbox"/> Limited Liability Partnership (LLP) |
| <input type="checkbox"/> Other (be specific): _____ | |

PART II – CERTIFICATION OF NON-DEBARMENT: Individual or Organization			
<p>I hereby certify that the individual or organization listed above in Part I is not debarred by the federal government from contracting with a federal agency. I further acknowledge: that I am authorized to execute this certification on behalf of the above-named organization; that the Atlantic City Board of Education is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the date of contract award by Atlantic City Board of Education to notify the Atlantic City Board of Education in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the Atlantic City Board of Education, permitting the Atlantic City Board of Education to declare any contract(s) resulting from this certification void and unenforceable.</p>			
Full Name (Print):		Title:	
Signature:		Date:	

**CERTIFICATION OF NON-DEBARMENT
FOR FEDERAL GOVERNMENT CONTRACTS (continued)**

N.J.S.A. 52:32-44.1 (P.L. 2019, c.406)

USC Locker Room

Bid #26-030

PART III – CERTIFICATION OF NON-DEBARMENT: Individual or Entity Owning Greater than 50 Percent of Organization

Section A (Check the Box that applies)

Below is the name and address of the stockholder in the corporation who owns more than 50 percent of its voting stock, or of the partner in the partnership who owns more than 50 percent interest therein, or of the member of the limited liability company owning more than 50 percent interest therein, as the case may be.

Name of Individual or Organization

Physical Address

OR

No one stockholder in the corporation owns more than 50 percent of its voting stock, or no partner in the partnership owns more than 50 percent interest therein, or no member in the limited liability company owns more than 50 percent interest therein, as the case may be.

Section B (Skip if no Business entity is listed in Section A above)

Below is the name and address of the stockholder in the corporation who owns more than 50 percent of the voting stock of the organization's parent entity, or of the partner in the partnership who owns more than 50 percent interest in the organization's parent entity, or of the member of the limited liability company owning more than 50 percent interest in organization's parent entity, as the case may be.

Stockholder/Partner/Member Owning Greater Than 50 Percent of Parent Entity

Physical Address

OR

No one stockholder in the parent entity corporation owns more than 50 percent of its voting stock, no partner in the parent entity partnership owns more than 50 percent interest therein, or no member in the parent entity limited liability company owns more than 50 percent interest therein, as the case may be.

**CERTIFICATION OF NON-DEBARMENT
FOR FEDERAL GOVERNMENT CONTRACTS (continued)**

N.J.S.A. 52:32-44.1 (P.L. 2019, c.406)

USC Locker Room

Bid #26-030

Section C – Part III Certification

I hereby certify that no individual or organization that is debarred by the federal government from contracting with a federal agency owns greater than 50 percent of the **Organization listed above in Part I** or, if applicable, owns greater than 50 percent of a parent entity of **Atlantic City Board of Education**. I further acknowledge: that I am authorized to execute this certification on behalf of the above-named organization; that the **Atlantic City Board of Education** is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the date of contract award **Atlantic City Board of Education** to notify the **Atlantic City Board of Education** in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the **Atlantic City Board of Education** permitting the **Atlantic City Board of Education** to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print):		Title:	
Signature:		Date:	

Part IV – CERTIFICATION OF NON-DEBARMENT: Contractor – Controlled Entities

Section A

Below is the name and address of the corporation(s) in which the **Organization listed in Part I** owns more than 50 percent of voting stock, or of the partnership(s) in which the **Organization listed in Part I** owns more than 50 percent interest therein, or of the limited liability company or companies in which the **Organization listed above in Part I** owns more than 50 percent interest therein, as the case may be.

Name of Business Entity	Physical Address

****Add additional sheets if necessary****

OR

The **Organization listed above in Part I** does not own greater than 50 percent of the voting stock in any corporation and does not own greater than 50 percent interest in any partnership or any limited liability company.

**CERTIFICATION OF NON-DEBARMENT
FOR FEDERAL GOVERNMENT CONTRACTS (continued)**

N.J.S.A. 52:32-44.1 (P.L. 2019, c.406)

USC Locker Room

Bid #26-030

Section B (skip if no business entities are listed in Section A of Part IV)

<input type="checkbox"/>	Below are the names and addresses of any entities in which an entity listed in Part III A owns greater than 50 percent of the voting stock (corporation) or owns greater than 50 percent interest (partnership or limited liability company).
--------------------------	---

Name of Business Entity Controlled by Entity Listed in Section A of Part IV	Physical Address

****Add additional Sheets if necessary****

OR

<input type="checkbox"/>	No entity listed in Part III A owns greater than 50 percent of the voting stock in any corporation or owns greater than 50 percent interest in any partnership or limited liability company.
--------------------------	--

Section C – Part IV Certification

I hereby certify that the **Organization listed above in Part I** does not own greater than 50 percent of any entity that that is debarred by the federal government from contracting with a federal agency and, if applicable, does not own greater than 50 percent of any entity that in turns owns greater than 50 percent of any entity debarred by the federal government from contracting with a federal agency. I further acknowledge: that I am authorized to execute this certification on behalf of the above-named organization; that the **Atlantic City Board of Education** is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the date of contract award by **Atlantic City Board of Education** to notify the **Atlantic City Board of Education** in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the **Atlantic City Board of Education**, permitting the **Atlantic City Board of Education** to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print):		Title:	
Signature:		Date:	

THIS FORM (FOUR PAGES) MUST BE COMPLETED, SIGNED, AND RETURNED PRIOR TO CONTRACT AWARD

SAMPLE DOCUMENT ONLY

A CURRENT IRS FORM MUST BE COMPLETED, SIGNED, AND RETURNED WITH YOUR BID

Form W-9 (Rev. August 2013) Department of the Treasury Internal Revenue Service	Request for Taxpayer Identification Number and Certification	Give Form to the requester. Do not send to the IRS.
Print or type See Specific Instructions on page 2.	Name (as shown on your income tax return)	
	Business name/disregarded entity name, if different from above	
	Check appropriate box for federal tax classification: <input type="checkbox"/> Individual/sole proprietor <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____ <input type="checkbox"/> Other (see instructions) ▶ _____	Exemptions (see instructions): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____
	Address (number, street, and apt. or suite no.)	Requestor's name and address (optional)
	City, state, and ZIP code	
List account number(s) here (optional)		

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number								
				-				

Employer identification number								
				-				

Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
- I am a U.S. citizen or other U.S. person (defined below), and
- The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here

Signature of U.S. person ▶

Date ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. The IRS has created a page on irs.gov for information about Form W-9, at www.irs.gov/w9. Information about any future developments affecting Form W-9 (such as legislation enacted after we release it) will be posted on that page.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, payments made to you in settlement of payment card and third party network transactions, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the

withholding tax on foreign partners' share of effectively connected income, and

4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct.

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

District Locations (Subject to Change)

Administrative Building
1300 Atlantic Avenue, 5th and 6th Floors

Atlantic City High School
1400 Albany Avenue

Atlantic City HS Boathouse
3300 Fairmount Avenue

Brighton Avenue School
30 N. Brighton Avenue

Chelsea Heights School
4101 Filbert Avenue

Dr. Martin Luther King School
1700 Marmora Avenue

New Jersey Avenue School
35 N. New Jersey Avenue

Pennsylvania Avenue School
201 N. Pennsylvania Avenue

New York Avenue School
411 North New York Avenue

Richmond Avenue School
4115 Ventnor Avenue

Sovereign Avenue School
3205 Arctic Avenue

Texas Avenue School
2523 Arctic Avenue

Uptown Complex
323 Madison Avenue

Venice Park
1601 N. Penrose Avenue

Indiana Avenue School
117 N. Indiana Avenue

All Locations are in Atlantic City, NJ 08401

BID PROPOSAL FORM

USC Locker Room

Bid #26-030

BIDDERS SHOULD NOT AMEND THIS FORM IN ANY WAY

ANY QUESTIONS SHOULD BE RESOLVED PRIOR TO SUBMITTING BIDS

The undersigned hereby declares that he/she has carefully examined the specifications, plans and form of contract for the project named above; that he/she has carefully examined the site of the project; and that he/she will contract to carry out and complete said project as specified and delineated at the price per unit measure or lump sum for each scheduled item of work stated on this Bid Proposal Form.

The undersigned proposes to furnish all labor, materials, supplies, and equipment required to construct and complete the structures and do other work complete in every detail, in accordance with plans, specifications and other contract documents for the following Prices:

<u>Item No.</u>	<u>Description</u>	<u>Total Price</u>
1.	USC Locker Room Project. LUMP SUM PRICE _____ Dollars and _____ Cents	\$ _____
2.	Contingency Allowance. ALLOWANCE _____ Fifty Thousand _____ Dollars and _____ No _____ Cents	\$ <u>50,000.00</u>
	TOTAL PRICE FOR BID ITEM NOS. 1 AND 2 _____ Dollars and _____ Cents	\$ _____

Company Name: _____

Taxpayer ID Number: _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

Name and Title of Bidder: _____

Signature of Bidder: _____

Phone: _____ **Fax:** _____

Email: _____ **Date:** _____

THIS FORM MUST BE COMPLETED, SIGNED AND RETURNED WITH YOUR BID

Uptown School Locker Room Renovations

Technical Specifications

Any drawings available for this project are appended to this bid package in a separate PDF. Prospective bidders are responsible for printing their own full-size copies.

STATEMENT OF WORK

1.01 IN GENERAL, this project consists of renovating the locker rooms at Uptown School Complex located at 323 Madison Avenue, Atlantic City, NJ 08401 complete as specified within these bid and contract documents.

1.02 COORDINATION

- A. Contractor shall coordinate his operations with those of other Contractors. Cooperation will be required in the arrangement for the storage of materials and in the detailed execution of the work. The Contractors, including their subcontractors, shall keep informed of the progress and the detail work of other Contractors and Subcontractors, and shall notify the *ENGINEER* immediately of lack of progress or defective workmanship on the part of others. Failure of a Contractor to keep informed of the work progressing on the site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by him of the status of the work as being satisfactory for proper coordination with his own work.
- B. All prime Contractors shall coordinate their work with adjacent work and with other trades so as to facilitate general progress of the work and assure correctness.
- C. Each Contractor shall lay out and install his work at such time or times and in such a manner as to facilitate the general progress of the project.
- D. Coordinate all work as further described in the contract documents.

1.03 The above Statement of Work outlines the general items and distribution of work and should not be construed as being all-inclusive.

END OF STATEMENT OF WORK

**SECTION 020720
MINOR DEMOLITION FOR REMODELING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Removal of designated construction and finishes including by not limited to plumbing fixtures, partitions, accessories, doors, frames, acoustical ceiling tile and grid system, flooring and base (tile and epoxy).
- B. Abrading/removing paint from existing CMU walls as required for the installation of new ceramic tile.
- C. Disposal of materials.
- D. Identification of utilities.
- E. Protection of all construction designated to remain.

1.2 RELATED SECTIONS

- A. Division 1 - Construction Facilities and Temporary Controls: Barricades, security at Owner occupied areas, and cleanup during construction.
- B. Division 1 - Contract Closeout: Project record documents.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection.
- B. Obtain required permits from authorities.
- C. Do not close or obstruct egress width to any building or site exit.
- D. Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.
- E. Coordinate interruption of any building systems or services as required.
- F. Conform to procedures applicable when hazardous or contaminated materials are discovered.

1.4 SCHEDULING

- A. Verify work schedule to coordinate with Owner's requirements.
- B. Schedule Work to precede new construction.
- C. Describe demolition removal procedures and schedule.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION

3.1 PREPARATION

- A. Provide, erect, and maintain temporary barriers and security devices.
- B. Protect existing materials which are not to be demolished.

- C. Prevent movement of structure; provide bracing and shoring.
- D. Notify affected utility companies before starting work and comply with their requirements.
- E. Mark location and termination of utilities.
- F. Provide appropriate temporary signage including signage for exit or building egress.

3.2 DEMOLITION

- A. Disconnect, remove, cap, and identify designated utilities within demolition areas.
- B. Demolish in an orderly and careful manner. Protect existing structures.
- C. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- D. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.
- E. Coordinate all demolition work with work shown on mechanical, electrical and plumbing drawings.

END OF SECTION

SECTION 022020
EXCAVATION, TRENCHING AND BACKFILLING FOR UTILITIES SYSTEMS

PART 1 GENERAL

1.1 SCOPE. This section covers the excavation, trenching, and backfilling for utilities systems.

PART 2 PRODUCTS

PART 3 EXECUTION

3.1 EXCAVATION.

3.1.1 General. All excavation of every description and of whatever substances encountered shall be performed to the depths indicated or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted as indicated or as directed. Grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved methods. Sheeting and shoring shall be done as may be necessary for the protection of the work and for the safety of personnel and shall conform to 29 CFR, Part P, and all costs associated therewith shall be included in the Contract price. Earth excavation shall comprise all materials not classified as rock excavation. Rock excavation shall comprise the following: rock material in ledges, bedded deposits, unstratified masses, and conglomerate deposits so firmly cemented as to possess the characteristics of solid rock that cannot be removed without systematic drilling and blasting; and below grade concrete or masonry structures. Concrete masonry evident from surface, such as curbs, sidewalks, pavements and utility structures are not considered rock excavation. Rock excavation is not anticipated.

3.1.2 Trench Excavation. Trenches shall be of the necessary width for proper laying of the utility. The banks of pipe trenches shall be as vertical as practicable from the trench bottom to a point one foot above the top of the pipe being installed. The remainder of the trench sides may be sloped or widened provided there is no interference with other utilities or facilities. Care shall be taken not to over excavate except where granular bedding is required. Stones shall be removed as necessary to avoid point bearing. Where rock excavation, as defined hereinbefore, is required in trenches for pipe, the rock shall be excavated to a minimum over depth of 6 inches below the trench depths indicated or specified. Except as hereinafter specified for wet or otherwise unstable material, over depths shall be backfilled as and with materials specified for backfilling the lower portion of trenches. Whenever wet or otherwise unstable material that is not capable of properly supporting the pipe is encountered in the bottom of the trench, such material shall be over excavated to a depth to allow for construction of a stable pipe bedding. The trench shall be backfilled to the proper grade with suitable approved material. Special requirements relating to specific utilities are as follows:

3.1.2.1 Sanitary Sewers. The width of the trench below 1 foot above the top of the pipe shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed 8 inches on either side of the pipe. The width of the trench above that level may be widened as hereinbefore specified. Trenches shall be over excavated to permit the installation of granular bedding as detailed on the drawings.

3.1.2.2 Electrical and Gas System. The banks of trenches shall be kept vertical below 1 foot above the top of the conduit or pipe but may be sloped or widened above that point. Trenches shall be over excavated to permit the installation of sand bedding as detailed on the drawings.

3.2 EXCAVATION FOR APPURTENANCES. Excavation for manholes and similar structures shall be sufficient to leave at least 12 inches in the clear between the outer surfaces and the embankment or timber that may be used to hold and protect the banks. Any over depth excavation below such appurtenances that has not been directed will be considered unauthorized and shall be refilled with sand, gravel, or concrete, as directed, at no additional cost to the Owner.

- 3.3 CAUTION IN EXCAVATION (EXISTING FACILITIES.) The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground utilities, structures, etc., both known and unknown, may be determined. The Contractor shall be held responsible for the repair of such structures when broken or damaged. The Contractor's attention is particularly called to this item of the Contract Documents. Particular attention shall be given to all underground utilities shown or implied on the Contract Drawings. The Contractor shall be responsible for coordinating his work with all existing utility owners known to exist in the area of construction, and shall accurately locate existing utilities along route of new utilities prior to beginning construction of the new utilities.
- 3.4 BACKFILLING. The trenches shall not be backfilled until all required pressure tests are performed and until the utilities systems as installed conform to the requirements specified in the several sections covering the installation of the various utilities. Where wood sheeting is used along sides of sanitary sewer trench, sheeting below one foot above the top of the pipe shall be left in place if pipe bedding has been placed against sheeting. Except as otherwise specified for special conditions of over depths, trenches shall be backfilled to the ground surface with selected material as hereinafter specified. Trenches improperly backfilled shall be reopened to the depth required for proper compaction, then refilled and compacted as specified, or the condition shall be otherwise corrected as approved. The surface shall be restored to its original condition as near as practicable and as hereinafter specified. Pavement, base course and compacted subgrade disturbed by trenching operations shall be replaced in an acceptable manner with materials equal to the adjacent compacted subgrade, base course, and pavement, and shall be as hereinafter specified.
- 3.4.1 Lower Portion Of Trench. Backfill material shall be deposited in 6-inch maximum thickness layers and compacted with suitable tampers to a density of at least 95% of ASTM D 1557 maximum density until there is a cover of not less than 1 foot over sewers and 6 inches over other utility lines. If any portion of the cover in the lower portion of the trench is in the depth of special compaction and materials requirements under pavements or railroads, the special requirements shall control. Special care shall be taken not to damage the coating and wrapping of pipes and conduits.
- 3.4.1.1 Acceptable Backfill Materials. All material shall be sound and free of injurious amounts of deleterious materials. Material shall be as referenced in subsequent paragraphs.
- 3.4.1.1.1 Gas Lines and Electric Conduit. Bedding and backfill in lower portion of trench shall be sand SW, SP, SM or SC, conforming to ASTM D 2487, maximum particle size shall not exceed 1/2 inch in any dimension.
- 3.4.1.1.2 Sanitary Sewers. Unless otherwise indicated, bedding shall be Class B as detailed on the drawings and defined in ASTM C-12. Materials shall be angular graded stone ASTM D 448, Size No. 67. Backfill above bedding in lower portion of trench shall be either bedding material or sand or gravel classified as GW, GP, SW, or SP per ASTM D 2487. Maximum particle size shall not exceed 1-1/2 inches in any direction.
- 3.4.2 REMAINDER OF TRENCH. Except for special materials beneath pavement, the remainder of the trench shall be backfilled with material that is free of stones larger than 6 inches or 1/2 the layered thickness, whichever is smaller, in any dimension. Backfill materials shall be deposited in layers not exceeding the thickness specified, and each layer shall be compacted to the minimum density specified as applicable to the particular area. Degree of compaction shall be as follows, expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.
- 3.4.2.1 Under Pavements. Remainder of trench shall be backfilled with cohesionless soils (sand or gravel) in 12-inch layers and compacted to 95 percent maximum density up to the elevations at which the requirements for pavement subgrade materials and compaction control.
- 3.4.2.2 All Other Areas. Twelve-inch layers, 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils.
- 3.5 Field Testing Control. Testing shall be the responsibility of the Contractor at his expense and shall be performed by an approved commercial testing laboratory. When test results indicate that compaction is not as specified, the material shall be removed and replaced or recompacted to meet specification requirements at no expense to the Owner. Subsequent tests on recompacted areas shall be performed to determine conformance with specification requirements.

- 3.5.1 Density-Moisture Determinations. Tests for determination of maximum density and optimum moisture shall be performed by the Contractor in accordance with the requirements of ASTM D-1557. Samples shall be representative of the materials to be placed. An optimum moisture-density curve shall be obtained for each principal type of material or combination of materials encountered or utilized. Results of these tests shall be the basis of control for compaction.
- 3.5.2 Density Control. The Contractor shall control the density of the backfill by tests made in accordance with ASTM Standard D 1556, D 2167 or nuclear devices. Nuclear testing equipment and procedures shall conform to ASTM D 2922. A density test shall be made for each foot of fill for each 400 lineal feet or less of trench. The Contractor shall make as many additional tests as he requires to obtain the specified density at all points. All test results shall be furnished by the Contractor to the Owner's Representative, certified by an independent testing laboratory approved by the Owner's Representative.
- 3.6 PAVEMENT REMOVAL AND REPLACEMENT
- 3.6.1 Flexible Pavement. Where construction requires cutting and replacing of flexible paving, cutting shall be so accomplished that the remaining exposed edges shall conform vertically and horizontally to a straight line. The full depth of surface and binder course shall be removed to a width of 2 feet back from each side of the trench with a saw cut on the edges. Base course shall be removed to a point one foot back from each side of the trench. The pavement replaced shall match the existing in section and depth.
- 3.6.2 Rigid Pavement. Where construction requires removal and replacement of rigid pavement, the cutting shall be accomplished by a concrete saw; minimum depth of vertical cut shall be 1 inch. The remaining depth of section may be broken out in any approved manner. Width of section removed shall be extended minimum of 2 feet back from each side of trench.

END OF SECTION

**SECTION 033000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete infill where plumbing work requires the removal of existing concrete floor slabs.
- B. Control, expansion and contraction joint devices associated with concrete work, including joint sealants.
- C. Concrete reinforcement and accessories.
- D. Vapor barrier.

1.2 RELATED SECTIONS

- A. Section 093060 – Ceramic Tile.
- B. Section 096723 – Resinous Quartz Flooring.

1.3 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 302 - Guide for Concrete Floor and Slab Construction.
- C. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- D. ACI 305R - Hot Weather Concreting.
- E. ACI 306R - Cold Weather Concreting.
- F. ACI 308 - Standard Practice for Curing Concrete.
- G. ACI 318 - Building Code Requirements for Reinforced Concrete.
- H. ASTM C33 - Concrete Aggregates.
- I. ASTM C94 - Ready-Mixed Concrete.
- J. ASTM C150 - Portland Cement.
- K. ASTM C260 - Air Entraining Admixtures for Concrete.
- L. ASTM C494 - Chemical Admixtures for Concrete.
- M. ANSI/ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- N. ASTM A165 - Deformed and Plain Billet Steel for Concrete Reinforcement.
- O. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

1.4 SUBMITTALS

- A. Product Data: Provide data on joint devices, attachment accessories and admixtures.
- B. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.

1.5 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301, ACI 347 and ACI 318.
- B. Acquire cement and aggregate from same source for all work.
- C. Conform to ACI 305R when concreting during hot weather.
- D. Conform to ACI 306R when concreting during cold weather.

1.7 COORDINATION

- A. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I - Normal; Portland Type.
- B. Fine and Coarse Aggregates: ASTM C33.
- C. Lightweight Aggregate: ASTM C330.
- D. Water: Clean and not detrimental to concrete.

2.2 ADMIXTURES

- A. Air Entraining Admixtures: ASTM C260; certified by manufacturer to be compatible with other required admixtures.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Sika Aer", Sika Corporation.
 - b. "MB-VR or MB-AE", Master Builders.
 - c. "Darex AEA" or "Daravair", W.R. Grace.
 - d. "Edoco 2001 or 2002", Edoco Technical Products.
- B. Water Reducing Admixture: ASTM C494, Type A, and containing no chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Eucon WR-75", Euclid Chemical Co.
 - b. "Pozzolith Normal", Master Builders.
 - c. "Plastocrete 160", Sika Chemical Corporation.
 - d. "Chemtard", Chem-Masters Corporation.

- C. High Range Water Reducing Admixture (Super Plasticizer): ASTM C494 Type F or Type G and containing no chloride ions.
 - 1. Products: Subject to compliance with the requirements, provide one of the following:
 - a. "Eucon WR-75", Euclid Chemical Co.
 - b. "Pozzolith Normal", Master Builder.
 - c. "Plastocrete 160", Sika Chemical Corporation.
 - d. "Chemtard", Chem-Masters Corporation.

- D. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C494, Type E, and containing no chloride ions.
 - 1. Products: Subject to compliance with the requirements, provide one of the following:
 - a. "Accelguard 80", Euclid Chemical Corporation.
 - b. "Pozzolith High Early", Master Builders.

- E. Water-Reducing, Retarding Admixture: ASTM C494, Type D, and containing no chloride ions.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Edoco 20006", Edoco Technical Products.
 - b. "Pozzolith Retarder", Master Builders.
 - c. "Eucon Retarder 75", Euclid Chemical Co.
 - d. "Daratard", W.R. Grace.
 - e. "Plastiment", Sika Chemical Corporation.

- F. Prohibited Admixtures: Calcium chloride thyoxyanates or admixtures containing chloride ions are not permitted.

2.3 REINFORCING STEEL

- A. Reinforcing Steel: ASTM A165; 60 ksi yield grade billet steel.
- B. Welded Steel Wire Fabric: Plain type; ANSI/ASTM A185.

2.4 ACCESSORIES

- A. Bonding Compound: Polyvinyl Acetate or acrylic base.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Polyvinyl Acetate (Interior Only): "Euco Weld", Euclid Chemical Co. "Weldcrete", Larsen Products Corporation.
 - b. Acrylic or Styrene Butadiene: "J-40 Bonding Agent", Dayton Superior Corporation. "Everbond", L & M Construction Chemicals. "Hornweld", A.C. Horn, Inc. "Sonocrete", Sonneborn-Rexnord. "Acrylic Bondcrete", The Burke Co. "SBR Latex", Euclid Chemical Co. "Daraweld C", W.R. Grace.

- B. Vapor Retarder: Provide vapor retarder to cover over prepared base material where indicated below slabs on grade. Use only materials which are resistant to decay when tested in accordance with ASTM E154, as follows:
 - 1. Polyethylene sheet not less than 10 mils thick.

- C. Non-Shrink Grout: CRD-621, factory premixed grout.
 - 1. Products: Subject to compliance with the requirements, provide one of the following:
 - a. Non-metallic
"Masterflow 713", Master Builders. "SonogROUT", Sonneborn-Contech. "Euco-NS", Euclid Chemical Co.
"Crystex", L & M Construction Chemical Co. "Sure Grip Grout", Dayton Superior Corporation. "Horngrout", A.C. Horn
- D. Cast in Concrete Anchors: ASTM A36; structural size and configuration suitable for application.
- E. PVC Piping: Polyvinyl chloride ASTM D2729, 4 inch inside diameter.

2.5 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/4 inch thick; tongue and groove profile.

2.6 CONCRETE MIX

- A. Prepare design mixes for each type and strength of concrete in accordance with ACI 301.
 - 1. Compressive Strength:
28 days: 3,000 psi (foundations and slab-on-grade) 28 days: 4,000 psi (walkways)
- B. Submit written reports to the Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Architect.
- C. Design mixes shall provide strength and durability as required and as indicated on drawings and schedule. Use air entrained concrete for areas exposed to weather.
- D. Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant at no additional cost to the Owner and as accepted by the Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Architect before using in work.
- E. Provide maximum water-cement (WC) ratios for standard concrete as follows:
 - 1. Subjected to freezing and thawing WC 0.50.
 - 2. Subjected to deicers WC 0.45.
 - 3. Subjected to brackish water WC 0.40.
- F. Proportion and design mixes for standard concrete to result in concrete slump at point of placement as follows:
 - 1. Ramps, slabs, and sloping surfaces: Not more than 3" prior to addition of superplasticizers.
 - 2. Other concrete: No less than 3" and not more than 6".
- G. Mix and deliver concrete in accordance with ASTM C94, Alternative No. 1.
- H. Vary mixing time to allow for effect of ambient temperature.

2.7 VAPOR RETARDERS

- A. Sheet Vapor Retarder under slab-on-grade:
ASTM E 1745, Class A, not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. Products: Subject to compliance with requirements, provide one of the following or approved equal:
 - a. Stego Industries, LLC; Stego Wrap 10 mil vapor barrier Class A - for use under slabs-on-grade.
 - b. Substitutions: Under provisions of Division 1 – General Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- D. Verify lines, levels and centers before proceeding with form work. Ensure dimensions agree with drawings.

3.2 REINFORCEMENT

- A. Place, support and secure reinforcement against displacement.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304.
- B. Notify Architect/Engineer minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- D. Separate slabs on grade from vertical surfaces with 1/4-inch-thick joint filler.
- E. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- F. Extend joint filler from bottom of slab to within 1/4 inch of finished slab surface. Conform to Section 07900 for finish joint sealer requirements.
- G. Apply sealants in joint devices in accordance with Section 07900.
- H. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- I. Place concrete continuously between predetermined expansion, control, and construction joints.
- J. Do not interrupt successive placement; do not permit cold joints to occur.
- K. Saw cut joints within 24 hours after placing. Use 3/16-inch-thick blade, cut into 1/4 depth of slab thickness.

- L. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/4 inch in 10 ft.
- M. Install vapor retarder under interior slabs-on-grade. Lap joints minimum 6 inches and seal watertight by sealant applies between overlapping edges and ends.
- N. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.

3.4 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements as required.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

3.5 CONCRETE FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301.
- B. Steel trowel surfaces which are scheduled to be exposed.
- C. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/8 inch per foot nominal.

3.6 CURING AND PROTECTION

- A. Cure floor surfaces in accordance with ACI 308.
- B. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.7 FIELD QUALITY CONTROL

- A. The Owner will engage a Testing Agency to perform material evaluation tests.
 - 1. Materials and installed work may require testing and retesting, as directed by the Architect, at any time during the progress of work. Allow free access to material stockpiles and facilities. Testing and retesting of rejected materials shall be done at the Contractor's expense.
- B. Sampling and testing for quality control, curing and placement of concrete shall include the following:
 - 1. Slump: ASTM C143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - 2. Air Content: ASTM C173; volumetric method for lightweight or normal weight concrete; one for each day's pour of each type of air entrained concrete.
 - 3. Concrete Temperature: Test hourly when air temperature is 40 degrees F and when 80 degrees F and above, and each time a set of compression test specimens made.
 - 4. Compression Test Specimen: ASTM C31. One set of 3 standard cylinders for each compressive strength test unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field cured test specimens are required.
 - 5. Compressive Strength Tests: ASTM C39. One set for each day's pour exceeding 5 cu. yds. over and above the first 25 cu. yds. of concrete class placed in any one day; one specimen retained in reserve for later testing if required.
- C. Test results will be reported in writing to the Architect/Engineer and the Contractor within 24 hours that tests are made. Reports of compressive strength tests shall contain the project identification name and

number, date of concrete placement, name of the project identification name and number, date of concrete placement, name of concrete testing service, concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength and type of break for 7 day and 28-day tests.

3.8 PATCHING

- A. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.
- B. Patch imperfections in accordance with ACI 301.

3.9 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect/Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

END OF SECTION

**SECTION 035050
SELF-LEVELING UNDERLAYMENT**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Liquid applied, cementitious self-leveling floor underlayment.
- B. Related Sections:
 - 1. Section 033000 - Cast-in-Place-Concrete.
 - 2. Section 093060 – Ceramic Tile.
 - 3. Section 096723 – Resinous Quartz Flooring.

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 302.1 - R-89 flatness tolerance.

1.3 SUBMITTALS FOR REVIEW

- A. Product Data: Provide physical characteristics and product limitations.

1.4 SUBMITTALS FOR INFORMATION

- A. Manufacturer's certification that the product specified is Portland cement-based, having an inorganic binder content which is a minimum of 85% Portland cement in accordance with ASTM C150; Standard Specification for Portland Cement.
- B. Manufacturer's certification that the product specified is suitable for the intended use when installed in accordance to the parameters described in the manufacturer's printed literature and installation instructions.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not install underlayment until floor penetrations and peripheral work are complete.
- B. Maintain minimum ambient temperatures of 50 degrees F, 24 hours before, during and 72 hours after installation of underlayment.

PART 2 – PRODUCTS

2.1 PRODUCTS

- A. Manufacturers:
 - 1. Ardex: Type K-15.
 - 2. Or approved equal.
- B. Materials:
 - 1. Cementitious based mix, high-strength, fast setting:
 - a. Gypsum-based products: not permitted.
 - b. Maximum installation thickness: up to 1-1/2 inches.
 - c. Setting time: 4 hours maximum at 70° F.

- d. Compressive Strength: ASTM C109.mod: 4,100 psi minimum after 28 days.
 - e. Flexural Strength: 1,000 psi minimum after 28 days.
 - f. Flammability, ASTM E84:
 - 1. Flame Spread: 0.
 - 2. Fuel Contribution: 0.
 - 3. Smoke Development: 0.
 - g. Coverage, 55 lb. Bag: Approximately 60 s.f. at 1/8", Approximately 30 s.f. at 1/4".
- 2. Water: Potable and not detrimental to underlayment mix materials. Not warmer than 70° F.
 - 3. Joint and Crack Filler: Latex based.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are clean, dry, do not contain petroleum bi-products, or other compounds detrimental to underlayment material bond to substrate.

3.2 PREPARATION

- A. Remove substrate surface irregularities. Finish smooth.
- B. Vacuum clean surfaces.
- C. Prime substrate in accordance with manufacturer's instructions. Allow to dry.

3.3 APPLICATION

- A. Install underlayment in accordance with manufacturer's instructions.
- B. Place to thickness as required to achieve flatness within allowable tolerances.
- C. Place after interior partitions are installed.

3.4 CURING

- A. Air cure in accordance with manufacturer's instructions.

3.5 APPLICATION TOLERANCE

- A. Top Surface: Level to 1/8 inch in 10 ft.

3.6 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over unprotected floor underlayment surfaces.
- B. Underlayment can be walked on in 2 to 3 hours at 70 degrees F.
- C. Underlayment can accept finish floor covering materials after 16 hours.

END OF SECTION

**SECTION 04100
MORTAR AND MASONRY GROUT**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mortar and grout for masonry.

1.2 RELATED SECTIONS

- A. Section 043000 - Unit Masonry System: Installation of mortar and grout.

1.3 REFERENCES

- A. ACI 530 - Building Code Requirements for Masonry Structures.
- B. ACI 530.1 - Specifications for Masonry Structures.
- C. ASTM C5 - Quicklime for Structural Purposes.
- D. ASTM C91 - Masonry Cement.
- E. ASTM C94 - Ready-Mixed Concrete.
- F. ASTM C144 - Aggregate for Masonry Mortar.
- G. ASTM C150 - Portland Cement.
- H. ASTM C207 - Hydrated Lime for Masonry Purposes.
- I. ASTM C270 - Mortar for Unit Masonry.
- J. ASTM C404 - Aggregates for Masonry Grout.
- K. ASTM C1142 - Ready-Mixed Mortar for Unit Masonry.
- L. IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 - General Requirements.
- B. Include design mix, indicate whether the Proportion or Property specification of ASTM C270 is to be used, required environmental conditions, and admixture limitations.
- C. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 and ACI 530.1.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Division 1 - General Requirements.

- B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C150, Type I, gray color.
- B. Mortar Aggregate: ASTM C144, standard masonry type.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Grout Course Aggregate: ASTM C404.
- E. Grout Fine Aggregate: sand.
- F. Water: Clean and potable.
- G. Bonding Agent: Latex type.

2.2 MORTAR MIXES

- A. Mortar for Load Bearing Walls and Partitions: ASTM C270, Type S using the Property specification.
- B. Mortar for Non-Load Bearing Walls and Partitions: ASTM C270, Type S using the Property specification.
- C. Mortar for Engineered Masonry: ASTM C270, Type S using the Property specification.

2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Add mortar color if required in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.
- D. Do not use anti-freeze compounds to lower the freezing point of mortar.
- E. If water is lost by evaporation, re-temper only within two hours of mixing.
- F. Use mortar within two hours after mixing at temperatures of 90 degrees F, or two-and- one-half hours at temperatures under 40 degrees F.

2.4 GROUT MIXES

- A. Bond Beams: 3,000 psi strength at 28 days; 8-10 inches slump; premixed type in accordance with ASTM C94.
- B. Engineered Masonry: 3,000 psi strength at 28 days; 8-10 inches slump; premixed type in accordance with

ASTM C94.

2.5 GROUT MIXING

- A. Mix grout in accordance with ASTM C94.
- B. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- C. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Request inspection of spaces to be grouted.

3.2 PREPARATION

- A. Apply bonding agent to existing concrete surfaces.
- B. Plug clean-out holes with brick or block masonry units. Brace masonry for wet grout pressure.

3.3 INSTALLATION

- A. Install mortar and grout in accordance with ASTM C270 and manufacturer's instructions.
- B. Work grout into masonry cores and cavities to eliminate voids.
- C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.
- D. Do not displace reinforcement while placing grout.
- E. Remove excess mortar from grout spaces.

3.4 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 1 - General Requirements.
- B. Test and evaluate mortar in accordance with ASTM C780.
- C. Test and evaluate grout in accordance with ASTM C1019.

END OF SECTION

**SECTION 043000
UNIT MASONRY SYSTEM**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete masonry units.
- B. Reinforcement, anchorage, and accessories.
- C. Expansion Joints.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Section 041000 – Mortar and Masonry Grout.

1.3 RELATED SECTIONS

- A. Section 041000 – Mortar and Masonry Grout.
- B. Section 079000 – Joint Sealers: Rod and sealant at control and expansion joints.

1.4 REFERENCES

- A. ACI 530 – Building Code Requirements for Masonry Structures.
- B. ACI 530.1 – Specifications for Masonry Structures.
- C. ASTM A167 – Stainless and heavy-resisting chromium-nickel steel plate.
- D. SMACNA – Architectural sheet metal manual.
- E. ASTM C90 – Load-Bearing Concrete Masonry Units.
- F. ASTM C129 – Non-Load Bearing Concrete Masonry Units.
- G. IMIAC – International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
- H. IMIAC – International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Hot Weather Masonry Construction.

1.5 SUBMITTALS

- A. Submit under provisions of Division 1 – General Requirements.
- B. Product Data: Provide data for masonry units and fabricated wire reinforcement.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's specifications, installation requirements and other data needed to provide compliance with the specified requirements.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Division 1 – General Requirements.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

1.9 COORDINATION

- A. Coordinate work under provisions of Division 1 – General Requirements.
- B. Coordinate the masonry work with installation of window and door frame anchors.

PART 2 PRODUCTS

2.1 MANUFACTURERS – CONCRETE MASONRY UNITS

- A. E.P. Henry Corporation: Standard units and special units for 90-degree corners, bond beams and lintels.
- B. Substitutions: Under provisions of Division 1 – General Requirements.

2.2 CONCRETE MASONRY UNITS

- A. Hollow Load Bearing Block Units (CMU): ASTM C90, Type I – Moisture Controlled, normal weight.
- B. Solid Load-Bearing Block Units (CMU): ASTM C90, Type I – Moisture Controlled, normal weight.

2.3 REINFORCEMENT AND ANCHORAGE

- A. Single Wythe Joint Reinforcement: Truss type; steel wire, hot dip galvanized to ASTM A641 Class 3 after fabrication.
- B. Reinforcing Steel: deformed type, specified in Section 03200, uncoated.
- C. Provide prefabricated units for corner and tee sections.

2.4 ACCESSORIES

- A. Preformed Control Joints: PVC material. Size and profile as required to suit application. Hohman & Barnard VS Series or approved equal.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self- expanding; maximum lengths.
- C. Neoprene Pads: ASTM D-1056.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify items provided by other sections of work are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied to other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Match existing.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave, where visible; Flush where concealed.

3.4 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- D. Interlock intersections and external corners.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- G. Isolate masonry partitions from vertical structural framing members with a control joint.

3.5 REINFORCEMENT AND ANCHORAGE

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first horizontal joint above and below openings. Extend continuous minimum 16 inches each side of opening.
- C. Place joint reinforcement continuous in first joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Install reinforcing as noted on Drawings.

3.6 GROUTED COMPONENTS

- A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- B. Place and consolidate grout fill without displacing reinforcing.
- C. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.7 CONTROL JOINTS

- A. Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joint in accordance with Section 079000 for sealant performance.
- D. Install expansion joint in accordance with manufacturer's instructions.

3.8 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames, wood nailing strips, anchor bolts, plates, and other items to be built-in the work and furnished by other sections.
- B. Install built-in items plumb and level.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill metal door frame voids solid with grout.
- D. Do not build in organic materials subject to deterioration.

3.9 TOLERANCES

- A. Maximum Variation from Unit to Adjacent Unit: 1/32 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30ft .
- E. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.10 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.11 CLEANING

- A. Clean work under provisions of Division 1 – General Requirements.
- B. Remove excess mortar and mortar smears as work progresses.
- C. Replace defective mortar. Match adjacent work.
- D. Clean soiled surfaces with cleaning solution.
- E. Use non-metallic tools in cleaning operations.
- F. Do not use harsh cleaning materials or methods that would damage or discolor surfaces.

3.12 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Division 1 – General Requirements.

END OF SECTION

**SECTION 079000
JOINT SEALERS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preparing substrate surfaces.
- B. Sealant and joint backing.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-In-Place Concrete: Sealants required in conjunction with cast-in- place concrete.
- B. Section 043000 – Unit Masonry System.
- C. Section 081120 – Standard Steel Frames.

1.3 REFERENCES

- A. ASTM C790 - Use of Latex Sealing Compounds.
- B. ASTM C804 - Use of Solvent-Release Type Sealants.
- C. ASTM C834 - Latex Sealing Compounds.
- D. ASTM C919 - Use of Sealants in Acoustical Applications.
- E. ASTM C920 - Elastomeric Joint Sealants.
- F. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
- G. ASTM D1565 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).
- H. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

- A. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- B. Samples: Submit two samples, illustrating sealant colors for selection.
- C. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.8 COORDINATION

- A. Coordinate the work with all sections referencing this section.

1.9 WARRANTY

- A. Provide a five-year warranty.
- B. Warranty: Include coverage for installed sealants and accessories which fail to achieve air tight seal, water tight seal, and exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 SEALANTS

	<u>Location</u>	<u>Type</u>	<u>Color</u>
A.	Door Frame/Walls	Acrylic, Latex	Paint to Match
B.	Fire Stop Sealant	One part silicone Elastomer (Dow Corning Fire Stop Sealant)	Grey
C.	Under Thresholds	Butyl Rubber	Black
D.	Expansion/Control Joints In Masonry	Silicone Single Component	To Match Mortar Color
E.	Ceramic Tile	Silicone Fungus Resistant	To Match Grout Color

2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: ASTM D1056; round, closed foam rod; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.

- C. Perform preparation in accordance with manufacturer's instructions.
- D. Protect elements surrounding the work of this section from damage or disfiguration.

3.3 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.
- B. Measure joint dimensions and size materials to achieve required 2:1 width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

3.4 CLEANING

- A. Clean adjacent soiled surfaces.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished installation.
- B. Protect sealants until cured.

END OF SECTION

**SECTION 081110
STANDARD STEEL DOORS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior non-rated steel doors.

1.2 RELATED SECTIONS

- A. Section 081120 - Standard Steel Frames.

1.3 REFERENCES

- A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- B. ANSI/SDI-100 - Standard Steel Doors and Frames.
- C. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- D. ASTM C236 - Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot-Box.
- E. Door Hardware Institute (DHI) - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 - General Requirements.
- B. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, cut-outs for glazing and finish.
- C. Product Data: Indicate door configurations, location of cut-outs for hardware reinforcement.
- D. Manufacturer's Installation Instructions: Indicate special installation instructions.
- E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of ANSI/SDI-100 and ANSI A117.1.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Division 1 - General Requirements.
- B. Protect doors with resilient packaging sealed with heat shrunk plastic.
- C. Accept doors on site in manufacturer's packaging. Inspect for damage.
- D. Break seal on-site to permit ventilation.

1.8 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.9 COORDINATION

- A. Coordinate work under provisions of Division 1 - General Conditions.
- B. Coordinate the work with door opening construction, door frame and door hardware installation.

PART 2 PRODUCTS

2.1 DOOR MANUFACTURERS – STANDARD STEEL DOORS

- A. Steelcraft Product: Graintech L Series.
- B. Substitutions: Under provisions of Division 1 - General Requirements.

2.2 DOORS

- A. Interior Doors: SDI-100, 18 gage, laminated flush design; provide Type F flush door or provide vision panels and louvers as per Architectural Drawings.

2.3 DOOR CONSTRUCTION – STANDARD STEEL DOORS

- A. Face: Steel sheet in accordance with ANSI/SDI-100.
- B. Core: Honeycomb.
- C. Edges: Standard Visible Edge Seam.
- D. Continuous channel reinforcement - 14 gage full perimeter.
- E. Glass Light: Designer Trim.
- F. Color: To be selected from manufacturer's standard color range.

2.4 ACCESSORIES

- A. Removable Stops: Rolled steel channel shape; mitered corners; prepared for countersunk type screws (18 gauge).

2.5 FABRICATION

- A. Astragals for Double Doors: Steel, T shaped, specifically for double doors.
- B. Fabricate doors with hardware reinforcement welded in place.
- C. Close top and bottom edge of exterior doors with inverted steel channel closure. Seal joints watertight.

2.6 FINISH

- A. All doors shall be cleaned, phosphatized and prime painted with (1) coat of baked-on prime paint capable of accepting an oil-based stain.
- B. The door shall be stained to simulate a wood door. The finished stained product shall be protected with a clear top coat incorporating UV inhibitors.
- C. If doors are field stained to match or touch up, the finished product shall be protected with a clear top

coat incorporating UV inhibitors.

- D. Color to be selected by Architect / Owner.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions under provisions of Division 1 - General Requirements.
- B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

- A. Install doors in accordance with ANSI/SDI-100 and DHI.
- B. Install glazing in accordance with FGMA Glazing and Sealant Manuals.
- C. Coordinate installation of doors with installation of frames specified in Section 081120 and hardware specified in Section 087100.
- D. Touch-up factory finished doors.

3.3 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.4 ADJUSTING

- A. Adjust work under provisions of Division 1 - General Requirements.
- B. Adjust door for smooth and balanced door movement.

END OF SECTION

**SECTION 081120
STANDARD STEEL FRAMES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-rated interior steel door frames.

1.2 RELATED SECTIONS

- A. Section 081110 – Standard Steel Doors.
- B. Section 099000 - Painting: Field painting of frames.

1.3 REFERENCES

- A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- B. ANSI/SDI-100 - Standard Steel Doors and Frames.
- C. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- D. DHI - Door Hardware Institute: The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- E. NFPA 80 - Fire Doors and Windows.
- F. NFPA 252 - Fire Tests for Door Assemblies.
- G. UL 10B - Fire Tests of Door Assemblies.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 - General Requirements.
- B. Shop Drawings: Indicate frame elevations, reinforcement, and finish.
- C. Product Data: Indicate frame configuration, anchor types and spacings, location of cut- outs for hardware, reinforcement.
- D. Manufacturer's Installation Instructions: Indicate special installation instructions.
- E. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of ANSI/SDI-100 and ANSI A117.1.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

- A. Fire Rated Frame Construction: Conform to ASTM E152, NFPA 252 and UL 10B.
- B. Installed Frame Assembly: Conform to NFPA 80 for fire rated class same as fire door.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Division 1 - General Conditions.
- B. Accept frames on site in manufacturer's packaging. Inspect for damage.

1.9 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.10 COORDINATION

- A. Coordinate work under provisions of Division 1 - General Requirements.
- B. Coordinate the work with frame opening construction, door and hardware installation.

PART 2 PRODUCTS

2.1 FRAME MANUFACTURERS

- A. Pioneer Product: Series F
- B. Substitutions: Under provisions of Division 1 - General Requirements.

2.2 FRAMES

- A. Interior Frames: 16 gage thick material, base metal thickness.

2.3 ACCESSORIES

- A. Silencers: Resilient rubber, fitted into drilled hole.
- B. Bituminous Coating: Fibered asphalt emulsion.
- C. Primer: Zinc chromate type.
- D. Mortar guard boxes.

2.4 FABRICATION

- A. Fabricate frames as welded unit in all CMU partitions.
- B. Fabricate frames as knock-down units in all GWB partitions; Knock-down frames to be field welded and ground after installation.
- C. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes.
- D. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
- E. Prepare frame for silencers. Provide three single silencers for single doors on strike side. Provide two single silencers on frame head at double doors without mullions.

- F. Fabricate frames to suit location with 2 inch or 4-inch head member or as indicated on Drawings.
- G. Jamb depth as indicated on Drawings and to suit application. GC to field verify all frame depths required.

2.5 FINISH

- A. Steel Sheet: Galvanized to ASTM A525 A60.
- B. Primer: Air dried.
- C. Coat inside of frame profile with bituminous coating to a thickness of 1/16 inch for frames in contact with masonry.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions under provisions of Division 1 - General Requirements.
- B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

- A. Install frames in accordance with ANSI/SDI-100 and DHI.
- B. Coordinate with masonry and wallboard wall construction for anchor placement.
- C. Coordinate installation of frames with installation of hardware specified in Section 087100 and doors in Section 081110.

3.3 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

END OF SECTION

**SECTION 087100
DOOR HARDWARE**

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Mechanical and electrified door hardware
 - 2. Electronic access control system components

- B. Section excludes:
 - 1. Windows
 - 2. Cabinets (casework), including locks in cabinets
 - 3. Signage
 - 4. Toilet accessories
 - 5. Overhead doors

- C. Related Sections:
 - 1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
 - 2. Division 06 Section "Rough Carpentry"
 - 3. Division 06 Section "Finish Carpentry"
 - 4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
 - 5. Division 08 Sections:
 - a. "Metal Doors and Frames"
 - b. "Flush Wood Doors"
 - c. "Stile and Rail Wood Doors"
 - d. "Interior Aluminum Doors and Frames"
 - e. "Aluminum-Framed Entrances and Storefronts"
 - f. "Stainless Steel Doors and Frames"
 - g. "Special Function Doors"
 - h. "Entrances"
 - 6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
 - 7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

- A. UL LLC
 - 1. UL 10B – Fire Test of Door Assemblies
 - 2. UL 10C – Positive Pressure Test of Fire Door Assemblies
 - 3. UL 1784 – Air Leakage Tests of Door Assemblies
 - 4. UL 305 – Panic Hardware

- B. DHI – Door and Hardware Institute
 - 1. Sequence and Format for the Hardware Schedule

2. Recommended Locations for Builders Hardware
 3. Keying Systems and Nomenclature
 4. Installation Guide for Doors and Hardware
- C. NFPA – National Fire Protection Association
1. NFPA 70 – National Electric Code
 2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
 3. NFPA 101 – Life Safety Code
 4. NFPA 105 – Smoke and Draft Control Door Assemblies
 5. NFPA 252 – Fire Tests of Door Assemblies
- D. ANSI – American National Standards Institute
1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
 2. ANSI/BHMA A156.1 – A156.29, and ANSI/BHMA A156.31 – Standards for Hardware and Specialties
 3. ANSI/BHMA A156.28 – Recommended Practices for Keying Systems
 4. ANSI/WDMA I.S. 1A – Interior Architectural Wood Flush Doors
 5. ANSI/SDI A250.8 – Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
 - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
 - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
 - a. Wiring Diagrams: For power, signal, and control wiring and including:
 - 1) Details of interface of electrified door hardware and building safety and security systems.
 - 2) Schematic diagram of systems that interface with electrified door hardware.
 - 3) Point-to-point wiring.
 - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule:
 - a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings.

Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.

- b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
- c. Indicate complete designations of each item required for each opening, include:
 - 1) Door Index: door number, heading number, and Architect's hardware set number.
 - 2) Quantity, type, style, function, size, and finish of each hardware item.
 - 3) Name and manufacturer of each item.
 - 4) Fastenings and other pertinent information.
 - 5) Location of each hardware set cross-referenced to indications on Drawings.
 - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for hardware.
 - 8) Door and frame sizes and materials.
 - 9) Degree of door swing and handing.
 - 10) Operational Description of openings with electrified hardware covering egress, Ingress (access), and fire/smoke alarm connections.

5. Key Schedule:

- a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
- b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
- c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
- d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
- e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
- f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

- 1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
- 2. Provide Product Data:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - b. Include warranties for specified door hardware.

D. Closeout Submittals:

- 1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Final approved hardware schedule edited to reflect conditions as installed.
 - d. Final keying schedule
 - e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
 - a. Fire door assemblies, in compliance with NFPA 80.
 - b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - a. For door hardware: DHI certified AHC or DHC.
 - b. Can provide installation and technical data to Architect and other related subcontractors.
 - c. Can inspect and verify components are in working order upon completion of installation.
 - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
 - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
 - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
2. Smoke and Draft Control Door Assemblies:
 - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
 - b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
3. Electrified Door Hardware
 - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
4. Accessibility Requirements:
 - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100,

1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

- C. Pre-Installation Meetings
 - 1. Keying Conference
 - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - 2) Preliminary key system schematic diagram.
 - 3) Requirements for key control system.
 - 4) Requirements for access control.
 - 5) Address for delivery of keys.
 - 2. Pre-installation Conference
 - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Inspect and discuss preparatory work performed by other trades.
 - c. Inspect and discuss electrical roughing-in for electrified door hardware.
 - d. Review sequence of operation for each type of electrified door hardware.
 - e. Review required testing, inspecting, and certifying procedures.
 - f. Review questions or concerns related to proper installation and adjustment of door hardware.
 - 3. Electrified Hardware Coordination Conference:
 - a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
 - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
 - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
 - a. Mechanical Warranty
 - 1) Locks
 - a) Schlage ND Series: 10 years
 - 2) Closers
 - a) LCN 4050 Series: 25 years

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
 - 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

- A. Fabrication
 - 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.

2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.
- C. Cable and Connectors:
1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
 2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
 3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

- A. Manufacturers and Products:
1. Scheduled Manufacturer and Product:
 - a. Ives 5BB series
 2. Acceptable Manufacturers and Products:
 - a. Hager BB1191/1279 series
 - b. Best FBB series
- B. Requirements:
1. Provide hinges conforming to ANSI/BHMA A156.1.
 2. Provide five knuckle, ball bearing hinges.
 3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
 4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
 5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
 6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
 7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
 8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
 9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CYLINDRICAL LOCKS – GRADE 1

- A. Manufacturers and Products:
1. Scheduled Manufacturer and Product:
 - a. Schlage ND series
 2. Acceptable Manufacturers and Products:
 - a. Sargent 11-Line
 - b. Corbin-Russwin CL3100 series
- B. Requirements:
1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
 2. Indicators: Where specified, provide escutcheon with lock status indicator window on top of lockset rose:
 - a. Escutcheon height (including rose) 6.05 inches high by 3.68 inches wide.
 - b. Indicator window measuring a minimum 3.52-inch by .60 inch with 1.92 square- inches of front facing viewing area and 180-degree visibility with a total of .236 square-inches of total viewable area.
 - c. Provide snap-in serviceable window to prevent tampering. Lock must function if indicator is compromised.
 - d. Provide messages color-coded with full text and symbol, as scheduled, for easy visibility.
 - e. Unlocked and Unoccupied message will display on white background, and Locked and Occupied message will display on red background.
 3. Cylinders: Refer to "KEYING" article, herein.
 4. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
 5. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
 6. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
 7. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
 8. Provide electrified options as scheduled in the hardware sets.
 9. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
 - a. Lever Design: RHO (Rhodes)

2.05 DEADBOLTS

- A. Manufacturers and Products:
1. Scheduled Manufacturer and Product:
 - a. Schlage B600 Series
 2. Acceptable Manufacturers and Products:
 - a. Sargent 480 Series
 - b. Marks 130 Series
- B. Requirements:
1. Provide grade 1 deadbolt series conforming to ANSI/BHMA A156.
 2. Cylinders: Refer to "KEYING" article, herein.
 3. Provide deadbolts with standard 2-3/4 inches (70 mm) backset. Provide 2-3/8 inches (60 mm) where noted or if door or frame detail requires. Provide deadbolt with full 1-inch (25 mm) throw, constructed of steel alloy.
 4. Provide manufacturer's standard strike.
 5. Lock Status Indicator Trim: Where specified, provide escutcheon with lock status indicator widow.
 - a. Escutcheon height 4.125 inches, width 2.54 inches. Projection 1.32 inches on thumb turn side and 1.28 inches on cylinder side.
 - b. Unlocked and Unoccupied message will display on white background, and Locked and Occupied message will display on red background.
 - c. Provide snap-in serviceable window to prevent tampering. Lock must function if indicator is compromised.
 - d. Indicator window to provide 180-degree visibility.

2.06 CYLINDERS

- A. Manufacturers:
 - 1. Scheduled Manufacturer and Product:
 - a. MEDECO
 - 2. Acceptable Manufacturers and Products:
 - a. No Substitute – Match owners existing key system.
- B. Requirements:
 - 1. Provide cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

2.07 KEYING

- A. Scheduled System:
 - 1. Existing factory registered system:
 - a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B. Requirements:
 - 1. Construction Keying:
 - a. Replaceable Construction Cores.
 - 1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - a) 3 construction control keys
 - b) 12 construction change (day) keys.
 - 2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.
 - 2. Permanent Keying:
 - a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - 1) Master Keying system as directed by the Owner.
 - b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - c. Provide keys with the following features:
 - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - 3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.
 - d. Identification:
 - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
 - 2) Identification stamping provisions must be approved by the Architect and Owner.
 - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 - e. Quantity: Furnish in the following quantities.
 - 1) Permanent Control Keys: 3.
 - 2) Master Keys: 6.
 - 3) Change (Day) Keys: 3 per cylinder/core that is keyed differently

- 4) Key Blanks: Quantity as determined in the keying meeting.

2.08 DOOR CLOSERS

- A. Manufacturers and Products:
1. Scheduled Manufacturer and Product:
 - a. LCN 4050A series
 2. Acceptable Manufacturers and Products:
 - a. Norton 7500 series
 - b. Sargent 351 series
- B. Requirements:
1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
 2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
 3. Closer Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
 4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
 5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
 6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
 7. Pressure Relief Valve (PRV) Technology: Not permitted.
 8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.09 DOOR TRIM

- A. Manufacturers:
1. Scheduled Manufacturer:
 - a. Ives
 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
- B. Requirements:
1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.10 PROTECTION PLATES

- A. Manufacturers:
1. Scheduled Manufacturer:
 - a. Ives
 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco
- B. Requirements:
1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
 2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
 3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.11 DOOR STOPS AND HOLDERS

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Ives
 - 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

- B. Provide door stops at each door leaf:
 - 1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumb turn.
 - 2. Where a wall stop cannot be used, provide universal floor stops.
 - 3. Where wall or floor stop cannot be used, provide overhead stop.
 - 4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.12 SILENCERS

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Ives
 - 2. Acceptable Manufacturers:
 - a. Burns
 - b. Trimco

- B. Requirements:
 - 1. Provide "push-in" type silencers for hollow metal or wood frames.
 - 2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
 - a. Zero International
 - b. No Substitute
 - c. National Guard
 - d. Reese
 - e. Pemko
 - 3. Omit where gasketing is specified.

2.13 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

- A. Manufacturers:

- B. Scheduled Manufacturer:
 - 1. Zero International

- C. Acceptable Manufacturers:
 - 1. National Guard
 - 2. Reese

- D. Seals and Gasketing: Provide continuous gasketing on exterior openings, to the head and jambs, forming a continuous seal between the door and the frame. Provide smoke, light, or sound gasketing on interior doors where indicated.
 - 1. Provide self-tapping fasteners for aluminum extruded gasketing being applied to hollow metal frames.
 - a. Provide non-corrosive fasteners for all exterior applications.
 - b. Provide security fasteners where indicated.
 - 2. Provide neoprene, EPDM, silicone, or nylon brush inserts as specified in hardware sets. Provide non brush inserts of solid or sponge cell, as specified in hardware sets. Vinyl inserts are not allowed except where specified in hardware sets.

- E. Smoke Labeled Gasketing: At all smoke labeled openings, provide smoke listed perimeter gasketing assemblies complying with NFPA 105 listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for smoke control ratings indicated based on testing according to UL 1784.
- F. Fire Listed Gasketing: Assemblies complying with NFPA 80 that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction for fire ratings indicated based on testing according to UL-10C.
 - 1. Where frame-applied intumescent seals are required by the manufacturer, provide gaskets that comply with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies and UBC 7-2, Fire Tests of Door Assemblies.
- G. Sound-Rated Gasketing: Provide acoustic gasketing to meet Sound Transmission Class (STC) rating required.
- H. Meeting-Stile Gasketing: Provide meeting-stile gasketing that fastens to the meeting stiles forming a continuous seal when doors are closed.
- I. Door Sweeps or Shoes: Apply to the bottom of the door to close the gap between the door bottom and finished floor or saddle threshold.
 - 1. Provide solid neoprene, EPDM, silicone, or nylon brush type of seal as specified in hardware sets. Vinyl inserts are not allowed except where specified in hardware sets.
- J. Automatic Door Bottoms:
 - 1. Provide closed cell sponge, bulb neoprene. or EPDM type of seal as specified in hardware sets.
 - 2. Door bottom to be mortised, semi mortised, or surface mount as with a minimum thickness as specified in hardware sets.
- K. Rain Drips:
 - 1. Provide overhead rain drips for out-swinging hollow metal doors that are not covered against 45 degree blowing rain. Aluminum extrusion to be a minimum of .088 inches thick and extend 2.50 inches from the face of the frame, in anodized finish to match door.
 - 2. Door sweeps or shoes with integral rain drip must meet ADA requirements
- L. Thresholds: Provide threshold units not less than 4 inches wide, formed to accommodate change in floor elevation where indicated, and fabricated to accommodate door hardware and fit door frames.
 - 1. Threshold extrusion to be a minimum thickness as specified in hardware sets.

2.14 COAT HOOKS

- A. Manufacturers:
 - 1. Scheduled Manufacturer:
 - a. Ives
 - 2. Acceptable Manufacturers:
 - a. Burns
- B. Provide coat hooks as specified.

2.15 FINISHES

- A. FINISH: BHMA 626/652 (US26D); EXCEPT:
 - 1. Hinges at Exterior Doors: BHMA 630 (US32D)
 - 2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
 - 3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
 - 4. Protection Plates: BHMA 630 (US32D)
 - 5. Overhead Stops and Holders: BHMA 630 (US32D)

6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 2. Custom Steel Doors and Frames: HMMA 831.
 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Lock Cylinders:
 1. Install construction cores to secure building and areas during construction period.
 2. Replace construction cores with permanent cores as indicated in keying section.
 3. Furnish permanent cores to Owner for installation.
- J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
 2. Connections to and from power supplies to electrified hardware.
 3. Connections to fire/smoke alarm system and smoke evacuation system.
 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
 5. Connections to panel interface modules, controllers, and gateways.
 6. Testing and labeling wires with Architect's opening number.
- K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- L. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.
- M. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- N. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
- P. Thresholds:
1. Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
 2. Aluminum thresholds to be cut-in, and scribed around mullions, frame members, and stops. Do not butt to thresholds. Provide a continuous surface across full width of opening from jamb to jamb.
 3. Where aluminum panic-type (rabbeted) thresholds with neoprene inserts are specified, undercut doors as required to properly mate with seal in threshold.
- Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- R. Perimeter Gasketing:
1. Apply to head and jamb, forming seal between door and frame.
 2. Install gasketing in a manner eliminating need to cut any seal to install surface mounted hardware. Install compatible mounting bracket for surface mounted hardware unless minimum ¼ inch thick solid aluminum seals are provided for mounting of surface applied hardware.
- S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- T. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer’s instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier’s responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

Abbreviation	Name
IVE	H.B. Ives
LCN	LCN Commercial Division
MED	Medeco High Security Locks Inc
SCH	Schlage Lock Company
ZER	Zero International Inc

Legend:







-  Link to catalog cut sheet
-  Electrified Opening

Hardware Group No. 01

For use on Door #(s):

B1 B2 B6 G1 G2 G5

Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
1	EA	CONTINUOUS HINGE	112XY		628	IVE
1	EA	CLASSROOM LOCK	ND70BD RHO		626	SCH
1	EA	SFIC CONSTRUCTION CORE	SFIC 7 PIN CORE		626	MED
1	EA	SFIC PERMANENT CORE	SFIC 7 PIN CORE		626	MED
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		626	IVE
1	EA	WEATHERSTRIPPING	9188BK 20FT (6096MM) PSA		BK	ZER








** PROVIDE ANY APPROPRIATE FILLERS FOR EXISTING PREPS AS REQUIRED.

Hardware Group No. 02

For use on Door #(s):

B4 G6

Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
1	EA	CONTINUOUS HINGE	112XY		628	IVE
1	EA	PRIVACY LOCK W/ OUTSIDE INDICATOR	ND40S RHO OS-OCC		626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		626	IVE
1	EA	COAT AND HAT HOOK	507		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

SINGLE TOILETS







** PROVIDE ANY APPROPRIATE FILLERS FOR EXISTING PREPS AS REQUIRED.

Hardware Group No. 03

For use on Door #(s):

B3 B5 G3 G4

Provide each SGL door(s) with the following:

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>		<u>FINISH</u>	<u>MFR</u>
1	EA	CONTINUOUS HINGE	112XY		628	IVE
1	EA	STOREROOM LOCK	ND80BD RHO		626	SCH
1	EA	SFIC CONSTRUCTION CORE	SFIC 7 PIN CORE		626	MED
1	EA	SFIC PERMANENT CORE	SFIC 7 PIN CORE		626	MED
1	EA	SURFACE CLOSER	4050A REG OR PA AS REQ		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		626	IVE
3	EA	SILENCER	SR64		GRY	IVE

. ** PROVIDE ANY APPROPRIATE FILLERS FOR EXISTING PREPS AS REQUIRED.

END OF SECTION

**SECTION 092600
GYPSUM BOARD SYSTEMS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gypsum Board utilized for patching/replacing existing GWB ceilings where applicable.
- B. Taped and sanded joint treatment.
- C. Accessories.

1.2 RELATED SECTIONS

- A. Section 099000 - Painting: Surface finish.
- B. Division 23 - Mechanical.
- C. Division 26 - Electrical.

1.3 REFERENCES

- A. ASTM C36 - Gypsum Wallboard.
- B. ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.
- C. ASTM C630 - Water Resistant Gypsum Backing Board.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C840 and GA-600.

1.5 QUALIFICATIONS

- A. Applicator: Company specializing in performing the work of this section with minimum 3 years documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS - GYPSUM BOARD SYSTEM

- A. USG
- B. Georgia-Pacific Gypsum Products.
- C. Substitutions: Under Provisions of Division 1 – General Requirements.

2.2 GYPSUM BOARD MATERIALS

- A. Moisture Rated Gypsum Board: ASTM 630; thickness to match existing, maximum permissible length; ends square cut, tapered edges; USG Sheetrock Brand UltraLight Panels Mold Tough or approved equal.

2.3 ACCESSORIES

- A. Corner Beads: Metal.
- B. Joint Materials: ASTM C475; reinforcing tape, joint compound, adhesive, and water.
- C. Fasteners: ASTM C1002.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions.
- B. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

3.2 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with GA-201, GA-216 and GA-600.
- B. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing. Provide double layer at rated partitions; install in accordance with approved assembly.
- C. Use screws when fastening gypsum board to wood stud or framing.
- D. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
- E. Remove and redo defective work.

3.3 JOINT TREATMENT

- A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
- B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
- C. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.

3.4 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

**SECTION 093030
CERAMIC TILE**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Porcelain tile floor finish and base using the thinset application method.
- B. Ceramic tile wall finish using the thinset application method.
- C. Thresholds at door openings, shower curbs and flooring transitions.

1.2 RELATED SECTIONS

- A. Section 043000 – Unit Masonry System.
- B. Section 079000 - Joint Sealers: Mildew resistant sealant.

1.3 REFERENCES

- A. ANSI A108.5 - Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
- B. ANSI A108.10 - Installation of Grout in Tilework.
- C. ANSI A118.4 - Bonding Mortars.
- D. ANSI A118.6 - Ceramic Tile Grouts.
- E. ANSI A137.1 - Standard Specifications for Ceramic Tile.
- F. TCA (Tile Council of America) - Handbook for Ceramic Tile Installation.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 - General Requirements.
- B. Samples: Submit product literature and samples as noted in administrative sections.
- C. Product Data: Provide instructions for using adhesives and grouts.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 MAINTENANCE DATA

- A. Submit under provisions of Division 1 - General Requirements.
- B. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI A137.1.
- B. Conform to TCA Handbook, ANSI A108.5 and ANSI A108.4.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum 3 years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Division 1 - General Requirements.
- B. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesives in an unventilated environment.
- B. Maintain 50 degrees F during installation of mortar materials.

1.10 EXTRA MATERIALS

- A. Furnish under provisions of Division 1 - General Requirements.
- B. Provide 40 s.f. total, of size, colors and surface finish of tile specified in quantities equal to proportion specified.

PART 2 PRODUCTS

2.1 TILE MANUFACTURERS

- A. Dal-Tile.
- B. Substitutions: Under provisions of Division 1 - General Requirements.

2.2 CERAMIC TILE MATERIALS

- A. Glazed Porcelain Floor Tile and Base: Dal-Tile Keystones Colorbody Porcelain Mosaics; ANSI A137.1, conforming to the following:

1. Moisture Absorption 0 to 0.5
2. Size 2" x 2" x 1/4"
3. Shape square
4. Edge square
5. Base coved; 3 pc x 6 pc Build up cove base with bull-nose (5x12 sheet)
6. Surface Finish glazed with stepwise technology
7. Color To Be Selected (Assume 2 colors, All price groups)

Note: Provide 5" High Coved porcelain tile base including all inside and outside corners and all special shapes required.

- B. Ceramic Mosaic Wall Tile: Dal-Tile Color Wheel Classic; ANSI A137.1, conforming to the following:
 1. Moisture Absorption 0.0 to 0.5 percent
 2. Size 4" x 4"
 3. Shape square
 4. Edge square
 5. Surface Finish glazed
 6. Color To Be Selected – Price Group 1 & 2 Note: Ceramic Wall Tile Installed in P.E. Office Toilet Room Showers as Shown on Drawings.

2.3 MORTAR MATERIALS – WALL TILE OVER CMU WHERE APPLICABLE

- A. Wall Render: MAPEI Modified Mortar Bed; as needed to achieve substrate flatness.
- B. Waterproofing/Crack Isolation Membrane: Mapelastic AquaDefense; as deemed necessary.
- C. Cementitious Bond Coat for New Tile: MAPEI Keraflex Super.

2.4 MORTAR MATERIALS – FLOOR TILE OVER EXISTING CONCRETE FLOOR SLABS

- A. Floor Patch: Mapecem Quickpatch
- B. Sloped Mortar Bed Bond Coat: 4 to 1 Mud Bed Mix with Planicrete AC.
- C. Mortar Bed Bond Coat for New Tile: Keraflex Super
- D. Waterproofing / Crack Isolation Membrane: Mapelastic Aqua Defense; as deemed Necessary.
- E. Cementitious Bond Coat for New Tile: Keraflex Super

2.5 GROUT MATERIALS

- A. Grout: MAPEI Flexcolor CQ ready-to-use grout; colors as selected by Architect.
- B. Sealant for Movement Joints: MAPEI Mapesil TPlus; colors as selected by Architect.

2.6 ACCESSORIES

- A. Thresholds: Marble type, color to be selected, honed finish, full width of frame opening, beveled both sides.
- B. Flashpatch: MAPEI Keraflex Super

2.7 MORTAR MIX AND GROUT MIX

- A. Mix and proportion pre-mix setting bed and grout materials with additives in accordance with manufacturer's instructions. and TCA Handbook.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate under provisions of Division 1 - General Requirements.
- B. Verify that surfaces are ready to receive work.

3.2 PREPARATION

- A. Protect surrounding work from damage or disfiguration.
- B. Vacuum clean surfaces and damp clean, if required.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Apply sealer to substrate surfaces in accordance with adhesive manufacturer's instructions.
- E. Prep existing concrete floors in accordance with Bond Coat and Tile manufacturer recommendations to guarantee a suitable substrate.

- F. Prep existing CMU walls in accordance with Bond Coat and Tile manufacturer recommendations to guarantee a suitable substrate.
- G. Prep existing and new CMU walls and existing concrete floors in accordance with MAPEI "Surface Preparation Requirements" reference guide.
- H. At existing CMU wall construction abrading/removal of existing paint finish is required. Prep existing CMU as recommended by tile and bond coat manufacturer.
- I. Install flexible sealant at all corners, changes in plane, floor drains, and at every 8 to 12 linear feet in both directions in accordance with the TCNA Handbook.

3.3 INSTALLATION - THINSET METHOD

- A. Install adhesive, tile, thresholds, and grout in accordance with manufacturer's instructions and to TCNA Handbook.
- B. Place thresholds edge strips at exposed tile edges and locations indicated.
- C. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- E. Sound tile after setting. Replace hollow sounding units.
- F. Allow tile to set for a minimum of 48 hours prior to grouting.
- G. Grout tile joints in accordance with manufacturer's directions and comply with ANSI A108.1. Grouting is not complete until all grout haze and residue are removed from the surface of the tile.
- H. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.
- I. Comply with ANSI A108.5 and TCNA for appropriate method of installation. Press and beat tile into place to obtain as near 100% coverage as possible.

3.4 CLEANING

- A. Clean work under provisions of Division 1 - General Requirements.
- B. Clean tile and grout surfaces.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Division 1 - General Requirements.
- B. Do not permit traffic over finished floor surface for 4 days after installation.
- C. Protect all floor tile installations with Kraft paper or other heavy coating during construction period to prevent stains or damage.

END OF SECTION

**SECTION 095110
SUSPENDED ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system and perimeter trim.
- B. Acoustical tile.

1.2 REFERENCES

- A. ASTM C635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- B. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
- C. ASTM E1264 - Classification of Acoustical Ceiling Products.
- D. Ceilings and Interior Systems Contractors Association (CISCA) - Acoustical Ceilings: Use and Practice.

1.3 SYSTEM DESCRIPTION

- A. Suspension system to rigidly secure acoustical ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 - General Requirements.
- B. Product Data: Provide data on metal grid system components and acoustical units.
- C. Samples: Submit two samples full size illustrating material and finish of acoustical units.
- D. Samples: Submit two samples each, of suspension system main runner, cross runner, and edge trim.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.5 QUALIFICATIONS

- A. Grid Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for combustibility requirements for materials.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.8 SEQUENCING

- A. Sequence work under the provisions of Division 1 - General Requirements.

- B. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install acoustical units after interior wet work is dry.

1.9 EXTRA MATERIALS

- A. Furnish under provisions of Division 1 - General Requirements.
- B. Provide two unopened boxes of each tile to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS - SUSPENSION SYSTEM

- A. Armstrong Contract Interiors.
- B. Substitutions: Under provisions of Division 1 - General Requirements.

2.2 SUSPENSION SYSTEM MATERIALS

- A. Non-fire Rated Grid: ASTM C635, intermediate duty; exposed T; components die cut and interlocking; hot dipped galvanized. Product: Prelude 15/16" T-bar grid suspension system.
- B. Grid Finish: Prelude 15/16" Grid - White.
- C. Accessories: Stabilizer bars, hold-down clips, splices, edge and moldings required for suspended grid system.
- D. Support Channels and Hangers: Hot dipped galvanized; size and type to suit application and ceiling system flatness requirement specified.

2.3 MANUFACTURERS - ACOUSTICAL UNITS

- A. Armstrong Contract Interiors.
- B. Substitutions: Under provisions of Division 1 - General Requirements.

2.4 ACOUSTICAL UNIT MATERIALS

- A. Acoustical Tile – Armstrong Fine Fissured No. 1729; conforming to the following:
 - 1. Size: 24 x 48 inches.
 - 2. Thickness: 5/8 inch.
 - 3. Composition: Wet-formed mineral fiber.
 - 4. NRC Range: .50-.60
 - 5. CAC Range: 33
 - 6. Edge Detail: Square lay-in.
 - 7. Surface Burning Characteristics: Flame spread 25 or under.
 - 8. Grid: 15/16 inch.
 - 9. Color: White.
 - 10. Factory applied vinyl latex paint.
 - 11. Humidity Resistance: Humiguard Plus.

2.5 ACCESSORIES

- A. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Division 1 - General Requirements.
- B. Verify that layout of hangers will not interfere with other work.

3.2 INSTALLATION - LAY-IN GRID SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636 and manufacturer's instructions and as supplemented in this section.
- B. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.
- C. Locate system on room axis according to reflected ceiling plan.
- D. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Do not eccentrically load system, or produce rotation of runners.
- I. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.

3.3 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units one way with pattern parallel to room axis. Fit border trim neatly against abutting surfaces.
- D. Install units after above ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp and dents.
- F. Cut tile to fit irregular grid and perimeter edge trim. Field rabbet tile edge. Double cut and field paint exposed edges of regular units.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees

END OF SECTION

**SECTION 096723
RESINOUS QUARTZ FLOORING**

RESUFLO DECO QUARTZ DB23 EPOXY FLOORING SYSTEM (3/16") – DOUBLE BROADCAST (Q11) STANDARD TEXTURE WITH URETHANE TOPCOAT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes the following:
 - 1. Quartz flooring system as shown on the drawings and in schedules.
- B. Related sections include the following:
 - 1. Cast-in-Place Concrete, section 033000

1.3 SYSTEM DESCRIPTION

- A. The work shall consist of preparation of the substrate, the furnishing and application of an epoxy based multi roller applied flooring system with Q 11 colored quartz aggregate and urethane topcoat. The system shall have the color and texture as specified by the Owner with a nominal thickness of 3/16 inch. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
- B. Cove base to be applied where noted on plans and per manufacturers standard details.

1.4 SUBMITTALS

- A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
- B. Manufacturer's Safety Data Sheet (SDS) for each product being used.
- C. Samples: A 3-inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system.

1.5 QUALITY ASSURANCE

- A. The Manufacturer shall have a minimum of 10 years' experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.
- B. The Applicator shall have been approved by the flooring system manufacturer in all phases of surface preparation and application of the product specified.
- C. No requests for substitutions shall be considered that would change the generic type of the specified System.
- D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.
- E. System shall be in compliance with the Indoor Air Quality requirements of California section 01350 as verified by a qualified independent testing laboratory.

- F. Mock-up: Install a mock-up to be approved by the owner or owner's representative in writing.
- G. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping
 - 1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.
- B. Storage and Protection
 - 1. The Applicator shall be provided with a storage area for all components. The area shall be between 60 F and 90 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
 - 2. Copies of Safety Data Sheets (SDS) for all components shall be kept on site for review by the Engineer or other personnel.
- C. Waste Disposal
 - 1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.7 PROJECT CONDITIONS

- A. Site Requirements
 - 1. Application may proceed while air, material and substrate temperatures are between 60 F and 90 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
 - 2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
 - 3. The Applicator shall ensure that adequate ventilation is available for the work area.
 - 4. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.
- B. Conditions of new concrete to be coated with epoxy material.
 - 1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured a minimum of twenty-eight days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
 - 2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
 - 3. Sealers and curing agents should not to be used.
 - 4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Safety Requirements

1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
2. "No Smoking" signs shall be posted at the entrances to the work area.
3. The Owner shall be responsible for the removal of foodstuffs from the work area.
4. Non-related personnel in the work area shall be kept to a minimum.

1.8 WARRANTY

- A. The Sherwin-Williams Co. warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to Sherwin-Williams' published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.
- B. Sherwin-Williams liability with respect to this warranty is strictly limited to the value of the material purchase.
- C. One-year standard material warranty.

PART 2 – PRODUCTS

2.1 FLOORING

- A. Sherwin-Williams Co., Resufloor Deco Quartz DB23, Epoxy-Based seamless flooring system; or approved equal.
 1. System Materials:
 - a. Primer: Sherwin-Williams Co., Resufloor Glaze primer resin and hardener.
 - b. Broadcast Coats: Sherwin-Williams Co., Resufloor Glaze resin and hardener.
 - c. The first and second broadcast of quartz aggregate shall be Dur-A-Flex, Inc. Sherwin-Williams Co. Q-11 colored quartz aggregate.
 - d. Grout coat: Sherwin-Williams Co., Resufloor Ultra resin and hardener.
 - e. Topcoat: Sherwin-Williams Co., Resutile AT resin, hardener, and grit.
 - f. Cove base: Resufloor Cove Rez; installed at room perimeter and at all concrete locker bases.
 2. Patch Materials
 - a. Shallow Fill and Patching: Use Sherwin-Williams Co., Resufloor Cove Rez.
 - b. Deep Fill and Sloping Material (over ¼ inch): Use Sherwin-Williams Co., Resufloor Screed

2.2 MANUFACTURER

- A. The Sherwin-Williams Co., 95 Goodwin Street, East Hartford, CT 06108, Phone: 866-540- 1299, email: swflooring@sherwin.com, Website: <https://industrial.sherwin-williams.com/na/us/en/resin-flooring.html>
- B. Manufacturer of Approved System shall be single source and made in the USA.

2.3 PRODUCT REQUIREMENTS

A. Primer	Resufloor Glaze Primer
1. Percent Solids	56 %
2. VOC	2 g/L
3. Bond Strength to Concrete ASTM D 4541	550 psi, substrates fails
4. Hardness, ASTM D 3363	3H
5. Elongation, ASTM D 2370	9 %
6. Flexibility (1/4: Cylindrical mandrel), ASTM D 1737	Pass
7. Impact Resistance, MIL D-2794	>160
6. Abrasion Resistance ASTM D 4060,	

CS 17-wheel, 1,000 g Load 30 mg loss

B. Broadcast Coat and Grout Coat	Resufloor Glaze
1. Percent Solids	100 %
2. VOC	0 g/L
3. Compressive Strength, ASTM D 695	16,000 psi
4. Tensile Strength, ASTM D 638	3,700 psi
5. Flexural Strength, ASTM D 790	4,700 psi
6. Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles	35 mg loss
7. Flame Spread/NFPA-101, ASTM E 84	Class A
8. Izod Impact ASTM D-256	0.50
9. Water Absorption ASTM D-570	0.04%
10. Potlife @ 70 F	20 minutes

C. Topcoat	Resutile AT
1. Percent Solids	95.2 %
2. VOC	0 g/L
3. Tensile Strength, ASTM D 2370	7,000 psi
4. Adhesion, ASTM 4541	Substrate Failure
5. Hardness, ASTM D 3363	>4H
6. 60° Gloss ASTM D 523	Satin 50+/-10 / Gloss 75+/-10
7. Abrasion Resistance, ASTM D4060 CS 17 wheel (1,000 g load) 1,000 cycles	Gloss Satin 4 8 mg loss with grit
	12 mg loss without grit
8. Pot Life, 70 F, 50% RH	45 minutes
9. Full Chemical Resistance	7 days

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
 - 1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 PREPARATION

- A. General
 - 1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
 - 2. Moisture Testing: Perform tests recommended by manufacturer and as follows:
 - a. Perform anhydrous calcium chloride test ASTM F 1869-98. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 3 lbs./1,000 sf/24 hrs.
 - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.
 - c. If the vapor emission exceeds 75 % relative humidity or 3 lbs./1,000 sf/24 hrs. then Sherwin-Williams Co., Resuprime MVP moisture mitigation system must be installed prior to resinous flooring installation. Slab-on grade substrates without a vapor barrier may also require the moisture mitigation system.
 - 3. There shall be no visible moisture present on the surface at the time of application of the system. Compressed oil-free air and/or a light passing of a propane torch may be used to dry the substrate.

4. Mechanical surface preparation
 - a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 3-4 as described by the International Concrete Repair Institute.
 - b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
 - c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4-inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
 - d. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.
5. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.3 APPLICATION

A. General

1. The system shall be applied in six distinct steps as listed below:
 - a. Substrate preparation
 - a. Priming
 - b. First broadcast coat application with first aggregate broadcast
 - c. Second broadcast coat with second aggregate broadcast
 - d. Grout coat application, sand floor (if required)
 - e. Topcoat application
2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Primer

1. The primer shall consist of a liquid resin and hardener that is mixed at the ratio of 1 part resin to 4 parts hardener per the manufacturer's instructions.
2. The primer shall be applied by 1/8-inch notched squeegee and back rolled at the rate of 200-250 sf/gal to yield a dry film thickness of 4 mils.

C. Broadcast Coat

1. The broadcast coat shall be applied as a double broadcast system as specified by the Architect.
2. The broadcast coat shall be comprised of two components, a resin, and hardener as supplied by the Manufacturer and mixed in the ratio of 2 parts resin to 1 part hardener.
3. The resin shall be added to the hardener and thoroughly mixed by suitably approved mechanical means.
4. The broadcast coat shall be applied over horizontal surfaces using "v" notched squeegee and back rolled at the rate of 90-100 sf/gal.
5. Colored quartz aggregate shall be broadcast to excess into the wet material at the rate of 0.5 lbs./sf.
6. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.
7. Apply a second coat of resin with a coverage rate of 50 sf/gal and broadcast aggregate to excess at the rate of 0.5 lbs./sf.
8. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

D. Grout Coat

1. The grout coat shall be comprised of a liquid resin and a liquid hardener that is mixed in the ratio of 1 part hardener to 2 parts resin and installed per the manufacturer's recommendations.

2. The grout coat shall be squeegee applied and back rolled with a coverage rate of 50 sf/gal.

E. Topcoat

1. The topcoat of Armor Top shall be roller applied at the rate of 500 sf/gal to yield a dry film thickness of 3 mils.
2. The topcoat shall be comprised of a liquid resin, hardener and grit that is mixed per the manufacturer's instructions.
3. The finish floor will have a nominal thickness of 3/16 inch.

3.4 FIELD QUALITY CONTROL

A. Tests, Inspection

1. The following tests shall be conducted by the Applicator:
 - a. Temperature
 1. Air, substrate temperatures and, if applicable, dew point.
 - b. Coverage Rates
 1. Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.5 CLEANING AND PROTECTION

- A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
- B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION

**SECTION 099000
PAINTING**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation and field application of paints and coatings.

1.2 RELATED SECTIONS

- A. Section 081120 – Standard Steel Frames.
- B. Section 092600 – Gypsum Board Systems.

1.3 REFERENCES

- A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

1.4 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this Section.

1.5 SUBMITTALS

- A. Product Data: Provide data on all finishing products and special coatings.
- B. Samples: Submit samples illustrating range of colors and textures available for each surface finishing product scheduled.
- C. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- D. Manufacturer's Safety Data Sheet (MSDS) for each product used.

1.6 QUALITY ASSURANCE

- A. Single Source
 - 1. Provide primers and other undercoat paints produced by same manufacturer as finish coats for each application.
 - 2. Use only thinners approved by paint manufacturer and use only with recommended limits.
- B. Coordination of Work
 - 1. Review other sections of these Specifications in which prime paints are to be provided, to ensure compatibility of total coatings system.
 - 2. Upon request from other trades, furnish information or characteristics of proposed finish materials, to ensure that compatible prime coats are used.
- C. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Applicator: Company specializing in performing the work of this section with minimum years documented experience and where applicable, approved by manufacturer.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable codes, standards and specifications referenced in this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 EXTRA MATERIALS

- A. Provide 1 unopened gallon of each color, type, and surface texture to Owner.
- B. Label each container with color, type, texture, and room locations, in addition to the manufacturer's label.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Sherwin Williams.
- B. MAB.
- C. Benjamin Moore.
- D. Finnaren & Haley.

2.2 MATERIALS

- A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2.3 FINISHES

- A. Refer to schedule at end of section for surface finish schedule.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions.
- B. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Interior Wood: 15 percent, measured in accordance with ASTM D2016.

3.2 PREPARATION

- A. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Correct defects and clean surfaces which affect work of this section.
- C. Seal with shellac and seal marks which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- F. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- G. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- H. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- I. Clean and prepare all surfaces in accordance with manufacturer's written specifications.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply each coat to uniform finish.

- D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Sand wood and metal lightly between coats to achieve required finish.
- F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
- G. Allow applied coat to dry before next coat is applied.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.
- J. Prime concealed surfaces of interior and exterior woodwork with primer paint.

3.4 CLEANING

- A. Clean work.
- B. Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.5 SCHEDULE - INTERIOR SURFACES

- A. Steel - Unprimed:
 - 1. One coat of primer: Sherwin Williams: Pro Industrial Procryl Primer, B66-310.
 - 2. Two coats of semi-gloss finish: Sherwin Williams: Pro Industrial HP Acrylic, B66- 600. Assume two (2) colors.
- B. Steel - Primed:
 - 1. One coat of primer: Sherwin Williams: Pro Industrial Procryl Primer, B66-310.
 - 2. Two coats of semi-gloss finish: Sherwin Williams: Pro Industrial HP Acrylic, B66- 600. Assume two (2) colors.
- C. Gypsum Board:
 - 1. One coat of latex primer sealer, Sherwin Williams: Promar 200 Zero VOC Interior Latex Primer B28-2600.
 - 2. Two coats of eggshell finish, Sherwin Williams: Promar 200 Zero VOC Interior Latex Eg-Shel, B20-2600. Assume three (3) colors.
- D. CMU:
 - 1. One coat primer/void filler: Sherwin Williams Heavy Duty Block Filler, B42W46.
 - 2. Two coats acrylic epoxy semi-gloss finish; Sherwin Williams Pro-Industrial Pre- catalyzed WB Epoxy, K46. Assume two (2) colors.

Note: General contractor to confirm all color selections and sheens with Owner prior to completing work.

END OF SECTION

**SECTION 101550
PLASTIC TOILET PARTITIONS**

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. Plastic Toilet Partitions
- B. Plastic Urinal/Entrance Screens
- C. Plastic Shower Dividers
- D. Plastic Dressing Compartments

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Division 5 Section "Metal Fabrications" for supports that attach units to overhead structural system.
- C. Wall backing to anchor wall brackets for Toilet Partitions, Urinal/Entrance Screens, Shower Dividers and Dressing Compartments.
- D. Division 10, Section 10800 "Toilet and Bath Accessories"

1.03 REFERENCES

- A. American Society for Testing and Materials:
 - 1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Material
 - 2. ASTM D1037 Direct Screw Withdrawal Test
 - 3. ASTM D570 Standard Test Method for Water Absorption
 - 4. ASTM A167, 18-8, Type 304 Cast Stainless Steel
 - 5. ASTM D638 Standard Test Method for Tensile Properties of Plastics
 - 6. ASTM D790 Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics
 - 7. ASTM D1693 Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics
- B. National Fire Protection Association (NFPA).
- C. UBC – Requirements for Handicapped.
- D. ADA, Accessibility Guidelines for Buildings and Facilities.
- E. Southern Building Code.

1.04 QUALITY STANDARDS

- A. Flame Spread: When tested in accordance with ASTM E84, Toilet Partition, Urinal/Entrance Screen, Shower Divider and Dressing Compartment materials shall meet or exceed all requirements for Class B Flame Spread Rating and Smoke Developed and shall carry a Class B Fire Rating Certification in accordance with the requirements of NFPA and ICC. Class B Fire Rating Certification shall be in the name of the Toilet Partition Manufacturer and shall be less than six (6) months old.
 - 1. Flame Spread shall not exceed 75.
 - 2. Smoke Developed shall not exceed 450.

- B. Impact Resistance Requirements: When tested in accordance with ASTM D2794, Partition materials shall withstand an Impact Force Value in excess of 45 inch-lbs.
- C. Screw Holding Strength: When tested in accordance with ASTM D1037, Direct Screw Withdrawal Test, Partition materials shall withstand a direct pull force that exceeds 1,100 lbs. per fastener.
- D. Tensile Strength: When tested in accordance with ASTM D638, Partition materials shall have a Tensile Modulus of 339,000 PSI, a Tensile Strength at Yield of 4500 PSI, and a Tensile Strength at Break of 2030 PSI.
- E. Flexural Properties: When tested in accordance with ASTM D790 Partition materials shall have a Flexural Modulus of 235,000 PSI.
- F. Environmental Stress-Crack Resistance: When tested in accordance with ASTM D1693, Partition material shall exceed 15.0 HR.
- G. Water Absorption Requirements: When tested in accordance with ASTM D570 Partition materials shall have a Water Absorption Rate of less than 0.09%.
- H. LEEDs Contribution Requirements: Partition materials shall contribute LEEDs Certification credits for both new construction and existing buildings. MR Credit 5.1, MR Credit 5.2, and EQ Credit 4.4.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of anchors, hardware, fasteners, and accessories in accordance with Section 01330 – Submittal Procedures.
- B. Shop Drawings: Furnish Shop Drawings in quantities requested for fabrication and installation of Toilet Partitions, Urinal/Entrance Screens, Shower Dividers and Dressing Compartment assemblies. Include plans, elevations, sections, details and anchorages/attachments to other work.
- C. Samples for Initial Selection:
 - 1. Submit manufacturer's color chart with manufacturer's full range of Standard Colors. Color shall be selected on a basis of four (4) stalls or more per color.
 - 2. Submit certification that materials furnished comply with requirements specified.
- D. Samples for Verification:
 - 1. Submit 6" square Samples of each color and finish on same substrate used in work, for color verification after selections have been made.
 - 2. Submit one (1) Sample of the following:
 - a. Hardware (Complete)
 - b. Pilaster (12" X 12")
 - c. Divider Panel (12" X 12")
 - d. Aluminum Mounting Bracket
 - e. Plastic Integral Hinge
- E. Maintenance Instructions: Provide manufacturer's printed Instructions for Cleaning and Maintenance of Installed Work.
- F. Manufacturer's Written Warranty: Provide manufacturer's Written Warranty as detailed herein.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating units without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to Established Dimensions.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original packaging to protect from damage.
- B. Store materials in manufacturer's original packaging in accordance with manufacturer's instructions. Store materials indoors, protected from the elements and construction hazards.
- C. Handle materials in a manner that will protect the finished product.

1.08 MANUFACTURER'S WARRANTY

- A. Provide manufacturer's Fifteen (15) year written limited warranty on its Panels, Pilasters and Doors, against chipping, breakage, corrosion, delamination and defects in workmanship; to be replaced without charge excluding labor.
- B. Provide manufacturer's Ten (10) year written limited warranty on all Cast Stainless Steel Hardware, Hinges and Mounting Brackets, as well as on all full high aluminum mounting brackets, against defects in material and workmanship. All other hardware will be provided with manufacturer's One (1) year written limited warranty, against all defects in material and workmanship.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Series Numbers and Model Descriptions for Plastic HDPE (Columbia PolyLife®) Toilet Partitions, Urinal/Entrance Screens, Shower Dividers and Dressing Compartments manufactured by COLUMBIA PARTITIONS®, a Division of PSISC®, are listed below to provide a standard of quality. Other manufacturers may be submitted for evaluation by the architect. All submittals for approval shall be presented in accordance with the submittals clause of this document and must be presented at least ten (10) days prior to the bid date. All bids shall be based on the standard of quality established herein.
- B. Plastic HDPE (Columbia PolyLife®) Toilet Partitions, Urinal/Entrance Screens, Shower Dividers and Dressing Compartments shall be Series 18543, manufactured by COLUMBIA PARTITIONS®, a Division of PSISC®, P.O. Box 181, Columbia, S.C. 29202, 866-337-7286, Fax: 866-337-7291.

2.02 INSTALLATION TYPES

- A. Toilet Partitions, Shower Dividers and Dressing Compartments shall be:
 - 1. Overhead-Braced Floor Supported
- B. Urinal Screens shall be:
 - 1. Type II, Wall Hung
- C. Entrance Screens shall be Overhead-Braced Floor Supported.

2.03 MATERIALS

- A. Material shall be Columbia PolyLife® Plastic HDPE and shall have homogenous color throughout entire thickness. PolyLife® shall be waterproof and nonabsorbent and shall have a self-lubricating surface to resist marks from pens and other writing instruments. Provide material which has been selected for uniform color, surface flatness and even texture. Exposed surfaces which exhibit discolorations, pitting, seam marks, roller marks, stains, telegraphing, or other imperfections on finished units are not acceptable. Columbia PolyLife® Plastic HDPE shall meet or exceed all requirements for Class B Flame Spread Rating and Smoke Developed calculated according to ASTM E84, and shall carry a Class B Fire Rating Certification. Class B Fire Rating Certification shall be in the name of the Toilet Partition Manufacturer and shall be less than six (6) months old. Aluminum Heat Sinc is not required for Class B Fire Rated materials. Materials shall contribute to LEED Certification credits. MR 5.1 & 5.2, EQ 4.4.
- B. Material Thicknesses and Heights:
1. Doors – Minimum 1.00" (25 mm) Finished Thickness, 55" High
 2. Divider Panels – Minimum 1.00" (25 mm) Finished Thickness, 55" High
 3. Pilasters – Minimum 1.00" (25 mm) Finished Thickness, 82" High
- C. Pilasters, Doors and Panels shall have edges machined to a .250" radius. Pilasters, Doors and Panels shall be provided with a self-adhesive peel coat to protect the finish during installation.
- D. Colors: To be selected by Project Architect from Manufacturer's Standard Colors.

2.04 HARDWARE

- A. Integral Hinge: Integral Hinge shall be made of Nylon and shall consist of a Bottom Hinge made of a fully adjustable .50" Nylon Cam with a .1875" Stainless Steel Center Rod and a Top Hinge made of a .500" Nylon Rod supported by a wire spring. The Nylon Cam shall be secured in desired closing position with two (2) threaded Stainless Steel Pins. Integral Hinges shall be integrated into the Door and Pilaster with no exposed metal parts. Hinges shall provide emergency access by lifting the door. Furnish one set per door.
- B. Slide Latch: Slide Latch shall be Heavy Duty Extruded 6063-T5 Aluminum with a Satin Anodized Finish. The Slide Latch shall be surface mounted and shall provide emergency access by lifting the door. The slide bar shall be .250" thick, .95" wide and 3.125" long. The slide bar and know shall have a black anodized finish. Latch shall have an internal buffering spring to prevent damage when door is inadvertently slammed against the Latch. Mounting holes are to be spaced at 3.50" O.C. The Slide Latch shall be mounted to the Door with Theft Proof Stainless Steel Torx Head with Pin Through-Bolts. Furnish one per door.
- C. Strike and Keeper: Strike and Keeper shall be Heavy Duty Extruded 6063-T5 Aluminum with a Satin Anodized Finish. The Strike and Keeper shall be 6.00" high, with three (3) mounting holes. The wall thickness shall be a minimum of .125". The Strike and Keeper shall be mounted to the Pilaster with Theft Proof Stainless Steel Torx Head with Pin Through-Bolts. The Strike and Keeper shall have an integral rubber bumper door stop. The Strike and Keeper shall provide emergency egress by lifting of the door. Furnish one per door.
- D. Coat Hook: Coat Hook shall be made of Heavy-Duty Chrome Plated Zamac. Coat Hook and Bumper shall be 2.340" high, 1.230" wide and shall protrude out from the door 3.05". The hook portion shall have a finished diameter of .250". Coat Hooks shall be mounted to the Door with Theft Proof Chrome Plated Steel Torx Head with Pin Screws. Stamped Stainless Steel Coat Hooks are unacceptable. Furnish one per door.
- E. Pull Handle: Pull Handle shall be made of Heavy-Duty Chrome Plated Zamac. Stamped Stainless Steel Door Stops are unacceptable. The Pull Handle shall protrude from the face of the door .940" and shall be 4.735" long. The Pull Handle shall have mounting holes drilled and tapped for 10/24 threads at 3.50" O.C. The Pull Handle shall be .655" wide. Furnish two for each Disabled Accessible door.

- F. Door Stop: Door Stop shall be Heavy Duty Chrome Plated Zamac. Stamped Stainless Steel Door Stops are unacceptable. Door Stop shall have a 2.125" base diameter and shall protrude 1.80" from the wall. The bumper at the end of the Door Stop shall be .250" thick. The diameter of the shaft shall be .6875". Furnish one for each Disabled Accessible or Outswing Door.
- G. Continuous Brackets: Brackets shall be Full High (54"), Extruded 6063-T5 Aluminum with a Satin Anodized Finish. Each Bracket is to have a minimum wall thickness of .125". Continuous Double Ear and Single Ear Brackets shall be used to mount Panel/Pilaster to wall. Continuous 'U' Brackets shall be used to mount Panel to Pilaster. Inside opening of Bracket shall be 1.00" for Panels and Pilasters. All holes in Brackets for mounting to wall and Panel/Pilaster shall be pre-drilled. Holes are to be spaced at 12" O.C. along the full length of the Bracket for a total of ten (10) holes for mounting to wall, and five (5) for mounting to panel or pilaster. Panels and Pilasters shall be secured to Brackets with Theft Proof Stainless Steel Torx Head with Pin Through-Bolts. Furnish as required.
- H. Overhead Bracing (Headrail): Continuous Heavy Duty Extruded 6063-T5 Aluminum Headrail with Anti-Grip profile. Headrail shall have a Satin Anodized Finish and shall have integral reinforcing channel and curtain track. Provide Headrail Corner Brackets, Wall Brackets, and Headrail End Caps as required. The Headrail and Aluminum Headrail Corner Brackets shall have a minimum wall height of 2". The minimum wall thickness of the Headrail and Headrail Corner Brackets shall be .125". The Headrail Wall Brackets shall be made of Type 304, 18 Gauge Stainless Steel.
- I. Pilaster Shoes: Pilaster Shoes shall be Type 304, 18 Gauge Stainless Steel and shall have a #4 Polished Satin Finish. Shoes shall be 3" high and shall have an integral heel for structural connection to the floor with Stainless Steel fasteners. Shoes shall be attached to Pilasters with Theft Proof Stainless Steel Torx Head with Pin Screws. Zinc Plated fasteners for connection to the floor are unacceptable.
- J. Anchorages and Fasteners: All Fasteners shall be Type 304 Stainless Steel and shall have Theft Proof Torx Heads with Pin. Stainless Steel Through-Bolts shall withstand a direct pull force in excess of 2000 lbs. each. All Fasteners shall be Through-Bolted unless noted otherwise. Chrome Plated Steel, Zinc Plated Steel and Brass Fasteners are not acceptable.

2.05 FABRICATION

- A. General: Provide Doors, Panels, Pilasters and Urinal/Entrance Screens fabricated for the partition system, complete with all accessories and hardware listed above and as required for installation of a fully functional system, unless otherwise noted. Provide units with cutouts and drilled holes to receive partition-mounted hinges, accessories, and grab bars as indicated. Doors and Panels are to be mounted 14" above finished floor.
- B. Pilasters: Each Pilaster shall have zinc plated threaded insert(s) threaded into the base of the Pilaster to receive 5/16" X 2.5" Type 304 Stainless Steel Jack Bolt(s) for leveling purposes.
- C. Doors: Unless otherwise indicated, provide 24" (610 mm) wide in-swinging doors for standard Toilet Partitions and 36" (914 mm) wide out-swinging doors with a minimum 32" (813 mm) wide clear opening for Partitions indicated to be Handicapped Accessible.

PART 3 – EXECUTION

3.01 SITE INSPECTION

- A. Verify that room dimensions are in accordance with Toilet Partition, Shower Divider, and Dressing Compartment Shop Drawings. Inspect walls to insure that they are plumb and suitable for the Wall Brackets.
- B. Check location of entrance doors and location of plumbing fixtures. Verify that these are in accordance with Toilet Partition, Shower Divider and Dressing Compartment Shop Drawings and that there is adequate clearance between plumbing fixtures and dividing panels or screens.
- C. Have any inappropriate conditions corrected before beginning installation.

3.02 INSTALLATION

- A. Comply with manufacturer's written installation instructions. Install Partitions rigid, straight, plumb, and level. Provide clearances of not more than .50" (13 mm) between pilasters and panels, and not more than 1.0" (25 mm) between pilasters/panels and walls. No evidence of drilling, cutting and patching shall be visible in finished work.
- B. Overhead-Braced Floor Supported Partitions: Secure Pilasters to floor and level, plumb, and tighten. Maintain proper Door Openings and secure continuous Overhead Brace (Headrail) to each pilaster with not less than two (2) Theft Proof Stainless Steel Torx Head with Pin Through-Bolts. Hang Doors and adjust so that tops of Doors are parallel with Overhead Brace and are the same height as the panels when doors are in closed position. Mount Doors and Panels 14" above finished floor.
- C. Screens: Attach with anchoring devices according to manufacturer's written instructions and to suit supporting structure. Set units level and plumb.

3.03 ACCESSORIES

- A. Mount accessories to Partition units in accordance with accessory manufacturer's instructions.

3.04 ADJUSTING AND CLEANING

- A. Hardware Adjustment: Adjust hardware according to manufacturer's written instructions for proper operation. Adjust cam on all out-swinging doors to hold doors in closed position when unlatched. Adjust cam on all in-swinging doors to hold doors in open position when unlatched.
- B. Provide final protection and maintain conditions that ensure Toilet Partitions and Screens are without damage or deterioration at the time of Substantial Completion. Clean all exposed surfaces of Toilet Partitions and hardware.

END OF SECTION

**SECTION 105100
LOCKERS**

PART 1 - GENERAL

1.1 SUMMARY

- A. Work Results:
 - 1. Metal lockers installed on existing concrete locker bases.
- B. Principal Products:
 - 1. Metal lockers.
 - 2. Locker benches.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting Attendees and Procedures:
 - 1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. Locker types, sizes, hardware, and accessories.
 - 2. Initial selection color charts and samples.
 - 3. Wood species and finish options.
- B. Shop Drawings:
 - 1. Locker plan layout with numbering.
- C. Samples:
 - 1. Lockers: 6 by 6 inch in size, of each color on base metal.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.
 - 1. Include master lock codes.
- B. Warranty documentation.

1.5 QUALITY ASSURANCE

- A. Field Samples: Construct one run of lockers. Demonstrate product interfaces, intersections, and terminations.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Handling Requirements:
 - 1. Metal Lockers: Store inside building.

1.7 FIELD CONDITIONS

- A. Ambient Conditions: Perform work within following limitations.
 - 1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.
- B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 METAL LOCKERS

- A. Locker Types and Locations: See Drawings.
- B. Knocked-Down Lockers:
 - 1. Manufacturers and Products:
 - a. Penco Products Inc. Guardian Defiant Series; as basis of design.
 - b. Art Metal Products.
 - c. List Industries.
 - d. Lyon LLC.
 - e. Or approved equal.
 - 2. Configurations:
 - a. See Drawings for locker types and sizes.
 - 3. Doors: Steel sheet, 0.075-inch minimum thickness; louver vents; sound-absorbing core.
 - 4. Frames: Steel sheet, 0.060-inch minimum thickness.
 - 5. Body Components: Steel sheet, 0.024-inch minimum thickness.
 - 6. Hinges: Continuous welded to doors and riveted to frames.
 - 7. Latches: Recessed stainless steel cup design.
 - 8. Locking: Padlock hasp.
 - 9. Finish: Thermoset enamel or powder coating.
 - a. Colors: Architect selected.
 - 10. Number Plates: Aluminum.
- C. Exterior Trim Accessories:
 - 1. Top closure panels.
 - 2. Filler panels.
 - 3. Sloped tops with vertical end panels.
 - 4. Recess trim.
 - 5. End panels with concealed fasteners.
- D. Interior Accessories:
 - 1. Coat Hooks: Two prongs, steel.
 - a. Quantity: Two per locker.
 - 2. Hanging Bar: 1 inch diameter steel tube.

2.2 LOCKER BENCHES

- A. Design: Fixed pedestal supports.
 - 1. Pedestals: Painted steel.
- B. Seats: Maple; clear finish; including bench seats in shower/dressing compartments.

2.3 FABRICATION

- A. Complete locker fabrication before shipment to site.
- B. Attach number identification plates.
- C. Fabricate sloping tops with valley joint at inside corners and vertical end panels.
- D. Provide matching perimeter trim for site fitting.
- E. Provide openings for electrical wiring.

2.4 FINISHES

- A. Powder Coating: Thermoset polyester; AAMA 2603 but 1.5 mil minimum thickness.
 - 1. Color and Gloss: Architect selected. Assume (2) colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify locations and sizes of anchorage framing or backing.

3.2 PREPARATION

- A. Coordinate anchorage locations for installing lockers.
- B. Prep/Level existing concrete locker bases as required and as recommended by locker manufacturer.

3.3 LOCKER INSTALLATION

- A. Install lockers plumb, level, and aligned in plane.
- B. Connect lockers into rigid, stable assemblies with flush, full contact joints.
 - 1. Fasten back-to-back locker groups together.
- C. Anchor lockers to existing concrete locker bases and to adjacent walls.
- D. Install end panels, filler panels, and sloped tops with concealed fasteners.

3.4 BENCH INSTALLATION

- A. Set benches parallel to locker fronts.
- B. Fasten bench pedestals with expansion anchors.
- C. Install benches at shower/dressing compartments in locations show on Drawings.

3.5 ADJUSTING

- A. Adjust doors for smooth, accurate movement and secure latching.
- B. Adjust drawers for movement free of binding.

3.6 CLEANING

- A. Cleaning: Clean interiors and exteriors of lockers.

3.7 CLOSEOUT ACTIVITIES

- A. Demonstration: Instruct Owner's staff on re-programming lock codes; if applicable.

3.8 PROTECTION

- A. Do not use installed lockers for storing construction materials or clothing.

END OF SECTION

**SECTION 108000
TOILET AND BATH ACCESSORIES**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Toilet and washroom accessories.
- B. Grab bars.
- C. Attachment hardware

1.2 RELATED SECTIONS

- A. Section 101550 – Plastic Toilet Partitions.

1.3 REFERENCES

- A. ANSI A117.1 - Safety Standards for the Handicapped.
- B. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- D. ASTM A269 - Seamless and Welded Austenitic Stainless-Steel Tubing for General Service.
- E. ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- F. ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1 - General Requirements.
- B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.5 REGULATORY REQUIREMENTS

- A. Conform to ANSI A117.1 code for access for the handicapped.

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on product data and instructed by the manufacturer.

1.7 COORDINATION

- A. Coordinate work under provisions of Division 1 - General Requirements.
- B. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Bobrick – Accessories; or approved equal.
- B. Substitutions: Under Provisions of Division 1 - General Requirements.

2.2 MATERIALS

- A. Sheet Steel: ASTM A366.
- B. Stainless Steel Sheet: ASTM A167, Type 304.
- C. Tubing: ASTM A269, stainless steel.
- D. Adhesive: Two component epoxy type, waterproof.
- E. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof.
- F. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 FABRICATION

- A. Weld and grind joints of fabricated components, smooth.
- B. Form exposed surfaces from single sheet of stock, free of joints. Form surfaces flat without distortion. Maintain surfaces without scratches or dents.
- C. Fabricate grab bars of tubing, free of visible joints, return to wall with end attachment flanges. Form bar with minimum 1 ½" clear of wall surface. Knurl grip surfaces.
- D. Shop assemble components and package complete with anchors and fittings.
- E. Provide steel anchor plates, adapters, and anchor components for installation.

2.4 KEYING

- A. Supply 3 keys for each accessory to Owner.
- B. Master key all accessories.

2.5 FINISHES

- A. Galvanizing: ASTM A123 to 1.25 oz/sq yd. Galvanize ferrous metal and fastening devices.
- B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- C. Chrome/Nickel Plating: ASTM B456, Type SC 2 satin finish.
- D. Stainless Steel: No. 4 satin luster finish.
- E. Back paint components where contact is made with building finishes to prevent electrolysis.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Division 1 - General Requirements.
- B. Verify that site conditions are ready to receive work and dimensions are as indicated on shop drawings and instructed by the manufacturer.
- C. Verify exact location of accessories for installation.
- D. Contractor to verify all quantities prior to ordering.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions and ANSI A117.1.
- B. Install plumb and level, securely and rigidly anchored to substrate.

3.4 SCHEDULE

- A. See Drawings for Accessory Schedule.

END OF SECTION

**SECTION 220500
COMMON WORK RESULTS FOR PLUMBING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Transition fittings.
3. Dielectric fittings.
4. Mechanical sleeve seals.
5. Sleeves.
6. Escutcheons.
7. Grout.
8. Plumbing demolition.
9. Equipment installation requirements common to equipment sections.
10. Painting and finishing.
11. Concrete bases.
12. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- D. The following are industry abbreviations for plastic materials:
1. ABS: Acrylonitrile-butadiene-styrene plastic.
 2. CPVC: Chlorinated polyvinyl chloride plastic.
 3. PE: Polyethylene plastic.
 4. PVC: Polyvinyl chloride plastic.
- E. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For the following:
1. Transition fittings.
 2. Dielectric fittings.
 3. Mechanical sleeve seals.

4. Escutcheons.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

D. The plumbing system shall comply with "The Reduction of Lead in Drinking Water Act (P.L. 111- 380) which amends the Safe Drinking Water Act (42 USC 300g-6).

E. The plumbing system shall comply with the current adopted plumbing code for this project site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. CPVC Piping: ASTM F 493.
 - 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 4. PVC to ABS Piping Transition: ASTM D 3138.

2.4 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
 - 1. Available Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser Industries, Inc.; DMD Div.
 - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
 - d. JCM Industries.
 - e. Smith-Blair, Inc.
 - f. Viking Johnson.
 - 2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
 - 3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
 - 4. Aboveground Pressure Piping: Pipe fitting.

- B. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement- joint end.
 - 1. Available Manufacturers:
 - a. Eslon Thermoplastics.
- C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
 - 1. Available Manufacturers:
 - a. Thompson Plastics, Inc.
- D. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
 - 1. Available Manufacturers:
 - a. NIBCO INC.
 - b. NIBCO, Inc.; Chemtrol Div.
- E. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
 - 1. Available Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Fernco, Inc.
 - c. Mission Rubber Company.
 - d. Plastic Oddities, Inc.

2.5 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
 - 1. Available Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Eclipse, Inc.
 - d. Epco Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
 - 1. Available Manufacturers:

- a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epco Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
- 1. Available Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 - 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- 1. Available Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.
- 1. Available Manufacturers:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Victaulic Co. of America.

2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- 1. Available Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
 - 2. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Stainless steel. Include two for each sealing element.
 - 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.7 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.

2.8 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With set screw and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PLUMBING DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type, polished chrome-plated finish with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish and set screw.
 - f. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough- brass finish and set screw.
 - g. Bare Piping in Equipment Rooms: One-piece, cast-brass type with set screw.
 - h. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
 2. Existing Piping: Use the following:

- a. Chrome-Plated Piping: Split-casting, cast-brass type with chrome-plated finish.
 - b. Insulated Piping: Split-plate, stamped-steel type with concealed hinge and spring clips.
 - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
 - d. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
 - e. Bare Piping in Unfinished Service Spaces: Split-casting, cast-brass type with rough-brass finish.
 - f. Bare Piping in Unfinished Service Spaces: Split-plate, stamped-steel type with concealed hinge and set screw.
 - g. Bare Piping in Equipment Rooms: Split-casting, cast-brass type.
 - h. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.
- M. Sleeves are not required for core-drilled holes in walls only, but are required in floors.
- N. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
 - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- P. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- Q. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe

material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- R. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- S. Verify final equipment locations for roughing-in.
- T. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 4. PVC Nonpressure Piping: Join according to ASTM D 2855.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.

1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.6 PAINTING

- A. Painting of plumbing systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.7 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Miscellaneous Cast-in-Place Concrete."

3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.9 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION

**SECTION 220523
GENERAL-DUTY VALVES FOR PLUMBING PIPING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Bronze ball valves.
- B. Related Sections:
 - 1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.
 - 2. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 2. ASME B31.1 for power piping valves.
 - 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, and weld ends.
3. Set ball and plug valves open to minimize exposure of functional surfaces.
4. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Refer to valve schedule articles for applications of valves.

B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

C. Valve Sizes: Same as upstream piping unless otherwise indicated.

D. Valve Actuator Types:

1. Handlever: For quarter-turn valves NPS 6 and smaller except plug valves.
2. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug-valve head.

E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.

F. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves.
2. Grooved: With grooves according to AWWA C606.
3. Solder Joint: With sockets according to ASME B16.18.
4. Threaded: With threads according to ASME B1.20.1.

2.2 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim 2" and under: Nibco (S or T)- 585-70-66.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Hammond Valve.
- b. Milwaukee Valve Company.
- c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-110.

- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Solder or Threaded.
- g. Seats: PTFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

B. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim 2-1/2" to 3": Nibco (S or T)-580- 70-66

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

- a. Hammond Valve.
- b. Milwaukee Valve Company.
- c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Solder or Threaded.
- g. Seats: PTFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

PART 3 -EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.

- D. Install valves in position to allow full stem movement.
- E. Install check valves for proper direction of flow and as follows:

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball, gate, or plug valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 3 and Smaller:
 - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Ball Valves: Two-piece, full port, bronze with stainless-steel trim.

END OF SECTION

**SECTION 220529
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following hangers and supports for plumbing system piping and equipment:
 - 1. Steel pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Metal framing systems.
 - 4. Thermal-hanger shield inserts.
 - 5. Fastener systems.
 - 6. Pipe positioning systems.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel pipe hangers and supports.
 - 2. Thermal-hanger shield inserts.
 - 3. Powder-actuated fastener systems.
 - 4. Pipe positioning systems.
- B. Shop Drawings Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze pipe hangers. Include Product Data for components.
 - 2. Metal framing systems. Include Product Data for components.
- C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code-- Steel." AWS D1.4, "Structural Welding Code--Reinforcing Steel." and ASME Boiler and Pressure Vessel Code: Section IX.
- B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
4. ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Available Manufacturers:
1. B-Line Systems, Inc.; a division of Cooper Industries.
 2. Anvil Corp.
 3. National Pipe Hanger Corporation.
- C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts

2.4 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Available Manufacturers:
1. B-Line Systems, Inc.; a division of Cooper Industries.
 2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
 3. Power-Strut Div.; Tyco International, Ltd.
 4. Unistrut Corp.; Tyco International, Ltd.
- C. Coatings: Manufacturer's standard finish unless bare metal surfaces are indicated.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.5 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. Available Manufacturers:
 - 1. Carpenter & Paterson, Inc.
 - 2. ERICO/Michigan Hanger Co.
 - 3. Pipe Shields, Inc.
 - 4. Rilco Manufacturing Company, Inc.
- C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass with vapor barrier.
- D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.
- E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- G. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.6 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Available Manufacturers:
 - a. Hilti, Inc.
 - b. ITW Ramset/Red Head.
 - c. MKT Fastening, LLC.
 - d. Powers Fasteners.
- B. Mechanical-Expansion Anchors: Insert-wedge-type stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Available Manufacturers:
 - a. B-Line Systems, Inc.; a division of Cooper Industries.
 - b. Empire Industries, Inc.
 - c. Hilti, Inc.
 - d. Powers Fasteners.

2.7 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.
- B. Available Manufacturers:
 - 1. C & S Mfg. Corp.
 - 2. HOLDRITE Corp.; Hubbard Enterprises.
 - 3. Samco Stamping, Inc.

2.8 MISCELLANEOUS MATERIALS

- A. Provide steel support above ceiling, mounted to wall to support domestic water heater.
- B. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- C. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches (100 mm) of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
 - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
 - 5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
 - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 - 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
 - 10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
 - 11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.
 - 12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
 - 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 - 14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.

15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
 16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
 17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
 18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
 19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

- a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb
 - d. de-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- 13. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 - 14. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 - 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 - 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
 - K. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
 - L. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
 - M. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
 - N. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 Section "Plumbing Fixtures" for plumbing fixtures.
- F. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other

accessories.

- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.
- J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- K. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.
- M. Insulated Piping: Comply with the following:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - 5. Pipes NPS 8 and Larger: Include wood inserts.
 - 6. Insert Material: Length at least as long as protective shield.
 - 7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 PAINTING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 220553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Pipe labels.
 - 3. Valve tags.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Minimum Label Size: Length and width vary for required label content, but not less than 2- 1/2 by 3/4 inch.
 - 3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 4. Fasteners: Stainless-steel rivets.
 - 5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction as manufactured by Setmark or equivalent.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.

2.3 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
 - 1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass S-hook.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed

locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 10 feet along each run. Reduce intervals to 5 feet in areas of congested piping and equipment.
7. On each side of wall penetrations within 5 feet of wall.

B. Pipe Label Color Schedule:

1. Domestic Water Piping:
 - a. Background Color: Green.
 - b. Letter Color: White.
2. Sanitary Waste and Vent Piping:
 - a. Background Color: Black.
 - b. Letter Color: White.

C. Pipe Label Abbreviation Schedule:

1. Domestic Cold Water – DCW
2. Domestic Hot Water – DHW
3. Domestic Tempered Water – DTW

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 1. Valve-Tag Size and Shape:
 - a. Domestic Water: 1-1/2 inches, round.
 2. Letter Color:
 - a. Domestic Water: Black.

END OF SECTION

**SECTION 220700
PLUMBING INSULATION**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Insulation Materials:
 - a. Mineral fiber.
 2. Insulating cements.
 3. Adhesives.
 4. Mastics.
 5. Lagging adhesives.
 6. Sealants.
 7. Factory-applied jackets.
 8. Field-applied fabric-reinforcing mesh.
 9. Field-applied cloths.
 10. Field-applied jackets.
 11. Tapes.
 12. Securements.
 13. Corner angles.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).
- B. Shop Drawings:
1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 2. Detail attachment and covering of heat tracing inside insulation.
 3. Detail insulation application at pipe expansion joints for each type of insulation.
 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 5. Detail removable insulation at piping specialties, equipment connections, and access panels.
 6. Detail application of field-applied jackets.
 7. Detail application at linkages of control devices.
 8. Detail field application for each equipment type.
- C. Qualification Data: For qualified Installer.
- D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- E. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- E. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fibrex Insulations Inc.; Coreplus 1200.
 - b. Johns Manville; Micro-Lok.
 - c. Knauf Insulation; 1000 Pipe Insulation.
 - d. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 deg F (454 deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory- applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 1. Products Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. Marathon Industries, Inc.; 225.
 - d. Mon-Eco Industries, Inc.; 22-25.
 2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. Marathon Industries, Inc.; 225.
 - d. Mon-Eco Industries, Inc.; 22-25.
 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. PVC Jacket Adhesive: Compatible with PVC jacket.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Chemical Company (The); 739, Dow Silicone.
 - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Speedline Corporation; Speedline Vinyl Adhesive.
 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. FSK and Metal Jacket Flashing Sealants:
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-76-8.
 - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
 - c. Marathon Industries, Inc.; 405.
 - d. Vimasco Corporation; 750.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. ASJ Flashing Sealants, and Vinyl, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Childers Products, Division of ITW; CP-76.
 - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
 - c. Marathon Industries, Inc.; 405.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: White.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.4 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354- C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto PVC Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White.
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

5. Factory-fabricated tank heads and tank side panels.

2.5 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
 - b. Compac Corp.; 110 and 111.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
 - d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
 - b. Compac Corp.; 130.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
 - d. Venture Tape; 1506 CW NS.
 2. Width: 2 inches.
 3. Thickness: 6 mils.
 4. Adhesion: 64 ounces force/inch in width.
 5. Elongation: 500 percent.
 6. Tensile Strength: 18 lbf/inch in width.
- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
 - b. Compac Corp.; 120.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
 - d. Venture Tape; 3520 CW.
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.6 CORNER ANGLES

- A. PVC Corner Angles: 30 mil thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
 1. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.
 - 6. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Comply with requirements in Division 07 Section "Penetration Firestopping" firestopping and fire-resistive joint sealers.
- E. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 - 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.

6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 7. For services not specified to receive a field-applied jacket except for flexible elastomeric, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 8. Label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.8 FINISHES

A. Equipment and Pipe Insulation with ASJ or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

3.9 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Underground piping.
 - 2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Water:
 - 1. Owens-Corning Model 25ASJ/SSL: 1 inch thick.

3.11 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field- applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.

END OF SECTION

**SECTION 221116
DOMESTIC WATER PIPING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Domestic water pipes, tubes, fittings, and specialties inside the building.
 - 2. Specialty valves.
 - 3. Escutcheons.
 - 4. Sleeves and sleeve seals.
 - 5. Wall penetration systems.

1.3 SUBMITTALS

- A. Product Data: For the following products:
 - 1. Specialty valves.
 - 2. Dielectric fittings.
 - 3. Flexible connectors.
 - 4. Escutcheons.
 - 5. Sleeves and sleeve seals.
- B. Water Samples: Specified in "Cleaning" Article.
- C. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 61 for potable domestic water piping and components.

1.5 PROJECT CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Architect, Owner no fewer than two days in advance of proposed interruption of water service.
 - 2. Do not proceed with interruption of water service without Architect's and Owner's written permission.

1.6 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B) water tube, drawn temper.
 - 1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
 - 2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
 - 3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
 - 4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and- socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
 - 5. Do not use compression type fittings on domestic water piping.

2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 SPECIALTY VALVES

- A. Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty metal valves.
- B. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for drain valves, backflow preventers, and vacuum breakers.

2.5 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Flex-Hose Co., Inc.
 - 2. Flexicraft Industries.
 - 3. Metraflex, Inc.
 - 4. Proco Products, Inc.
- B. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
 - 1. Working-Pressure Rating: Minimum 200 psig.
 - 2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
 - 3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.
- C. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.

1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

2.6 ESCUTCHEONS

- A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.
- B. One Piece, Cast Brass: Polished, chrome-plated finish with setscrews.
- C. One Piece, Deep Pattern: Deep-drawn, box-shaped brass with chrome-plated finish.
- D. One Piece, Stamped Steel: Chrome-plated finish with setscrew.
- E. Split Casting, Cast Brass: Polished, chrome-plated finish with concealed hinge and setscrew.
- F. Split Plate, Stamped Steel: Chrome-plated finish with concealed hinge, setscrew.
- G. One-Piece Floor Plates: Cast-iron flange.
- H. Split-Casting Floor Plates: Cast brass with concealed hinge.

2.7 SLEEVES

- A. Cast-Iron Wall Pipes: Fabricated of cast iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 1. Underdeck Clamp: Clamping ring with setscrews.

2.8 SLEEVE SEALS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Advance Products & Systems, Inc.
 2. Calpico, Inc.
 3. Metraflex, Inc.
 4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.
 1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 2. Pressure Plates: Stainless steel.
 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.9 GROUT

- A. Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install shutoff valve immediately upstream of each dielectric fitting.
- D. Install domestic water piping level and plumb.
- E. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- F. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- G. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- H. Install piping adjacent to equipment and specialties to allow service and maintenance.
- I. Install piping to permit valve servicing.
- J. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.
- K. Install piping free of sags and bends.
- L. Install fittings for changes in direction and branch connections.
- M. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

3.2 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

- D. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter.
- E. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

3.3 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.
- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball valves for piping NPS 3 and smaller.
- C. Install drain valves at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."
 - 1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
 - 2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.

3.4 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 3 and Smaller: Use dielectric couplings or nipples.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet: If Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 4. NPS 2-1/2 and 3: 96 inches with 1/2-inch rod.
 - 5. NPS 4 to NPS 5: 10 feet with 1/2-inch rod.
 - 6. NPS 6: 10 feet with 5/8-inch rod.
 - 7. NPS 8: 10 feet with 3/4-inch rod.
- E. Install supports for vertical copper tubing every 10 feet.
- F. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code.

3.7 ESCUTCHEON INSTALLATION

- A. Install escutcheons for penetrations of walls, ceilings, and floors.
- B. Escutcheons for Piping:
 - 1. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
 - 2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
 - 3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
 - 4. Bare Piping in Unfinished Service Spaces: One piece, cast brass with polished chrome-plated finish cast brass with rough-brass finish.
 - 5. Bare Piping in Equipment Rooms: One piece, cast brass.
 - 6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.

3.8 SLEEVE INSTALLATION

- A. General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, roofs, and walls.
- B. Sleeves are not required for core-drilled holes.
- C. Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.
- D. Install sleeves in new partitions, slabs, and walls as they are built.
- E. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint.
- F. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint.
- G. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using sleeve seals specified in this Section.
- H. Seal space outside of sleeves in concrete slabs and walls with grout.
- I. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated.
- J. Install sleeve materials according to the following applications:
 - 1. Sleeves for Piping Passing through Concrete Floor Slabs: Steel pipe.
 - 2. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: Steel pipe.

- a. Extend sleeves 2 inches above finished floor level.
 - b. For pipes penetrating floors with membrane waterproofing, extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
3. Sleeves for Piping Passing through Gypsum-Board Partitions:
- a. Steel pipe sleeves for pipes smaller than NPS 6.
 - b. Exception: Sleeves are not required for water supply tubes and waste pipes for individual plumbing fixtures if escutcheons will cover openings.
4. Sleeves for Piping Passing through Concrete Roof Slabs: Steel pipe.
5. Sleeves for Piping Passing through Interior Concrete Walls:
- a. Steel pipe sleeves for pipes smaller than NPS 6.
- K. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with approved firestop materials.
- L. Non-Fire-Barrier Penetrations: Seal pipe penetrations with approved materials.

3.9 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

3.10 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Piping Inspections:
 - 1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - 2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing- in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 - 3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
 - 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- C. Piping Tests:
 - 1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - 2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - 3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - 4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without

exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and for corrective action required.

D. Domestic water piping will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.11 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.12 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.13 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Brazed joints may be used on aboveground copper tubing.

D. Aboveground domestic water piping, shall be the following:

1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B) wrought- copper solder-joint fittings; and soldered joints.

3.14 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball valves.
2. Throttling Duty: Use ball valves.
3. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION

**SECTION 221119
DOMESTIC WATER PIPING SPECIALTIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following domestic water piping specialties:
1. Vacuum breakers.
 2. Hose bibbs.
 3. Drain valves.
 4. Water hammer arresters.
- B. Related Sections include the following:
1. Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers, pressure gages, and flow meters in domestic water piping.

1.3 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig, unless otherwise indicated.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. NSF Compliance:
1. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Ames Co.
 - b. Watts Industries, Inc.; Water Products Div.
 - c. Zurn Plumbing Products Group; Wilkins Div.
- 2. Standard: ASSE 1001.
 - 3. Size: NPS 1/4 to NPS 3, as required to match connected piping.
 - 4. Body: Bronze.
 - 5. Inlet and Outlet Connections: Threaded.
 - 6. Finish: Chrome plated.

B. Hose-Connection Vacuum Breakers:

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Watts Industries, Inc.; Water Products Div.
 - b. Woodford Manufacturing Company.
 - c. Zurn Plumbing Products Group; Light Commercial Operation.
 - d. Zurn Plumbing Products Group; Wilkins Div.
- 2. Standard: ASSE 1011.
- 3. Body: Bronze, nonremovable, with manual drain.
- 4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
- 5. Finish: Chrome or nickel plated.

2.2 HOSE BIBBS

A. Hose Bibbs:

- 1. Standard: ASME A112.18.1 for sediment faucets.
- 2. Body Material: Bronze.
- 3. Seat: Bronze, replaceable.
- 4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
- 5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
- 6. Pressure Rating: 125 psig.
- 7. Vacuum Breaker: Integral, nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
- 8. Finish for Equipment Rooms: Rough bronze.
- 9. Finish for Service Areas: Rough bronze.
- 10. Finish for Finished Rooms: Chrome or nickel plated.
- 11. Operation for Equipment Rooms: Wheel handle or operating key.
- 12. Operation for Service Areas: Operating key.
- 13. Operation for Finished Rooms: Operating key.
- 14. Include operating key with each operating-key hose bibb.
- 15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.3 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

- 1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
- 2. Pressure Rating: 400-psig minimum CWP.
- 3. Size: NPS 3/4.
- 4. Body: Copper alloy.
- 5. Ball: Chrome-plated brass.
- 6. Seats and Seals: Replaceable.
- 7. Handle: Vinyl-covered steel.
- 8. Inlet: Threaded or solder joint.
- 9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.4 WATER HAMMER ARRESTERS

A. Water Hammer Arresters:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Sioux Chief Manufacturing Company, Inc.
 - b. Watts Drainage Products Inc.
 - c. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Metal bellows or Copper tube with piston.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.
5. Provide in accessible location.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install water regulators with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gages on inlet and outlet.
- C. Install water control valves with inlet and outlet shutoff valves and bypass with globe valve. Install pressure gages on inlet and outlet.
- D. Install balancing valves in locations where they can easily be adjusted.
- E. Install water hammer arresters in water piping according to PDI-WH 201.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.
- B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and prepare test reports:
 1. Test each reduced-pressure-principle backflow preventer, double-check backflow- prevention assembly and double-check, detector-assembly backflow preventer according to authorities having jurisdiction and the device's reference standard.
- B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

END OF SECTION

**SECTION 221316
SANITARY WASTE AND VENT PIPING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following for soil, waste, and vent piping inside the building:
 - 1. Pipe, tube, and fittings.
 - 2. Special pipe fittings.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. LLDPE: Linear, low-density polyethylene plastic.
- D. NBR: Acrylonitrile-butadiene rubber.
- E. PE: Polyethylene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. TPE: Thermoplastic elastomer.

1.4 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water.
- B. Seismic Performance: Soil, waste, and vent piping and support and installation shall be capable of withstanding the effects of seismic events determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures."

1.5 SUBMITTALS

- A. Product Data: For pipe, tube, fittings, and couplings.
- B. Shop Drawings:
 - 1. Design Calculations: Signed and sealed by a qualified professional engineer for selecting seismic restraints.
 - 2. Solvent Drainage System: Include plans, elevations, sections, and details.
- C. Field quality-control inspection and test reports.

1.6 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; "NSF- drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service class.
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.4 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. Sovent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.
- C. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
 - 1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
 - a. Manufacturers:
 - 1) Fernco, Inc.
 - 2) Ideal Div.; Stant Corp.
 - 3) Mission Rubber Co.
 - 4) Tyler Pipe; Soil Pipe Div.
 - 2. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.
 - a. Manufacturers:
 - 1) Clamp-All Corp.
 - 2) Ideal Div.; Stant Corp.
 - 3) Mission Rubber Co.
 - 4) Tyler Pipe; Soil Pipe Div.

2.10 STEEL PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Standard Weight or Schedule 40, galvanized. Include ends matching joining method.
- B. Drainage Fittings: ASME B16.12, threaded, cast-iron drainage pattern.
- C. Pressure Fittings:
 - 1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
 - 2. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and- socket, metal-to-metal, bronze seating surface; and female threaded ends.
 - 3. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, standard pattern.
 - 4. Cast-Iron Flanges: ASME B16.1, Class 125.
 - 5. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125.
- D. Grooved-Joint Systems:
 - 1. Manufacturers:
 - a. Anvil International.
 - b. Victaulic Company.
 - c. Ward Manufacturing, Inc.
 - 2. Grooved-End, Steel-Piping Fittings: ASTM A 47/A 47M, malleable-iron casting; ASTM A 106, galvanized-steel pipe; or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
 - 3. Grooved-End, Steel-Piping Couplings: AWWA C606, for steel-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

2.11 COPPER TUBE AND FITTINGS

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
 - 1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- B. Hard Copper Tube: ASTM B 88, Types L and M (ASTM B 88M, Types B and C), water tube, drawn temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought- copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
 - 3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.12 PVC PIPE AND FITTINGS

- A. Solid-Wall PVC Pipe: ASTM D 2665, Schedule 40, drain, waste, and vent.
- B. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- C. Adhesive Primer: ASTM F 656
 - 1. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Solvent Cement: ASTM D 2564

1. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.13 SPECIAL PIPE FITTINGS

- A. Flexible, Nonpressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
 1. Manufacturers:
 - a. Dallas Specialty & Mfg. Co.
 - b. Fernco, Inc.
 - c. Logan Clay Products Company (The).
 - d. Mission Rubber Co.
 - e. NDS, Inc.
 - f. Plastic Oddities, Inc.
 2. Sleeve Materials:
 - a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- B. Shielded Nonpressure Pipe Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Mission Rubber Co.
- C. Pressure Pipe Couplings: AWWA C219 metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser, Inc.; DMD Div.
 - c. EBAA Iron Sales, Inc.
 - d. Ford Meter Box Company, Inc. (The); Pipe Products Div.
 - e. JCM Industries, Inc.
 - f. Romac Industries, Inc.
 - g. Smith-Blair, Inc.
 - h. Viking Johnson.
 2. Center-Sleeve Material: Stainless steel.
 3. Gasket Material: Natural or synthetic rubber.
 4. Metal Component Finish: Corrosion-resistant coating or material.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

- A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- B. Aboveground, soil and waste piping shall be any of the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless cast-iron soil pipe and fittings heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
 - 3. Copper DWV tube, copper drainage fittings, and soldered joints.
 - 4. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 5. Dissimilar Pipe-Material Couplings: Flexible, Shielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- C. Aboveground, vent piping shall be any of the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
 - 3. Steel pipe, drainage fittings, and threaded joints.
 - 4. Copper DWV tube, copper drainage fittings, and soldered joints.
 - 5. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 6. Dissimilar Pipe-Material Couplings: Flexible, Shielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.
- D. Underground, soil, waste, and vent piping shall be any of the following:
 - 1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
 - 2. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
 - 3. Solid wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
 - 4. Dissimilar Pipe-Material Couplings: Flexible, Shielded, Rigid, unshielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

3.3 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- B. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- C. Install cleanout fitting with closure plug inside the building in sanitary force-main piping.
- D. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."
- E. Install wall-penetration fitting at each service pipe penetration through foundation wall. Make installation watertight.
- F. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
 - 1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.
- G. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if

change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back-to-back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

- H. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- I. Install soil and waste drainage and vent piping at the State Plumbing Codes minimum slopes.
- J. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- K. Install PVC soil and waste drainage and vent piping according to ASTM D 2665 and state plumbing code.
- L. Install underground PVC soil and waste drainage piping according to ASTM D 2321 and state plumbing code.
- M. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- C. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
- D. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.
- E. Grooved Joints: Assemble joint with keyed coupling, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- F. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Install individual, straight, horizontal piping runs according to the following:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
 - 2. NPS 3: 60 inches with 1/2-inch rod.
 - 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
 - 4. NPS 6: 60 inches with 3/4-inch rod.
 - 5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.
- F. Install supports for vertical cast-iron soil piping every 15 feet.
- G. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 3. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - 4. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
 - 5. NPS 6: 10 feet with 5/8-inch rod.
 - 6. NPS 8: 10 feet with 3/4-inch rod.
- H. Install supports for vertical copper tubing every 10 feet.
- I. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
 - 2. NPS 3: 48 inches with 1/2-inch rod.
 - 3. NPS 4 and 5: 48 inches with 5/8-inch rod.
 - 4. NPS 6: 48 inches with 3/4-inch rod.
 - 5. NPS 8 to NPS 12: 48 inches with 7/8-inch rod.
- J. Install supports for vertical PVC piping every 48 inches.
- K. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:
 - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 - 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.

4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

3.7 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 25-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 6. Prepare reports for tests and required corrective action.

3.8 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.9 PROTECTION

- A. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION

**SECTION 221319
SANITARY WASTE PIPING SPECIALTIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following sanitary drainage piping specialties:
 - 1. Cleanouts.
 - 2. Floor drains.
 - 3. Trench drains.
 - 4. Through-penetration firestop assemblies.
 - 5. Miscellaneous sanitary drainage piping specialties.
 - 6. Flashing materials.
- B. Related Sections include the following:
 - 1. Division 22 Section "Storm Drainage Piping Specialties" for trench drains for storm water, channel drainage systems for storm water, roof drains, and catch basins.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FRP: Fiberglass-reinforced plastic.
- C. HDPE: High-density polyethylene plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:
 - 1. Floor Drains.
 - 2. Floor Cleanouts.
- B. Field quality-control test reports.
- C. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Exposed Metal Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for cast iron cleanout test tee.
3. Size: Same as connected drainage piping
4. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch or Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk or raised-head, brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Closure: Stainless-steel plug with seal.

B. Metal Floor Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Zurn Plumbing Products Group.
2. Standard: ASME A112.36.2M for threaded, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Threaded, adjustable housing.
5. Body or Ferrule: Cast iron.
6. Closure: Plastic plug.
7. Adjustable Housing Material: Cast iron with threads.
8. Frame and Cover Material and Finish: Polished Nickel-bronze.
9. Frame and Cover Shape: Round.

C. Cast-Iron Wall Cleanouts:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Zurn Plumbing Products Group; Specification Drainage Operation.

2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hub-and-spigot, cast-iron soil pipe T-branch or Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Raised-head, drilled-and-threaded Bronze plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, stainless-steel cover plate with screw.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Zurn Plumbing Products Group.
2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Coated cast iron.
5. Outlet: Bottom.
6. Coating on Interior and Exposed Exterior Surfaces: Acid-resistant enamel.
7. Top or Strainer Material: See schedule on plans.
8. Top of Body and Strainer Finish: See schedule on plans.
9. Top Shape: See schedule on plans.

2.3 TRENCH DRAINS

A. Trench Drains:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Josam Company; Josam Div.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Zurn Plumbing Products Group.
2. Standard: ASME A112.6.3 for trench drains.
3. Material: 304 Stainless Steel, 16-gage.
4. Outlet: See schedule on plans.
5. Grate Material: See schedule on plans.
6. Grate Finish: See schedule on plans.

2.4 ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Acorn Engineering Company; Elmdor/Stoneman Div.
 - b. Thaler Metal Industries Ltd.

- ### B. Description: Manufactured assembly made of 6.0-lb/sq. ft., 0.0938-inch-thick, lead flashing collar and skirt extending at least 10 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.

1. Open-Top Vent Cap: Without cap.
2. Low-Silhouette Vent Cap: With vandal-proof vent cap.
3. Extended Vent Cap: With field-installed, vandal-proof vent cap.

2.5 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ProSet Systems Inc.
2. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
3. Size: Same as connected soil, waste, or vent stack.
4. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
5. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
6. Special Coating: Corrosion resistant on interior of fittings.

2.6 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Open Drains:

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping with increaser fitting of size indicated.

B. Deep-Seal Traps:

1. Description: Cast-iron casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
2. Size: Same as connected waste piping.
 - a. NPS 2: 4-inch-minimum water seal.
 - b. NPS 2-1/2 and Larger: 5-inch-minimum water seal.

C. Air-Gap Fittings:

1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
2. Body: Bronze or cast iron.
3. Inlet: Opening in top of body.
4. Outlet: Larger than inlet.
5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

2.7 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
2. Vent Pipe Flashing: 3.0-lb/sq. ft., 0.0469-inch thickness.
3. Burning: 6-lb/sq. ft., 0.0938-inch thickness.

B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:

1. General Applications: 12 oz./sq. ft.
 2. Vent Pipe Flashing: 8 oz./sq. ft..
- C. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04- inch minimum thickness, unless otherwise indicated. Include G90 hot-dip galvanized, mill- phosphatized finish for painting if indicated.
 - D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.
 - E. Fasteners: Metal compatible with material and substrate being fastened.
 - F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
 - G. Solder: ASTM B 32, lead-free alloy.
 - H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

PART 3 - EXECUTION

3.1 CONCRETE BASES

- A. Anchor grease interceptors to concrete bases.
 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 19-inch centers around full perimeter of base.
 2. For installed equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be imbedded.
 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
 5. Concrete base construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."
 6. Cast-in-place concrete materials and placement requirements are specified in Division 03.

3.2 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated or required per the state plumbing code.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with cover flush with finished wall.
- E. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 1. Position floor drains for easy access and maintenance.

2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4- inch total depression.
 - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
 - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1- inch total depression.
 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- F. Install trench drains at low points of surface areas to be drained. Set grates of drains flush with finished surface, unless otherwise indicated.
 - G. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
 - H. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
 - I. Install through-penetration firestop assemblies in plastic conductors and stacks at floor penetrations.
 - J. Assemble open drain fittings and install with top of hub 2 inches above floor.
 - K. Install deep-seal traps on floor drains and other waste outlets, if indicated.
 - L. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
 - M. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
 - N. Install wood-blocking reinforcement for wall-mounting-type specialties.
 - O. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.
 - P. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FLASHING INSTALLATION

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
 1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft., 0.0938-inch thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft., 0.0625-inch thickness or thinner.
 2. Copper Sheets: Solder joints of copper sheets.

- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
 - 1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
 - 2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
 - 3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200mm) around specialty.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.
- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Division 07 Section "Sheet Metal Flashing and Trim."
- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.
- G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.5 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.6 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

**SECTION 224000
PLUMBING FIXTURES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following conventional plumbing fixtures and related components:
 - 1. Faucets for lavatories, showers, and sinks.
 - 2. Flushometers.
 - 3. Toilet seats.
 - 4. Protective shielding guards.
 - 5. Fixture supports.
 - 6. Water closets.
 - 7. Urinals.
 - 8. Lavatories.
 - 9. Commercial sinks.
 - 10. Individual showers.
 - 11. Water Coolers.
- B. Related Sections include the following:
 - 1. Division 22 Section "Domestic Water Piping Specialties" for backflow preventers, floor drains, and specialty fixtures not included in this Section.

1.3 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- C. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.
- D. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.
- E. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.
- F. FRP: Fiberglass-reinforced plastic.
- G. PMMA: Polymethyl methacrylate (acrylic) plastic.
- H. PVC: Polyvinyl chloride plastic.
- I. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.4 SUBMITTALS

- A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.
- D. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
 - 1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101- 336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.
- D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- G. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
 - 1. Solid-Surface-Material Lavatories and Sinks: ANSI/ICPA SS-1.
 - 2. Stainless-Steel Commercial, Handwash Sinks: NSF 2 construction.
 - 3. Vitreous-China Fixtures: ASME A112.19.2M.
 - 4. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.
- H. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
 - 1. Faucets: ASME A112.18.1.
 - 2. Hose-Coupling Threads: ASME B1.20.7.
 - 3. NSF Potable-Water Materials: NSF 61.
 - 4. Supply Fittings: ASME A112.18.1.
 - 5. Brass Waste Fittings: ASME A112.18.2.
- I. Comply with the following applicable standards and other requirements specified for shower faucets:
 - 1. Devices for Hand-Held Showers: ASME A112.18.3M.
 - 2. Combination, Pressure-Equalizing and Thermostatic-Control Antiscald Faucets: ASSE 1016.
 - 3. Faucets: ASME A112.18.1.
 - 4. Hand-Held Showers: ASSE 1014.
 - 5. High-Temperature-Limit Controls for Thermal-Shock-Preventing Devices: ASTM F 445.
 - 6. Hose-Coupling Threads: ASME B1.20.7.

- J. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
 - 1. Atmospheric Vacuum Breakers: ASSE 1001.
 - 2. Brass and Copper Supplies: ASME A112.18.1.
 - 3. Brass Waste Fittings: ASME A112.18.2.
 - 4. Battery-Operation Flushometers: ASSE 1037 and UL 1951.

- K. Comply with the following applicable standards and other requirements specified for miscellaneous components:
 - 1. Floor Drains: ASME A112.6.3.
 - 2. Grab Bars: ASTM F 446.
 - 3. Hose-Coupling Threads: ASME B1.20.7.
 - 4. Plastic Toilet Seats: ANSI Z124.5.
 - 5. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.6 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fixtures that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of controls
 - b. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Period for Commercial Applications: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

- 2.1 Vitreous fixtures shall be American Standard, Kohler, Zurn, or approved equal.
- 2.2 Lavatory carriers shall be Jay R. Smith, Josam, Zurn, or approved equal.
- 2.3 Electric water coolers shall be Oasis, Haws, Elkay, or approved equal.
- 2.4 Water closet seats shall be Bemis, Olsonite, Zurn or approved equal.
- 2.5 Plumbing fixture trim shall be American Standard, T&S Brass, Zurn or approved equal.
- 2.6 Stainless steel sinks shall be Advance Tabco, Crowne, Elkay, Just, or approved equal.
- 2.7 Stainless steel showers shall be Acorn, Willoughby, or approved equal.
- 2.8 Refer to Plumbing Fixture Schedule on drawings for Manufacturer, Model Number and Description.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.
- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
 - 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
 - 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
 - 3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-mounting fixtures with tubular waste piping attached to supports.
- F. Install counter-mounting fixtures in and attached to casework.
- G. Install fixtures level and plumb according to roughing-in drawings.
- H. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
 - 1. Exception: Use ball or globe valves if supply stops are not specified with fixture. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- I. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- J. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- K. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- L. Install toilet seats on water closets.
- M. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- N. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- O. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- P. Install shower flow-control fittings with specified maximum flow rates in shower arms.
- Q. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
 - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
- R. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Common Work Results for Plumbing."
- S. Set service basins in leveling bed of cement grout. Grout is specified in Division 22 Section "Common Work Results for Plumbing."

- T. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

3.5 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.
- C. Replace washers and seals of leaking and dripping faucets and stops.
- D. Install fresh batteries in sensor-operated mechanisms.

3.6 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
 - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
 - 2. Remove sediment and debris from drains.
- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.7 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION

**SECTION 230500
COMMON WORK RESULTS FOR HVAC**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. All work and material on this project shall be in compliance with all local, state and federal regulations including but not limited to the following:
 - 1. Established Federal Standards of the Occupational Safety and Health Administration under the Department of Labor.
 - 2. New Jersey UCC as based on International Building Code 2018.
 - 3. International Mechanical Code 2018.
 - 4. International Energy Conservation 2018.
- C. The above regulations are considered a part of the specifications and shall prevail should they differ with the plans and specifications. Prior to construction the Contractor shall notify the Architect of the difference. Should the Contractor not so notify the Architect, the Contractor shall fully comply without claim for extra costs.

1.2 SUMMARY

- A. This section includes General Provisions for HVAC/Mechanical work.
- B. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Sleeves.
 - 5. Escutcheons.
 - 6. Grout.
 - 7. Equipment installation requirements common to equipment sections.
 - 8. Painting and finishing.
 - 9. Concrete bases.
 - 10. Supports and anchorages.

1.3 DEFINITIONS

- A. **Finished Spaces:** Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. **Exposed, Interior Installations:** Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. **Concealed, Interior Installations:** Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- D. **Exposed, Exterior Installations:** Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.4 SUBMITTALS

A. SHOP DRAWINGS AND OTHER RELATED SUBMITTALS

1. The type submittal information required for each item of equipment shall be as indicated in the individual sections of the specification.
2. When a substitute item of equipment has been submitted for approval, submit layout drawings indicating the changes necessary to adapt the substituted item of equipment to the system design.
3. Submittal data shall include Specification data, such as metal gauges, finishes, optional accessories, etc., even though such equipment and materials may be detailed on the drawings or specified. In addition, the submittal data shall include performance (certification) data, wiring diagrams where applicable, accurate dimensional data and a recommended spare parts list. Outline or dimensional drawings alone are not acceptable. No roughing-in, connections, etc., shall be done until Architect reviewed equipment submittals are in the hands of the Contractors. It shall be the Contractor's responsibility to obtain drawings and to make all connections, etc., in the neatest and most workmanlike manner possible.
4. In general, normal catalog information (with the particular items underlined or otherwise denoted as being the submitted item) will be acceptable as submittal data. Installation, operating and maintenance instructions must be that information, specifically applicable to the items furnished, ordinarily supplied with the equipment to the Owner with any modifications indicated. Wiring diagrams must be correct for the application. Generalized wiring diagrams, showing alternate methods of connection, will not be acceptable unless all unrelated sections are marked. out. Submittal data sheets, which indicate several different model numbers, figure numbers, optional accessories, installation arrangements, etc., shall be clearly marked to indicate the specific items of equipment to be furnished. Samples and certificates shall be furnished as requested. Submittal data must be complete for each piece of equipment; piecemeal data will not be processed.
5. It shall be noted that the reviewing of shop drawings by the Architect applies only to general design, arrangement, type, capacity, and quality. Such review does not apply to quantities, dimensions, connection locations and the like. In all cases, the Contractor alone shall be responsible for furnishing the proper quantity of equipment and/or materials required, that all equipment fits the available space in a satisfactory manner, all equipment characteristics are appropriate and that all connections are suitably located.
6. Before the project is accepted, all submittal data (shop drawings, etc.) must be complete and reviewed.
7. After equipment requiring temperature control connection has been reviewed, furnish complete manufacturer's data and wiring diagrams to the Automatic Temperature Control Supplier.

B. Product Data: For the following:

1. Transition fittings.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Escutcheons.

C. Welding certificates.

1.5 SUBSTITUTION OF MATERIALS AND EQUIPMENT

- A. When the Contractor requests approval of substitute materials and/or equipment, except when under formal alternate proposal, it shall be understood and agreed that such substitution, if approved, will be made without cost to the Owner, regardless of changes in connections, spacing, electrical service, etc. In all cases where substitutions affect other trades the Contractor offering such substitutions shall reimburse all affected Contractors for all necessary changes in their work (without cost to Owner).

1.6 QUALITY ASSURANCE

- A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers and subcontractors required to countersign special warranties with the Contractor.
- B. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture. Cover all delivered sections of ductwork such that dirt and moisture are not introduced prior to installation.

1.8 COORDINATION

- A. Coordination Between Trades:
 - 1. Carefully examine all architectural, structural, electrical and any other drawings and specifications pertaining to the construction before fabricating and installing the work described and indicated under these drawings and specifications. Cooperate with all other Contractors in locating piping, ductwork, sleeves, equipment, etc., in order to avoid conflict with all other Contractor's work. No extra compensation will be allowed to cover the cost of relocating piping, ducts, etc., or equipment found encroaching on space required by others.
 - 2. Lay out work from construction lines and levels established by the General Contractor. This Contractor shall be responsible for the proper location and placement of his work.
 - 3. Any discrepancies occurring on the accompanying drawings and between the drawings and the specifications shall be reported to the Architect prior to any fabrication and installation so that a workable solution can be presented. Extra payment will not be allowed for the relocation of, or revision to, piping, ductwork, equipment, etc., not installed in accordance with the above instructions, and which interferes with work and equipment of other trades.
- B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.
- C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- D. Coordination Drawings - Refer to Division 23 Section 23 31 13 "Metal Ducts" for requirements of coordination drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 23 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C).
 - 1. Available Manufacturers:
 - a. Watts Industries, Inc.; Water Products Div.
 - b. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.
 - 1. Available Manufacturers:
 - a. Epco Sales, Inc.
 - b. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Available Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Central Plastics Company.
 - c. Pipeline Seal and Insulator, Inc.

2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig (1035- or 2070-kPa) minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).
1. Available Manufacturers:
 - a. Calpico, Inc.
 - b. Lochinvar Corp.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).
1. Available Manufacturers:
 - a. Precision Plumbing Products, Inc.
 - b. Sioux Chief Manufacturing Co., Inc.
 - c. Victaulic Co. of America.

2.5 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
1. Available Manufacturers:
 - a. Calpico, Inc.
 - b. Metraflex Co.
 - c. Pipeline Seal and Insulator, Inc.
 2. Sealing Elements: EPDM and/or NBR interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 3. Pressure Plates: Stainless steel. Include two for each sealing element.
 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.6 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
1. Underdeck Clamp: Clamping ring with set screws.

2.7 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
1. Finish: Polished chrome-plated.

- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw or spring clips, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.8 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 STRUCTURAL RESPONSIBILITY

- A. Properly shore, brace, support, etc., any construction to guard against cracking, settling, collapsing, displacing or weakening. No structural member shall be cut without the written consent of the Architect.
- B. Any damage occurring to the structure, due to failure to exercise proper precautions or due to action of the elements, shall be promptly and properly made good to the satisfaction of the Owner or Architect, without cost.

3.2 EXISTING IMPROVEMENTS

- A. Maintain in operating condition all active utilities, sewer, gutters and other drains, etc., encountered in the utility installation. Repair to the satisfaction of the Architect and the Owner any surfaces or subsurface improvements damaged during the course of the work, unless such improvement is shown to be abandoned or removed.
- B. Any obstructing utilities encountered in the course of this work, not shown on the drawings, nor evident during inspection prior to starting the work, shall be relocated as directed by the Architect.

3.3 PROTECTION OF THE BUILDING AND STORED EQUIPMENT

- A. Do not store materials or equipment on any floor or roof of building in such quantity that these parts of the building will be overloaded in any way. Do not move heavy equipment across any floor or roof without first submitting the details of the work to the Architect and having obtained his approval. In cases where frequent movement of men or materials over the roof is encountered, provide walking boards or other suitable protection for the roofing.
- B. Provide suitable storage for, and completely protect all materials and equipment prior to installation. Storage shall be dry, clean and safe. Any materials or equipment lost through theft or mishandling shall be replaced, all without additional cost to the Owner.

3.4 DRAWINGS

- A. The drawings accompanying these specifications are diagrammatic and indicate the general design and arrangement of the proposed work. Do not scale drawings for the exact location of equipment and work. The exact routing and/or location of piping, ductwork, sleeves, equipment, etc., unless specifically dimensioned on the drawings, shall be determined to suit field conditions encountered, and to avoid interferences with other Contractors' work.

3.5 EQUIPMENT CONNECTIONS

- A. Make all water and drainage connections, etc., to equipment furnished by others under this Contract whenever such equipment is shown on any of the drawings or mentioned in any section of the specifications, unless otherwise specifically specified hereinafter.

3.6 TOOLS

- A. Furnish and install all special wrenches, valve handles, keys, or other special tools as necessary to dismantle or service any piece of equipment installed. This shall include thermostat keys in the number directed by the Architect.

3.7 PERMITS AND APPROVALS

- A. All permits and certificates of approval for the complete system shall be obtained by the respective Contractors from the authorities governing such work. The cost of all permits, tap-in-fees and approvals shall be borne by the Contractor furnishing the work, except as noted in the General Requirements. All work shall be approved by the Architect before final payment will be made.

3.8 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:

- a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - c. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with concealed or exposed-rivet hinge and spring clips set screw or spring clips.
 - d. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - e. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw or spring clips.
 - f. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor- plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 92 00 Section "Joint Sealants" for materials and installation.
- P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 84 13 Section "Penetration Firestopping" for materials.
- Q. Verify final equipment locations for roughing-in.
- R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.9 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- F. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding

operators according to Part 1 "Quality Assurance" Article.

- G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.10 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.11 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.12 PAINTING

- A. Painting of HVAC systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.13 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.
 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 7. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement.

3.14 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.15 GROUTING

- A. Mix and install grout for HVAC equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

3.16 INSTALLATION

- A. All equipment shall be installed at locations indicated.
- B. Assembly and installation of equipment shall be in strict accordance with manufacturer's installation instructions.
- C. Equipment shall be securely anchored in place. Care shall be exercised to correctly orient equipment before securing in place.

3.17 EQUIPMENT PADS AND GROUTING

- A. Floor-mounted equipment, such as air handling units, boilers, water heaters, etc., shall be provided with a suitable concrete pad. Each pad shall have suitable hold-down bolts in pipe sleeves, of sufficient number to properly secure the apparatus. Hold-down bolts shall be accurately located by template prepared from actual measurement of the equipment or from certified drawings furnished by the equipment manufacturer. Hold-down bolts shall be set in wrought iron pipe sleeves $\frac{3}{4}$ " larger than the bolts to facilitate alignment of equipment.
- B. All pads shall be complete with all pipe sleeves, anchor bolts, reinforcing steel, concrete, etc., as required. Pads larger than 18" in width shall be reinforced with $\frac{1}{2}$ " bars on 9" centers, both ways. Bars shall be approximately 3" below top of pad. All parts of pads and foundations shall be properly spaced. If exposed parts of the pads and foundations are rough after removing forms, all rough surfaces shall be rubbed to a smooth surface.
- C. Pads, unless indicated otherwise, shall extend 4" above the finished floor and shall be securely anchored to the floor so vibration or stresses cannot cause lateral movement.
- D. In general, pads for equipment such as air handling units, pumps, etc., shall extend 6" beyond base dimensions.

- E. Where grouting is required, equipment shall be set to use by jack screws or by use of wedges where no jack screws are provided. After grout has set up, the supporting jack screws or wedges shall be removed and the holes left by removal of the wedges shall be dry packed.

3.18 EQUIPMENT MOUNTING

- A. All equipment with moving parts, such as fans, air handling units, etc., shall be mounted on vibration supports and in addition, said equipment shall be isolated from external connections, such as piping, ducts, raceways, etc., by means of flexible connectors.
- B. Unitary equipment, such as small exhaust fans, etc., shall be rigidly braced and mounted to wall, floor, or ceiling, as required, and tightly gasketed and sealed to mounting surface to prevent air leakage and to obtain quiet operation.
- C. Where drivers are connected with couplings, the alignment shall be checked and the driver reconnected. Couplings shall have tolerances as indicated by the manufacturer.
- D. Where drivers are connected with belt or chain drives, the driver and driver shafts shall be aligned parallel. The motor adjustment shall be loosened sufficiently to put on the belts or chain and then tightened to the proper centerline distance or tension. No belt compound shall be used.

3.19 PLATFORMS AND SUPPORTING STANDS

- A. Each piece of equipment or apparatus mounted above the floor level shall be supported in accordance with the best recognized practice.
- B. Such supporting or mounting means shall be provided by each Contractor for all equipment furnished by him.
- C. Exercise extreme care that structural members of building are not overloaded by such equipment.
- D. All structural members of platforms, supporting stands, etc., shall be factory prime coated.
- E. Finish painting shall be the responsibility indicated under SECTION PAINTING, DIVISION FINISHES.

3.20 METAL GUARDS

- A. Furnish and install in approved expanded metal or sheet metal guard around all exposed moving and rotating parts, such as pump couplings, belt drives, fan belts, etc.

3.21 FRAMING

- A. All rectangular or special shaped openings in walls, partitions, roofs, ceilings, etc., including plaster, stucco, or similar materials shall be framed by means of plaster frames, casing beads, wood or metal angle members, as required. The intent of this paragraph is to prohibit cutting and patching in new construction and to provide smooth, even termination of wall, floor, and ceiling finishes, as well as to provide a fastening means for grilles, diffusers, etc. Lintels shall be provided over all openings in walls, etc., when not specifically indicated elsewhere. Lintels shall be of size and shape to prevent excessive deflection and shall be approved by Architect prior to installation.

3.22 CUTTING, FITTING AND PATCHING

- A. Each respective Contractor shall do all cutting and drilling of masonry, steel, wood, or iron work, and all fitting necessary for the proper installation of all apparatus and materials.
- B. No cutting or drilling of the structure, of any kind, shall be done without first obtaining permission from Architect. All cutting and drilling shall be done under the supervision of the General Contractor in strict accordance with instructions furnished by Architect.

- C. All patching and finishing shall be the responsibility of the Contractor whose cutting or drilling makes such patching and finishing necessary. Patching and finishing shall be done by workmen skilled in the trade affected (masonry, plastering, painting, etc.).

3.23 CLEANING, TESTING AND PREPARATION FOR START-UP

- A. All equipment shall be cleaned of all foreign material.
- B. All equipment shall be lubricated and placed in proper working order. Drives on rotating equipment shall be checked for proper rotation and alignment. V-belt drives shall be checked and adjusted for proper tension. All fans shall be operated for at least 24 hours so that the initial stretch of the V-belt drives will take place before testing. When the belts have stretched, the fan drives shall be realigned and adjusted for tightness to make sure that the excess slippage is eliminated. All drives shall be set for the recommended speeds. All sheaves and bearing blocks shall be checked for any loose screws or nuts.
- C. All controls and safety devices shall be checked to determine that they are in place and properly installed.
- D. Where equipment is intended to contain fluids, it shall be filled and tested for leaks as recommended by the equipment manufacturer.
- E. Equipment shall be operated for a reasonable time to determine any undue vibration, heating of parts, or other improper operation.

END OF SECTION

SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes TAB to produce design objectives for the following:
 - 1. Air Systems:
 - a. Constant-air-volume systems.
 - b. Variable-air-volume systems.
 - 2. HVAC equipment quantitative-performance settings.
 - 3. Verifying that automatic control devices are functioning properly.
 - 4. Reporting results of activities and procedures specified in this Section.

1.2 SUBMITTALS

- A. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.
- B. Warranties specified in this Section.

1.3 QUALITY ASSURANCE

- A. TAB Firm Qualifications: Engage a TAB firm certified by AABC, NEBB or TABB.
- B. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 - 2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.
- C. TAB Report Forms: Use standard forms from AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems." NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems." or SMACNA's TABB "HVAC Systems - Testing, Adjusting, and Balancing." TAB firm's forms approved by Architect. TABB "Contractors Certification Manual."
- D. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2019, Section 7.2.2 - "Air Balancing."
- E. ASHRAE/IESNA 90.1-2019 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2019, Section 6.7.2.3 - "System Balancing."

1.4 COORDINATION

- A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.
- B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.5 WARRANTY

- A. National Project Performance Guarantee: Provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract

Documents. Guarantee includes the following provisions:

1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
 2. Systems are balanced to optimum performance capabilities within design and installation limits.
- B. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee shall include the following provisions:
1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
 2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
 1. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- B. Examine approved submittal data of HVAC systems and equipment.
- C. Examine Project Record Documents described in Division 01 Section "Project Record Documents."
- D. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data including fan and pump curves. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.
- F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.
- G. Examine system and equipment test reports.
- H. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- I. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- J. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

- K. Examine terminal units, such as variable-air-volume boxes, to verify that they are accessible and their controls are connected and functioning.
- L. Examine strainers for clean screens and proper perforations.
- M. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.
- N. Examine system pumps to ensure absence of entrained air in the suction piping.
- O. Examine equipment for installation and for properly operating safety interlocks and controls.
- P. Examine automatic temperature system components to verify the following:
 - 1. Dampers, valves, and other controlled devices are operated by the intended controller.
 - 2. Dampers and valves are in the position indicated by the controller.
 - 3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
 - 4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.
 - 5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
 - 6. Sensors are located to sense only the intended conditions.
 - 7. Sequence of operation for control modes is according to the Contract Documents.
 - 8. Controller set points are set at indicated values.
 - 9. Interlocked systems are operating.
- Q. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system readiness checks and prepare system readiness reports. Verify the following:
 - 1. Permanent electrical power wiring is complete.
 - 2. Hydronic systems are filled, clean, and free of air.
 - 3. Automatic temperature-control systems are operational.
 - 4. Equipment and duct access doors are securely closed.
 - 5. Balance, smoke, and fire dampers are open.
 - 6. Isolating and balancing valves are open and control valves are operational.
 - 7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - 8. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in ASHRAE 111, AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems", NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", SMACNA's TABB "HVAC Systems - Testing, Adjusting, and Balancing" and this Section.
 - 1. Comply with requirements in ASHRAE 62.1-2019, Section 7.2.2 - "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes

and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

- C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan- speed-control levers, and similar controls and devices, to show final settings.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.
- E. Check airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling unit components.
- L. Check for proper sealing of air duct system.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS (EXHAUST FANS)

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure fan static pressures to determine actual static pressure as follows:
 - a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
 - 2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.
 - 3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers, under final balanced conditions.

4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
 5. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
 6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
 - a. Where sufficient space in submain and branch ducts is unavailable for Pitot- tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure terminal outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust terminal outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a maximum set- point airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced airflow terminal units so they are distributed evenly among the branch ducts.
- B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
1. Set outside-air dampers at minimum, and return- and exhaust-air dampers at a position that simulates full-cooling load.
 2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.

3. Measure total system airflow. Adjust to within indicated airflow.
4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units as described for constant-volume air systems.
5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow as described for constant-volume air systems.
 - a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.
6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.
7. Measure static pressure at the most critical terminal unit and adjust the static- pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
8. Record the final fan performance data.

3.7 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 1. Manufacturer, model, and serial numbers.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Efficiency rating.
 5. Nameplate and measured voltage, each phase.
 6. Nameplate and measured amperage, each phase.
 7. Starter thermal-protection-element rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass for the controller to prove proper operation. Record observations, including controller manufacturer, model and serial numbers, and nameplate data.

3.8 PROCEDURES FOR TEMPERATURE MEASUREMENTS

- A. During TAB, report the need for adjustment in temperature regulation within the automatic temperature-control system.
- B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of two successive eight-hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.
- C. Measure outside-air, wet- and dry-bulb temperatures.

3.9 TEMPERATURE-CONTROL VERIFICATION

- A. Verify that controllers are calibrated and commissioned.
- B. Check transmitter and controller locations and note conditions that would adversely affect control functions.
- C. Record controller settings and note variances between set points and actual measurements.
- D. Check the operation of limiting controllers (i.e., high- and low-temperature controllers).
- E. Check free travel and proper operation of control devices such as damper and valve operators.
- F. Check the sequence of operation of control devices. Note air pressures and device positions and correlate

with airflow and water flow measurements. Note the speed of response to input changes.

- G. Check the interaction of electrically operated switch transducers.
- H. Check the interaction of interlock and lockout systems.
- I. Check main control supply-air pressure and observe compressor and dryer operations.
- J. Record voltages of power supply and controller output. Determine whether the system operates on a grounded or nongrounded power supply.
- K. Note operation of electric actuators using spring return for proper fail-safe operations.

3.10 TOLERANCES

- A. Set HVAC system airflow and water flow rates within the following tolerances:
 - 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 5 to plus 10 percent.
 - 2. Air Outlets and Inlets: 0 to minus 10 percent.
 - 3. Heating-Water Flow Rate: 0 to minus 10 percent.

3.11 FINAL REPORT

- A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.
- B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
 - 1. Include a list of instruments used for procedures, along with proof of calibration.
- C. Final Report Contents: In addition to certified field report data, include the following:
 - 1. Fan curves.
 - 2. Manufacturers' test data.
 - 3. Field test reports prepared by system and equipment installers.
 - 4. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.
- D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:
 - 1. Title page.
 - 2. Name and address of TAB firm.
 - 3. Project name.
 - 4. Project location.
 - 5. Architect's name and address.
 - 6. Engineer's name and address.
 - 7. Contractor's name and address.
 - 8. Report date.
 - 9. Signature of TAB firm who certifies the report.
 - 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 - 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer, type size, and fittings.
 14. Notes to explain why certain final data in the body of reports varies from indicated values.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outside-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Fan drive settings including settings and percentage of maximum pitch diameter.
 - e. Settings for supply-air, static-pressure controller.
 - f. Other system operating conditions that affect performance.
- E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outside, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.
 6. Balancing stations.
 7. Position of balancing devices.

3.12 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.

END OF SECTION

**SECTION 233300
AIR DUCT ACCESSORIES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Backdraft and pressure relief dampers.
 2. Manual volume dampers.
 3. Flange connectors.
 4. Turning vanes.
 5. Duct-mounted access doors.
 6. Flexible connectors.
 7. Flexible ducts.
 8. Duct accessory hardware.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
 - a. Special fittings.
 - b. Manual volume damper installations.
 - c. Control damper installations.
 - d. Fire-damper installations, including sleeves; and duct-mounted access doors.
 - e. Wiring Diagrams: For power, signal, and control wiring.
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with AMCA 500-D testing for damper rating.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 1. Galvanized Coating Designation: G90 (Z275).
 2. Exposed-Surface Finish: Mill phosphatized.
- C. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

2.2 BACKDRAFT AND PRESSURE RELIEF DAMPERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Air Balance Inc.; a division of Mestek, Inc.
 2. American Warming and Ventilating; a division of Mestek, Inc.
 3. Cesco Products; a division of Mestek, Inc.
 4. Duro Dyne Inc.
 5. Greenheck Fan Corporation.
 6. Lloyd Industries, Inc.
 7. Nailor Industries Inc.
 8. NCA Manufacturing, Inc.
 9. Pottorff; a division of PCI Industries, Inc.
 10. Ruskin Company.
 11. SEMCO Incorporated.
 12. Vent Products Company, Inc.
- B. Description: Gravity balanced.
- C. Maximum Air Velocity: 2000 fpm.
- D. Maximum System Pressure: 1-inch wg.
- E. Frame: 0.052-inch-thick, galvanized sheet steel 0.063-inch-thick extruded aluminum or 0.052-inch-thick stainless steel, with welded corners and mounting flange.
- F. Blades: Multiple single-piece blades, center-pivoted, maximum 6-inch width, 0.025-inch-thick, roll-formed aluminum or 0.050-inch-thick aluminum sheet with sealed edges.
- G. Blade Action: Parallel.
- H. Blade Seals: Felt, Vinyl foam, Extruded vinyl, mechanically locked or Neoprene, mechanically locked.
- I. Blade Axles:
1. Material: Nonferrous metal, Galvanized steel, Plated steel, Stainless steel, Non-metallic or Aluminum.
 2. Diameter: 0.20 inch.
- J. Tie Bars and Brackets: Aluminum or Galvanized steel.
- K. Return Spring: Adjustable tension.
- L. Bearings: Steel ball or synthetic pivot bushings.
- M. Accessories:
1. Adjustment device to permit setting for varying differential static pressure.
 2. Counterweights and spring-assist kits for vertical airflow installations.
 3. Screen Mounting: Rear mounted.
 4. Screen Material: Galvanized steel or Aluminum.
 5. Screen Type: Bird.
 6. 90-degree stops.

2.3 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering

products that may be incorporated into the Work include, but are not limited to, the following:

- a. Air Balance Inc.; a division of Mestek, Inc.
 - b. American Warming and Ventilating; a division of Mestek, Inc.
 - c. Flexmaster U.S.A., Inc.
 - d. McGill AirFlow LLC.
 - e. METALAIRE, Inc.
 - f. Nailor Industries Inc.
 - g. Pottorff; a division of PCI Industries, Inc.
 - h. Ruskin Company.
 - i. Trox USA Inc.
 - j. Vent Products Company, Inc.
2. Standard leakage rating, with linkage outside airstream.
 3. Suitable for horizontal or vertical applications.
 4. Frames:
 - a. Hat-shaped, galvanized or stainless-steel channels, 0.064-inch minimum thickness.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
 5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized Stainless-steel, 0.064 inch thick.
 6. Blade Axles: Galvanized steel, Stainless steel or Nonferrous metal.
 7. Bearings:
 - a. Oil-impregnated bronze, Molded synthetic or Stainless-steel sleeve.
 - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 8. Tie Bars and Brackets: Galvanized steel.
- B. Jackshaft:
1. Size: 1-inch diameter.
 2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
 3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.
- C. Damper Hardware:
1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
 2. Include center hole to suit damper operating-rod size.
 3. Include elevated platform for insulated duct mounting.

2.4 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Ductmate Industries, Inc.
 2. Nexus PDQ; Division of Shilco Holdings Inc.
 3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

- B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gage and Shape: Match connecting ductwork.

2.5 TURNING VANES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Ductmate Industries, Inc.
 - 2. Duro Dyne Inc.
 - 3. METALAIRE, Inc.
 - 4. SEMCO Incorporated.
 - 5. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- C. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-3, "Vanes and Vane Runners," and 2-4, "Vane Support in Elbows."
- D. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

2.6 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Warming and Ventilating; a division of Mestek, Inc.
 - 2. Cesco Products; a division of Mestek, Inc.
 - 3. Ductmate Industries, Inc.
 - 4. Flexmaster U.S.A., Inc.
 - 5. Greenheck Fan Corporation.
 - 6. McGill AirFlow LLC.
 - 7. Nailor Industries Inc.
 - 8. Pottorff; a division of PCI Industries, Inc.
 - 9. Ventfabrics, Inc.
 - 10. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."
 - 1. Door:
 - a. Double wall, rectangular.
 - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
 - c. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
 - d. Fabricate doors airtight and suitable for duct pressure class.
 - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
 - 3. Number of Hinges and Locks:
 - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
 - b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
 - c. Access Doors up to 24 by 48 Inches: Three hinges and two compression latches with

- d. outside and inside handles.
- d. Access Doors Larger Than 24 by 48 Inches: Four hinges and two compression latches with outside and inside handles.

2.7 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Ductmate Industries, Inc.
 - 2. Duro Dyne Inc.
 - 3. Ventfabrics, Inc.
 - 4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to 2 strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - 1. Minimum Weight: 26 oz./sq. yd..
 - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 - 3. Service Temperature: Minus 40 to plus 200 deg F.
- F. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.
 - 1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
 - 2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 - 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 - 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 - 6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
 - 7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

2.8 FLEXIBLE DUCTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Ductmate Industries, Inc.
 - 2. Flexmaster U.S.A., Inc
 - 3. McGill AirFlow LLC.
 - 4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene or aluminized vapor- barrier film.
 - 1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
 - 2. Maximum Air Velocity: 4000 fpm.
 - 3. Temperature Range: Minus 20 to plus 175 deg F.

4. Insulation R-Value: R6

C. Flexible Duct Connectors:

1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action or Nylon strap in sizes 3 through 18 inches, to suit duct size.

2.9 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts.

E. Set dampers to fully open position before testing, adjusting, and balancing.

F. Install test holes at fan inlets and outlets and elsewhere as indicated.

G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

1. On both sides of duct coils.
2. At outdoor-air intakes.
3. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
4. Upstream from turning vanes.
5. Control devices requiring inspection.
6. Elsewhere as indicated.

H. Install access doors with swing against duct static pressure.

I. Access Door Sizes:

1. One-Hand or Inspection Access: 8 by 5 inches.
2. Two-Hand Access: 12 by 6 inches.
3. Head and Hand Access: 18 by 10 inches.
4. Head and Shoulders Access: 21 by 14 inches.

J. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

- K. Install flexible connectors to connect ducts to equipment.
- L. For fans developing static pressures of 5-inch wg (1250 Pa) and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- M. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- N. Connect diffusers to ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- O. Connect flexible ducts to metal ducts with draw bands.
- P. Install duct test holes where required for testing and balancing purposes.
- Q. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch (6-mm) movement during start and stop of fans.
- R. Install turning vanes in supply duct only.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire dampers to verify full range of movement and verify that proper heat- response device is installed.
4. Inspect turning vanes for proper and secure installation.

END OF SECTION

**SECTION 233713
DIFFUSERS, REGISTERS, AND GRILLES**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rectangular and square ceiling diffusers.
2. Louver face diffusers.
3. Fixed face grilles.

B. Related Sections:

1. Division 23 Section "Air Duct Accessories" for fire and volume-control dampers not integral to diffusers, registers, and grilles.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

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

PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS

A. Rectangular and Square Ceiling Diffusers

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. A-J Manufacturing Co., Inc.
 - b. Anemostat Products; a Mestek company.
 - c. Carnes.
 - d. Hart & Cooley Inc.
 - e. Krueger.
 - f. METALAIRE, Inc.
 - g. Nailor Industries Inc.
 - h. Price Industries.
 - i. Titus.
 - j. Tuttle & Bailey.
3. Devices shall be specifically designed for variable-air-volume flows.
4. Material: Steel.
5. Finish: Baked enamel, color selected by Architect.
6. Face Size: As scheduled.
7. Face Style: Plaque.
8. Mounting: As scheduled.
9. Pattern: Fixed.

B. Louver Face Diffuser

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. A-J Manufacturing Co., Inc.
 - b. Anemostat Products; a Mestek company.
 - c. Carnes.
 - d. METALAIRE, Inc.
 - e. Nailor Industries Inc.
 - f. Price Industries.
 - g. Titus.
 - h. Tuttle & Bailey.
3. Devices shall be specifically designed for variable-air-volume flows.
4. Material: Steel.
5. Finish: Baked enamel, color selected by Architect.
6. Face Size: As scheduled.
7. Mounting: As scheduled.
8. Pattern: Core style, as scheduled.

2.2 REGISTERS AND GRILLES

A. Fixed Face Grille:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. A-J Manufacturing Co., Inc.
 - b. Anemostat Products; a Mestek company.
 - c. Carnes.
 - d. Dayus Register & Grille Inc.
 - e. Hart & Cooley Inc.
 - f. Krueger.
 - g. Nailor Industries Inc.
 - h. Price Industries.
 - i. Titus.
 - j. Tuttle & Bailey.
3. Material: Steel or Aluminum.
4. Finish: Baked enamel, color selected by Architect.
5. Face Arrangement: Core, as scheduled.
6. Core Construction: Integral.
7. Frame: As scheduled.
8. Mounting: As scheduled.

2.3 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers and grilles with airtight connections to ducts and to allow service and maintenance of dampers.

3.2 ADJUSTING

- A. After installation, adjust diffusers and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION

SECTION 238239.19
WALL AND CEILING UNIT HEATERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes wall and ceiling heaters with propeller fans and electric-resistance heating coils.

1.2 ACTION SUBMITTALS

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

1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

- B. Shop Drawings:

1. Include plans, elevations, sections, and details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include details of anchorages and attachments to structure and to supported equipment.
4. Include equipment schedules to indicate rated capacities, operating characteristics, furnished specialties, and accessories.
5. Wiring Diagrams: Power, signal, and control wiring.

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

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Airtherm; a Mestek company.
2. Berko; Marley Engineered Products.
3. Carrier Corporation; a unit of United Technologies Corp.
4. Chromalox, Inc.
5. Markel Products; TPI Corporation.
6. Marley Engineered Products.
7. QMark; Marley Engineered Products.
8. Trane.

2.2 DESCRIPTION

- A. Assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 by a qualified testing agency, and marked for intended location and application.

2.3 CABINET

- A. Front Panel: Extruded-aluminum bar grille, with removable panels fastened with tamperproof fasteners.

- B. Finish: Baked enamel over baked-on primer with manufacturer's color selected by Architect, applied to factory-assembled and -tested wall and ceiling heaters before shipping.
- C. Surface-Mounted Cabinet Enclosure: Steel with finish to match cabinet.

2.4 COIL

- A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless- steel hardware, and limit controls for high-temperature protection.

2.5 FAN AND MOTOR

- A. Fan: Aluminum propeller directly connected to motor.
- B. Motor: Permanently lubricated, multispeed. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.6 CONTROLS

- A. Controls: Unit-mounted thermostat.
- B. Electrical Connection: Factory wire motors and controls for a single field connection.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wall and ceiling unit heaters to comply with NFPA 90A.
- B. Install wall and ceiling unit heaters level and plumb.
- C. Install wall-mounted thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.
- D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

END OF SECTION

**SECTION 260500
COMMON WORK RESULTS FOR ELECTRICAL**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section applies to all work specified in Division 26.
- B. Provide all required materials, labor, equipment, installation, fabrication and testing required for a complete, safe, and fully operational system. System shall include all required materials and features whether specified or shown on drawings or not to comply with applicable codes and authorities having jurisdiction.
- C. The electrical installation shall be made in strict conformance with the latest edition and supplements in force at the time of bid opening of the National Electrical Code, the Rules and Regulations of the New Jersey Building Code, the applicable Standards of the National Fire Protection Association, and applicable requirements of the Occupational Safety and Health Act of the United States Department of Labor. All materials and equipment employed shall be approved by and bear the label of Underwriters' Laboratories, Inc., where such labeling is made available by any manufacturer for said materials or equipment. All codes and regulations applicable shall be considered as jointly governing and the requirements of either and all will prevail. If it occurs that Drawings conflict with any applicable code, then this Contractor shall immediately bring same to attention of Architect or his representative for resolution.

1.3 DESCRIPTION OF DOCUMENTS

- A. The Drawings are generally diagrammatic and indicate the general design and arrangement of the proposed work. Do not scale drawings for the exact location of equipment and work. The exact routing of circuits and final location of all the electrical equipment, lighting fixtures, and other systems, unless specifically dimensioned on the Drawings, shall be subject to building and structural conditions, grid systems, and work of other trades involved in the construction, and subject to the approval of the Architect. The Contractor shall familiarize himself with the Contract Documents, and shall be responsible for the final location of his particular equipment to suit field conditions encountered and to avoid interferences with other trades' work, without extra cost to the Owner or the Architect. The Contractor shall visit the job site to determine the job conditions. The Architect reserves the right to make minor changes in outlet and equipment locations at any time prior to rough-in of the electrical work without incurring any additional costs.
- B. Where sizes are not provided for material and equipment, the material and equipment shall be sized in accordance with the latest addition of the National Electrical Code and in accordance with the manufacturer's recommendations.

1.4 DEFINITIONS

- A. The term "finished space" shall mean any space designated for the general or specific use of the occupants.
- B. The term "concealed space" shall mean all furred spaces, pipe chases, spaces above finished ceilings, crawl spaces, and other areas not generally accessible to the occupants.
- C. The term "electrical space" as used in this division of the specifications shall mean any space designated primarily for the installation of electrical equipment.

- D. "Provide" - Furnish and install the specific item, equipment, and/or system.
- E. "Furnish" - Supply the specific item, equipment, and/or system.
- F. "Install" - Set in position and adjust for use the specific item, equipment, and/or system unless otherwise specifically noted to be installed by others.
- G. "Concealed" - Hidden from sight in walls, chases, furred spaces, above ceilings, underground, in concrete, etc.
- H. "Exposed" - Not hidden from sight.
- I. "Work" - Labor and installation, including materials, equipment, and systems required for completion of all portions of the project.

1.5 CODES AND STANDARDS

- A. Following is a list of abbreviations for codes and standards which are referred to in the Specifications. Where such reference is made, the code or standard becomes a part of these Specifications as if the code or standard were included herein. Reference is always to the latest edition of the code or standard unless otherwise specifically noted.

ANSI - American National Standards Institute, Inc. NFPA - National Fire Protection Association

ASTM - American Society for Testing and Materials NBS - National Bureau of Standards

NEMA - National Electrical Manufacturers Association UL - Underwriters' Laboratories, Inc.

NEC - National Electrical Code

NESC - National Electrical Safety Code

IPCEA - Insulated Power Cable Engineers Assn. IEEE - Institute of Electrical and Electronics Engineers

OSHA - Occupational Safety and Health Act

IES - Illuminating Engineering Society JIC - Joint Industrial Council

1.6 GUARANTEES AND WARRANTIES

- A. This Contractor shall guarantee all equipment, apparatus, materials, and workmanship entering into the Contract to be the best of its respective kind, and shall replace all parts at his expense which are defective within one year from final acceptance of the work by the Architect. Items of equipment which may have longer guarantees shall have warranties and guarantees completed, in order, and in effect at the time of final acceptance of the work by the Architect. This Contractor shall furnish all such warranties and guarantees at the time of final acceptance of the work.
- B. All work that is not installed in accordance with the Contract Documents shall be repaired or replaced at the direction of the Architect.

1.7 SUBMITTAL

- A. Submittals shall be made in accordance with Submittals paragraph in Division 1.
- B. Submittal data shall include specification data, such as metal gauges, finishes, optional accessories; even though such equipment and materials may be as specified. In addition, the submittal data shall include performance (certification) data, wiring diagrams where applicable, accurate dimensional data, and a recommended spare parts list. Outline or dimensional drawings alone are not acceptable.
- C. No roughing-in or connections shall be done until accepted equipment submittals are in the hands of the Contractor. It shall be this Contractor's responsibility to obtain accepted drawings and to make all connections in the neatest and most workmanlike manner possible. This Contractor shall coordinate with all other Contractors having any connections or roughing-in to the equipment.
- D. In general, normal catalog information (with the particular items underlined or otherwise denoted as being the submitted item) will be accepted as submittal data. Installation, operating and maintenance

instructions must be that information specifically applicable to the items furnished, which is ordinarily supplied with the equipment to the Owner, for any modifications indicated. Wiring diagrams must be correct for the application. Generalized wiring diagrams, showing alternate methods of connection, will not be acceptable unless all unrelated sections are marked out. Submittal data sheets which indicate several different model numbers, figure numbers, optional accessories, or installation arrangements shall be clearly marked to indicate the specific items of equipment being furnished. Samples and certificates shall be furnished as requested. Submittal data must be complete for each piece of equipment; piecemeal data will not be processed.

- E. It shall be noted that acceptance of shop drawings by the Architect applies only to general design, arrangement, type, capacity, and quality. Such acceptance does not relieve the Contractor of the responsibility for furnishing the proper equipment.
- F. Corrections or comments made on the submittals during the Architect's review do not relieve the Contractor from compliance with the Drawings and Specifications. The Architect's review of submittals is only for general conformance with design concept and general compliance with the information given in the Contract Documents. The Contractor's responsibility includes, but is not limited to, conforming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner.

1.8 SUBSTITUTIONS

- A. When this Contractor requests approval of substitute materials and/or equipment, except where under formal alternate proposal, it shall be understood that such substitution, if approved, will be made without cost to the Owner and Architect, regardless of changes. In all cases where substitutions affect other trades, the Contractor offering such substitutions shall reimburse all affected contractors for all necessary changes in their work.

1.9 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance data shall be submitted in accordance with the requirements of Division "GENERAL REQUIREMENTS".

1.10 RECORD DRAWINGS

- A. This Contractor shall submit to the Owner Record Drawings. Drawings shall be identified with the Contractor's name, the date, and title "RECORD DRAWINGS" on the paper copies.

1.11 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways and cables will be clear of obstructions and of the working and access space of other equipment.
- B. The Contractor shall coordinate with all other contractors in locating conduit, light fixtures, boxes, and equipment in order to avoid conflict with all other trades' work. No extra compensation will be allowed to cover the cost of relocating light fixtures, conduit, boxes, or other electrical equipment found encroaching on space required by others.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Material and equipment shall be furnished as specified in this section and each individual electrical section of these Specifications and shall be in strict accordance with applicable ANSI, NBS, ASTM, NESC, NEMA, IEEE, IPCEA, UL, NEC, OSHA and NFPA standards, codes, and specifications. Applicable codes, standards, and manufacturers' products referred to in these Specifications shall establish minimum requirements for materials and equipment furnished for this installation.
 - B. When two or more articles of the same material or equipment are required, they shall be of the same manufacturer.
- 2.2 Bolting shall be carbon steel conforming to ASTM A-307 with heavy hexagonal nuts.
- 2.3 Angles, Channels, Beams, Bars and Rods shall be steel conforming to ASTM A-36 as applicable.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.
- F. Any electrical box, device, conduit, or enclosure installed in any fire rated column, wall, or ceiling shall not reduce the fire rating of said column or wall. The Contractor providing the device, box, conduit, or enclosure shall provide the required material to maintain the fire rating of the column, wall, or ceiling.
- G. At penetrations of fire walls provide fire barrier penetration sealing system in conformance with Section FIRESTOPPING. The sealing system shall have a 3-hour rating when tested in accordance with the provisions of ASTM E-119. Installation of penetration sealing systems shall be in accordance with manufacturer's instructions.
- H. Provide cover plates where conduit and raceways pass through ceiling or walls and are exposed in finished rooms. Flanges shall fit snugly and shall be sized to cover the openings. All escutcheons shall be chromium plated wing type with fastening screws.

3.2 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

3.3 EQUIPMENT CONNECTION AND WIRING

- A. Unless specifically noted otherwise on the Drawings or elsewhere in the Specifications, all wiring and all equipment connections shall be provided by the Electrical Contractor, including equipment requiring electrical services furnished under other sections of the Specifications or by the Owner.
- B. The Electrical Contractor shall furnish and install all disconnect switches, NEC circuit protection, motor controllers, relays, and devices as required for all equipment to provide complete and operable electrical systems, unless the items are specifically noted elsewhere as being provided with, or as part of, the equipment.
- C. Electrical Contractor shall verify voltage, phase, quantity of wires, and wattage of all equipment which requires electrical connections before equipment purchase or rough-in, and shall install branch circuits which are suitable in all respects for connection to, and operation with, the equipment furnished. Exact location of all equipment which requires electrical connection shall be verified with the equipment installer before rough-in.

3.4 EQUIPMENT INSTALLATION

- A. All equipment shall be installed at locations indicated and oriented so as to be easily accessible.
- B. Assembly and installation of equipment shall be in strict accordance with manufacturer's installation instructions. Equipment shall be securely anchored in place. Care shall be exercised to correctly orient equipment before securing in place.
- C. Cutting, Fitting, and Patching
 - 1. The Electrical Contractor shall do all cutting and drilling of masonry, steel, wood, or iron work and all fitting necessary for the proper installation of all electrical equipment and materials included in the Specifications or governed thereby.
 - 2. No cutting or drilling of the structure, of any kind, shall be done without first obtaining permission from the Architect. All cutting and drilling shall be done under the supervision of the Contractor in strict accordance with instructions furnished by the Architect.
 - 3. All patching and finishing shall be done by workmen skilled in the trades involved.

3.5 PERMITS, CERTIFICATES, LAWS AND ORDINANCES

- A. The Electrical Contractor shall, at his own expense, procure all permits, certificates, and licenses required of him by law for the execution of his work. He shall comply with all Federal, State, and local laws, ordinances, rules and regulations relating to the performance of the work.
- B. Following completion, a certificate of approval shall be secured from the local code enforcement authority and delivered to the Architect.

3.6 INSPECTION

- A. The Electrical Contractor shall, at his own expense, furnish electrical inspection as required by the local code enforcing agency, when applicable. The Contractor shall notify the Electrical Inspector in writing upon the start of the job and a copy of the notice shall be sent to the Architect. The Contractor shall furnish certificates of final approval by the Electrical Inspection Bureau and final payment shall be withheld until he has presented the Architect with the aforementioned certificates of approval.

3.7 PAINTING

- A. Refinish surfaces marred or damaged by electrical work to original or specified condition.
- B. Replace marred or discolored factory, multiple coat, baked on finish surfaces. Minor inconspicuous scratches may be "touched-up".

C. The following items do not require painting.

1. Equipment with a factory baked on finish.
2. Receptacle and switch cover plates.
3. Faceplates of instruments, equipment, and control panels.

END OF SECTION

SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Copper Building wires rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
- B. Related Sections include the following:
 - 1. Division 26 Sections:
 - a. "Common Work Results for Electrical"
 - b. "Hangers and Supports for Electrical Systems"

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. Wire and cable shall be manufactured with material selection tests as described in ASTM D3291 and EN 50497 to prevent plasticizer exudation from PVC insulated and sheathed cables.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. American Insulated Wire Corp.; a Leviton Company.
 - 2. General Cable Corporation.
 - 3. Senator Wire & Cable Company.
 - 4. Southwire.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and XHHW.

2.2 CONNECTORS AND SPLICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Hubbell Power Systems, Inc.
 - 3. O-Z/Gedney; EGS Electrical Group LLC.
 - 4. 3M; Electrical Products Division.
 - 5. Tyco Electronics Corp.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Branch Circuits: Copper. Solid or stranded for No. 10 AWG and smaller; stranded for No. 8 AWG and larger. Minimum conductor size shall be No. 12 AWG. MC cable is acceptable for branch circuits.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway, Metal-clad cable, Type MC.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls and ceilings, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems".
- F. Identify and color-code conductors and cables.
- G. No wiring shall be pulled until construction is such that there is no danger of moisture entering open raceways. Protect all openings with caps or plugs until final connections are made. Conduit shall be swabbed clean before pulling conductors.
- H. No thermoplastic conductors shall be pulled through raceways at ambient temperatures below 33oF.
- I. All insulated bushings shall be installed before pulling conductors.
- J. All wiring in panel gutters, pull boxes, and other accessible enclosures shall be tied and bundled with cable ties.
- K. Wiring shall be installed continuously between terminal points indicated or dictated by field conditions without intermediate splices or taps unless specifically authorized by the Architect. Splices shall be made only in junction or terminal boxes.

- L. Conductors shall not be subject to pulling tension in excess of 50 percent of yield strength of conductor. Pulling lugs shall be attached to conductor with a sleeve or grip over the cable sheath to prevent slipping the insulation.
- M. Where terminals and splices are taped with insulation tape, apply a minimum of two layers of electrical tape, half-lapped.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. All joints between conductors shall be made with wire connectors. Splices shall be in boxes and shall be accessible. Branch circuit conductors #10 AWG and smaller shall be spliced together using properly sized and listed spring type insulated conductors (i.e. wire nut) Conductors #8 AWG and larger shall be spliced using a non-insulated compression type sleeve or split-bolt connector with tape covering.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test conductors for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test.
- C. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

**SECTION 260529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.

1.3 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70.

1.5 COORDINATION

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
 2. Whenever possible, conduit shall be top mounted.
 3. Each conduit shall be individually clamped to supports.
 4. Parallel runs of conduit shall be grouped and fastened to walls with wall brackets of steel channel or knee-braced angles.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design

load used for strength determination shall be weight of supported components plus 200 lb.

- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To Wood: Fasten with lag screws or through bolts.
 2. To New Concrete: Bolt to concrete inserts.
 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 4. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight- aggregate concrete or for slabs less than 4 inches (100 mm) thick.
 5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
 6. To Light Steel: Sheet metal screws.
 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

END OF SECTION

**SECTION 260533
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes raceways, fittings, and boxes for electrical wiring.
 - 1. Metal conduits and fittings.
 - 2. Surface raceways.
 - 3. Boxes.
- B. Related Sections include the following:
 - 1. Division 26 Section "Common Work Results for Electrical".
 - 2. Division 26 Section "Hangers and Supports for Electrical Systems" for raceway and box supports.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. LFMC: Liquid tight flexible metal conduit.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Alflex Inc.
 - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
 - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 5. Electri-Flex Co.
 - 6. Manhattan/CDT/Cole-Flex.
 - 7. Maverick Tube Corporation.
 - 8. O-Z Gedney; a unit of General Signal.
 - 9. Wheatland Tube Company.
- B. EMT: ANSI C80.3.
- C. FMC: Zinc-coated steel.

- D. LFMC: Flexible steel conduit with PVC Jacket.
- E. Fittings for Conduit (Including all Types and Flexible), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Fittings for EMT: Steel compression type. Set screw fittings not allowed.

2.2 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Prime coated, ready for field painting.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems.
 - b. MonoSystems, Inc.
 - c. Panduit Corp.
 - d. Wiremold / Legrand.

2.3 BOXES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 - 2. EGS/Appleton Electric.
 - 3. Erickson Electrical Equipment Company.
 - 4. Hoffman.
 - 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
 - 6. O-Z/Gedney; a unit of General Signal.
 - 7. RACO; a Hubbell Company.
 - 8. Robroy Industries, Inc.; Enclosure Division.
 - 9. Scott Fetzer Co.; Adalet Division.
 - 10. Spring City Electrical Manufacturing Company.
 - 11. Thomas & Betts Corporation.
 - 12. Walker Systems, Inc.; Wiremold Company (The).
 - 13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Comply with the following indoor applications, unless otherwise indicated:
 - 1. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 2. Connection to Vibrating Equipment: FMC except use LFMC in damp or wet locations.

3. Boxes and Enclosures: NEMA 250, Type 1.
 - a. Minimum outlet box depth shall be 2 1/8 inches.
 - b. Four-inch octagonal outlet boxes shall be provided for wall and ceiling mounted fixtures. Outlet boxes shall be provided with fixture studs as required for mounting fixture.
 - c. Four-inch square outlet boxes shall be provided for switches and convenience outlet boxes. A 4 inch by 2 1/8-inch handy box may be used for these devices when only one raceway enters the outlet box.
 - d. Four-inch square outlet boxes shall be provided for voice outlets, data outlets, and other special system outlets unless larger outlet boxes are specified elsewhere.
 - e. Square cornered boxes shall be provided in block and brick wall construction.
- B. Minimum Raceway Size: 3/4-inch trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
- D. Install Surface raceways only where indicated on Drawings.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 12 inches away from parallel runs of flues and uninsulated steam or hot-water pipes, 6 inches if crossing. Where lines are insulated, conduit parallel or crossing shall be at least 2 inches away. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation. All conduit shall be swabbed and cleaned before pulling wire.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems". Conduit shall be securely fastened in place within 3 feet of each outlet box, junction box, cabinet, or fitting and shall be supported at least every 10 feet. No conduit shall be supported by the equipment to which it is connected.
- E. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- F. Conceal conduit and EMT within finished walls and ceilings, unless otherwise indicated.
- G. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- H. Surface Raceways:
 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 84 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- I. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for motors.
 1. Use LFMC in damp or wet locations.
- J. Metallic conduit systems shall be electrically continuous in their entirety.
- K. Outlet boxes shall be provided for all devices. Pull boxes and junction boxes shall be provided at all points

of splicing and tapping.

- L. Boxes shall not be installed back-to-back in any wall, but shall be staggered at least 12 inches apart.
- M. Boxes and supports shall be fastened to wood with wood screws or screw-type nails of equal holding strength with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry block and with screws or welded studs on steel work.
- N. Threaded studs driven in by powder charge and provided with lock washers and nuts, or nail-type nylon anchors, may be used in lieu of wood screws, expansion shields or machine screws.
- O. Outlet boxes in lay-in ceilings shall be supported by bar hangers anchored to the ceiling construction.
- P. Connections between outlet boxes on the opposite sides of a wall shall be made with conduit employing the use of two 90-degree bends from box to box.
- Q. All boxes shall be accessible.
- R. Conduit shall be run with smooth, easy bends. Exposed conduit or surface raceway as indicated shall be run parallel or perpendicular to walls, ceilings, beams, and columns. Concealed conduit may be run at angles other than parallel or perpendicular to building lines but shall be grouped in a neat and workmanlike manner. Dissimilar angles and crisscross arrangement will not be acceptable.
- S. Conduit bends and elbows shall be long-sweep, large radii when required by cable manufacturer.

END OF SECTION

**SECTION 260923
LIGHTING DEVICES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Indoor occupancy sensors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show installation details for occupancy sensors.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Cooper Industries, Inc.
 - 2. Hubbell Building Automation, Inc.
 - 3. Leviton Manufacturing Co., Inc.
 - 4. Lithonia Lighting; Acuity Brands Lighting, Inc.
 - 5. Philips Lighting Controls.
 - 6. Sensor Switch, Inc.
 - 7. Watt Stopper.
- B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor, suitable for mounting in a single gang switchbox.
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F.
 - 3. Switch Rating: Shall match fixture type being controlled.
- C. Wall-Switch Sensor:
 - 1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft..
 - 2. Sensing Technology: Dual technology - PIR and ultrasonic.
 - 3. Switch Type: SP, field selectable automatic "on," or manual "on" automatic "off."
 - 4. Voltage: Match the circuit voltage type.
 - 5. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

- A. Install and aim sensors in locations to achieve coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 WIRING INSTALLATION

- A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Lighting control devices will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Occupancy Adjustments: When requested within 6 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

END OF SECTION

SECTION 262726 WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Snap switches.

1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.
- C. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
 - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 - 3. Leviton Mfg. Company Inc. (Leviton).
 - 4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

- A. Duplex Convenience Receptacles – Tamper resistant, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, UL 498, and FS W-C-596.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper.
 - b. Hubbell.
 - c. Leviton.
 - d. Pass & Seymour.

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, FS W-C-596 and UL 943, Class A, and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles – Tamper resistant, 125 V, 20 A:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper.
 - b. Pass & Seymour.
 - c. Leviton.
 - d. Hubbell.

2.4 SNAP SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-C-596.
- B. Switches, 120/277 V, 20 A:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cooper.
 - b. Hubbell.
 - c. Leviton.
 - d. Pass & Seymour.

2.5 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
 1. Plate-Securing Screws: Metal with head color to match plate finish.
 2. Material for Finished Spaces: Stainless steel.

2.6 FINISHES

- A. Device Color:
 1. Wiring Devices Connected to Normal Power System: Color to be selected by Architect.
- B. Wall Plate Color: Stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
 - 1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
- D. Device Installation:
 - 1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
 - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
 - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
 - 6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
 - 7. When conductors larger than No. 12 AWG are installed 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - 8. Tighten unused terminal screws on the device.
 - 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
 - 1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Ground Impedance: Values of up to 2 ohms are acceptable.
3. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
4. Using the test plug, verify that the device and its outlet box are securely mounted.
5. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION

SECTION 265119
LED LIGHTING

PART 1- GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes the following types of LED luminaires:
 - 1. LED Luminaires.
 - 2. Materials.
 - 3. Finishes.
 - 4. Luminaire support.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. LED: Light-emitting diode.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
 - 5. Photometric data and adjustment factors based on laboratory tests.
 - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

- B. Provide luminaires from a single manufacturer for each luminaire type.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

PART 2- PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Standards:
 - 1. ENERGY STAR certified.
 - 2. Recessed luminaires shall comply with NEMA LE 4.
- C. Lamps dimmable from 100 percent to 0 percent of maximum light output.
- D. Internal driver.
- E. Nominal Operating Voltage: As indicated.
 - 1. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

2.2 MANUFACTURERS

- A. In Lighting Fixture Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selections:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.3 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- C. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

2.4 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece.

2.5 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems".
- B. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling.
 - 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
- E. Ceiling-Grid-Mounted Luminaires:
 - 1. Secure to any required outlet box.
 - 2. Luminaire installed in or on lay-in ceiling system shall be supported independently of the ceiling system grid with No. 14 galvanized support wires at two opposite corners of the fixture from the building structural system.
 - 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- F. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.

END OF SECTION